

STUDIES IN JOB EVALUATION

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STUDIES IN JOB EVALUATION :

AN INVESTIGATION INTO THE EVALUATION OF
 JOBS IN A LARGE HETEROGENEOUS GROUP
 OF AFRICAN WORKERS.



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Il cherche la fameuse machine à peser
les balances.

Jacques Prévert.

Tell me, which is greater, the man
who sits at table, or the man who
serves him? Surely the man who sits
at table; yet I am here among you as
a servant.

Luke 22, 27.

To Rita,

to her endurance,

and to her very tangible
achievements.

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SUMMARY

1. Wage differentials have been known to exist since the beginnings of a money economy. They are used, at present, in all the economies of the world.
2. Economic wage theories endeavour to explain differentials as consequences of the principle of supply and demand. The application of this principle to the labour market is questioned.
3. Job evaluation is a technique of occupational psychology which endeavours to apply principles of judgment to the determination of wage differentials. Job evaluation follows job analysis.
4. The historical development and various techniques of job evaluation are described. The concept of the job is discussed at length and found to lack precision. Current research in job evaluation is reviewed.
5. This study comprises two experiments which were carried out in the context of a job evaluation assignment, dealing with African jobs. The position of the African in the South African economy, and the manner in which his wages are determined, are briefly described.
6. The conceptual nature of job analysis is established. The first experiment is designed to test the hypothesis that European analysts, evaluating African jobs, will be influenced in their judgments by the particular group of jobs they happen to be studying. The hypothesis is found to be partly correct. Analysts appear to start with a set that African jobs are not important, and discard it only after a prolonged and uninterrupted exposure to Africans doing skilled jobs. Analysts are guided by their immediate experience in the manner in which they collect and present material about jobs.

8. The nature of value and the value judgment is discussed. Studies dealing with attitudes to work are reviewed. The second experiment tests the hypothesis that the concepts used in the evaluation of jobs and the relative importance attached to them are the same for a sample of European management officials as they would be for Africans at various occupational levels. The hypothesis is partly confirmed. Judges use the same broad concepts, but attach different importance to them. This appears to be due to the fact that they have different experiences of work.
9. The consequence of our experiments are briefly discussed, more especially the relevance of knowledge to the process of evaluation, the desirability and consequence of consulting Africans when their wages are determined, and the manner in which the principle of equity can be considered within the pragmatic limitations of the South African situation. The relation of wage practices to the overall managerial policy of the organization is considered.

CHAPTER I

INTRODUCTION

1. Wage differentials.

This study deals with some aspects of the problem of wage differentials. We mean by this the differences in earnings of individuals for the work they do.

Wage differentials are significant in an economy which uses money and which has furthered the specialization of work to the level where division of labour becomes practical. Postan and Rich (143) discuss in their economic history the particular relevance of money to the existence of wage differentials. The development of money aimed primarily to remove the difficulties of barter. Money began with the adoption of a commodity - generally acceptable - as a medium of exchange, e.g. precious metals, gems. This led in turn to the development of coinage; coins obviated many of the difficulties encountered in transacting with the raw commodity, i.e. weighing and assaying it. The minting of coins however could only result from the growth of a central institution which would guarantee the value of the coins. Once this was achieved there resulted a common denominator of exchange value. It is at this juncture that wage differentials became meaningful, simply because money is available as a reliable unit of comparison. Postan and Rich argue that the elaborate division of labour, based upon exchange, and which characterize modern economic systems would not be possible without the services of money.

Differentials in wages paid can be traced back to the 4th century B.C., Michell (125) quotes records from Eleusis, a town just outside Athens. They showed that the daily wage of the free and unskilled labourer was 1.5 drachma, that of the sawyer of wood 2 drachma and that of artisans such as bricklayers, carpenters and plasterers was 2.5 drachma. The records at Eleusis give perhaps the earliest distinction made between unskilled, semi-skilled and skilled workers. The ratio between these rates is 1 : 1.3 : 1.7.

The relative value of work in Ancient Greece was however more dramatically illustrated by the price of slaves. An unskilled labourer fit only for the roughest work, and mostly employed in the silver mines was worth 150 drachma. A cabinet worker was worth 400. An armourer or a skilled builder fetched up to 1,200. A slave exceptionally qualified to act as a foreman in the mines would fetch as much as 6,000 drachma. The ratio between these prices is 1 : 2.7 : 8 : 40.

Diocletian in his edict of 301 A.D. (51) listed the wages which should be paid to various occupations. The manual labourer earned 11 denari, the bricklayer 22, the marble cutter 26, the painter 32, and the decorative painter 65. This established the following ratio between unskilled and highly skilled occupation 1 : 2 : 2.4 : 3 : 6. An interesting observation is the distinction which Diocletian drew between teachers. An ordinary teacher could charge 22 denari per pupil every month. A teacher who taught arithmetic could charge 33 denari, whereas one who taught Greek or geometry could charge 87, establishing a relationship of 4 : 1.5 : 1.

Differentials in wages paid were operative throughout the Middle Ages. Roger in his "Six Centuries of Work and Wages" (149) gives ample indication of the nature and the extent of these differentials in England. In the 13th century, the unskilled hand would earn £2.10. a year, the artisan up to £5, depending on his reputation, establishing therefore a ratio of 2 : 1. In the 15th century distinctions are made between two grades of artisans. The free mason was paid £8. 8. a year and a raw mason £6. 3., establishing within this group of skilled workers a ratio of 1.4 : 1. The free masons were so called because they could carve free stone. This was ungrained stone which could be worked in any direction. They dressed stone, used in the core or inner part of walls, and would carve tracery, pillar capitals, and other work of an intricate nature. When the free mason's work had been tried with square and mold to see that the angles of the surfaces and the profile or pattern were accurate, then the raw mason would set the stones truly with a plumb line.

In the 16th century the wage of the artisan was 4 shillings a day, that of the labourer 2 shillings (ratio 2 : 1). In the 17th century the wage of the artisan is given as £15. 13. a year, that of the labourer as £10. 8. 8. a ratio of 1.5 : 1. In the 18th century the one differential which is worth noting is that attached to the factory system. A woolcomber would earn 13 shillings a week, whereas calimanco weavers only got 5/9 a week (ratio 2.2 : 1). The woolcomber had by far the more strenuous job, and any negligence from his part would result in substantial losses of valuable raw material.

And on to modern times. The practice of wage differentials is common to all economies. We experience it regularly in our Western capitalistic society. Wage differentials are common in the planned economies of the East (82). The wages committee of the Council of Ministers in the U.S.S.R. made recently proposals regarding skill differentials, with ratios between the lowest and highest category of 2 : 1 for the clothing industry 2.8 to 1 in the engineering industry and 3.2 to 1 in the ore mining industry.

We have established in this brief review of a facet of economic history that differentials in earnings have occurred since the earliest money economies. The magnitude of such differentials have tended to fluctuate with time, but they appear to have retained certain recurring characteristics. The skilled man consistently earns more than the unskilled man. Within skilled jobs, the more skilled appears to earn more than the less skilled. We found this illustrated in the decree of Diocletian, and much later on in the distinction made between free- and raw-masons.

We conclude that wage differentials are not only universally applied, but that they have acquired through their long historical existence the force of a well established tradition. This is perhaps best illustrated in the fact that prominent writers on the topic of wage differentials accept as self evident the principle of wage differentials. Jaques (85) for example writes:

"It may seem self evident that individuals engaged in employment work expect differential reward for differential responsibility carried. The notion of a fair return for work done, a 'rate for the job' notion, is certainly widely held."

Authoritative writers on the planned economies of the East (82) have indicated moreover that the transition from the inferior phase of communism (where the system of wage differentials predominates in the accepted maxim "To everyone according to his work") to the superior phase of communism, where wage differentials will be abolished, and where everyone will receive "according to his needs", depends on the nature of man having undergone a profound change. Such a change will, it appears, not take place before the end of the present century.

We shall accept therefore the existence of wage differentials as important enough to warrant study.

2. Theories of wages in economics.

Though we generally accept that wages must differentiate between occupations, the basis on which differences must be determined is not known. This has formed the subject of much speculation among economists and has resulted in the formulation of various theories of wages.

Economic theories, of which wage theories are a particular example, are conditioned by the institutions of the economy in which they are conceived. Theories of wages are derived from the role wages play in the functioning of the economy. Commenting on this, Dunlop (40) wrote that "there is a deep seated intellectual habit for writers on wage determination to generalize from the experience of their own country. They tend to assume the unique validity of their native institutions". He mentions among those factors in the economy which affect thinking on wages, the relative isolation from world trade, the degree of industrialization and its stage of economic development, whether it suffers from chronic underemployment, whether it is subject to inflation.

This view is substantiated in a way by the earliest known theory of wages. It was formulated by St. Thomas Aquinas (121). We can hardly consider St. Thomas as an economist, but his views on wages acquire importance by virtue of the fact that he was the leading representative of mediaeval thought, and that he is the first known person to have discussed the problem of wages and their differentials.

St. Thomas wrote that a just wage was one which permitted its recipient to live in a manner appropriate to his position in society. St. Thomas was no doubt influenced by his philosophy of a static society, characterized by a rigid class structure. He argued that the type of work an individual performed as well as his place of work was largely determined by his birth, and that wages should take cognizance of this fact. Matchet (121) points out that to St. Thomas wages had a single function: the distribution of income.

The views of St. Thomas are rejected nowadays because we talk generally of dynamic societies. In such societies, wages have the second function of allocating labour to the various occupations and productive enterprises. St. Thomas' views have however an interesting echo in modern times. The restrictions placed in South Africa on workers of Bantu extraction follow the argument that the type of work an individual performs, as well as his place of work, is largely determined by his birth. Another interesting relation between St. Thomas' views and modern times is the implication that the cost of living of the worker should be a first charge on production. This is at the basis of minimum wage legislation common in countries like Australia and Great Britain.

Theories of wages have developed substantially since the days of St. Thomas. Their major contribution has been to explore extensively the concept of supply and demand. It is important to note that these theories have rarely been formulated per se, but were incorporated in some major essay on political economy.

The principle of supply and demand stems from the observation that employers bid against each other for labour. The principle was formulated elegantly by John Stuart Mill (127) in the following manner:

"Demand and supply, the quantity demanded and the quantity supplied, will be made equal. If unequal at any moment, competition equalizes them, and the manner in which this is done is by an adjustment of the value. If the demand increases, the value rises, if the demand diminishes, the value falls. Again, if the supply falls off, the value rises, and falls, if the supply is increased the value which a commodity will bring in any market is no other than the value which in that market gives a demand just sufficient to carry off the existing or expected supply" (127).

Mill formulated the principle of supply and demand for commodities in general. However the principle has been applied to wages, as to many economists, wage is no more than a price for the commodity of labour. Hicks (69) wrote that: "The theory of the determination of wages in a free market is simply a special case of the general theory of value. Wages are the price of labour; and thus in the absence of control, they are determined like all prices by supply and demand". One notes that the main function of wages, seen here as a price is to maintain the equilibrium between demand and supply.

The earliest of the modern wage theories to deal with this concept was formulated by Ricardo in the "Principles of Political Economy" (146). He deduced his theory from the population theory of Malthus (that the population of the world if unchecked would double itself every 25 years, while food supplies produced under conditions of diminishing returns increase more slowly). Ricardo stated that wages should be just about sufficient for a worker to maintain life and to ensure his reproduction. If wages are below this level then the working class will diminish in number, the supply will be cut and wages will go up. If on the other hand, wages go up, the well-being results in increased number of children. The supply of labour will increase and so wages will go down.

This theory which has come to be known as the "Subsistence theory of wages", led Thomas Carlyle to refer to economics as: "that dismal science". Malthus and Ricardo were contemporaries of the early Industrial Revolution when the population of the Western countries grew at an extraordinarily rapid rate, and when technological developments were still in their infancy. The theory was proved invalid by subsequent trends. The population did not continue to increase at the predicted rate. The technological advances were much greater than had been anticipated. The increase in productivity was so great that real wages rose substantially.

Dissatisfaction with Ricardo's theory led to the formulation of the "Wages Fund Doctrine". Though many economists contributed to its development, the doctrine was prominent in the writings of John Stuart Mill. Dobb (36) gives a fair condensation of the doctrine. It was seen as a departure from Ricardo in that emphasis was placed on the factor of demand. The theory was based on the Protestant concept of capital developed by Senior, i.e. capital is abstinence from consumption.

The wage fund doctrine states that the total amount available for wages is constant in the short run. As capital provides the fund from which employers advance wages to labourers, their wage is determined on an average by the amount of this fund divided by the number of workers. The wage fund would increase in the long run in proportion to the growth of capital. Higher wages would result from a larger amount of savings and investments.

The theory, though rejected in Britain, because it failed to take into account union activities, appears to guide much of the current thinking by South African economists. The argument is frequently put forward that the wages of African workers cannot be raised as they are related to productivity, and availability of capital is one of the factors determining productivity.

Virile union activity in Britain did much to negate the validity of the theory. Workers showed little inclination to wait patiently for the accumulation of capital or for a reduction in their numbers before wages would be

raised. The theory failed moreover to establish any quantitative relationship between a wage fund and the amount of capital available.

Both the two previous theories focussed attention on a single facet of the concept of supply and demand. Ricardo concerned himself solely with the concept of supply. The wage fund doctrine discussed solely the concept of demand. The marginal productivity theory which followed was an ambitious attempt to explain not only the general level of wages, but the entire wage structure of a highly competitive economy, in terms of both supply and demand.

What contributed most to the form of this new theory was the increasing fashion among economists at the end of the XIX century to think in terms of small increments added or subtracted at the margin. As Dobb (36) puts it "economists were at this time trying to explain the price of a commodity in terms of the extra utility - or satisfaction - to consumers yielded by the final or marginal unit of a given supply: given x-hundred bushels of wheat, the price per bushel would measure the utility of the x-hundredth bushel to some one or other of the purchasers". We see once more the direct analogy between the price of labour and the general price of commodities. As however labour satisfied consumers' wants indirectly, i.e. by turning out a product, the marginal value of labour was seen as determined by the extra product yielded by the addition of labour to some marginal unit. This is a special instance of the law of diminishing returns. All other things remaining equal, the net addition to the total output which is obtained by hiring an additional employee decreases as the number of employees increases.

The theory rests on a number of assumptions. The employer is seen to behave in such a manner that he will maximize his profits. This means that he will continue to hire additional labour as long as the revenue produced by the addition of a worker exceeds the cost of hiring him, i.e. the wage he will be paid. The worker also seeks maximal profit. He is highly mobile and will move from low wage to high wage firms. But the wage he

will be paid will not exceed the value to the employer of the net product, i.e. how much would be added to the total output of his factory if he employed an additional man. These assumptions are bracketed under the term of perfect competition. For it is assumed further that no firm by its own decisions can affect the price of the commodity it sells, or of the labour it hires. We must stress again that labour is completely mobile, and that employers and employees have knowledge on which to judge their best interests, simply seen as maximal personal gain.

The theory can be confusing if one ignores the fact that it does not yield the wage a typical employer will pay, but rather that it indicates the amount of labour he will hire at a given rate. Generally speaking the higher the wage, the less labour he will employ. Supply and demand each depend on the wage rate - the one rising, the other falling as the wage rate rises. The equilibrium which is arrived under conditions of perfect competition results in an allocation of labour which is the most efficient possible - given the existing income distribution and the pattern of consumer wants.

The theory was hailed by many at its initial exposition as complete and final. It has been since then the subject of much criticism and has served perhaps as the most important stimulus for discussion of the basis of wage differentials.

Dobb (36) notes the essential weakness of the theory. "It is important ... to bear in mind that the marginal net product of labour depends not only on the supply of labour but also on the supply of all other factors of production; and when this has been said, the theory is robbed of much of its apparent simplicity and finality". The scarcity of capital, the efficiency with which the industry is organized, the existing state of technique, the distribution of consumers demand between different products are factors which determine the marginal net product as well as the intrinsic efficiency of labour itself.

Two additional criticisms have been levelled against the theory:

1. Its basic assumptions are challenged

1.1 All business conduct cannot be interpreted in terms of profit maximization. Simon (159) gives perhaps an apt aphorism when he says "Administrative theory is peculiarly the theory of intended and bounded rationality - of the behaviour of human beings who satisfice because they have not the wits to maximize".

Pierson (141) in his evaluation of wage theories notes that much managerial action is taken quite without knowledge of how it fits into a theoretical scheme. "Status as a dependable supplier either to big scarce customers or to millions of adherents to brand (corporate) names, vies with price and profit as a dominant factor in managerial wage decisions". On the whole, business decisions are not predicated on present prices but on estimates of the future.

1.2 There is a lack of true mobility of labour. A recent I.L.O. publication (81) points to the fact that mobility is primarily a social factor. Some groups may tend to change jobs more frequently than others. The actual possibility of change is limited moreover, especially in jobs other than the lowest paid. Four reasons are listed:

1.2.1 A worker accumulates experience and knowledge which though of value to his present employer is of lesser value to a new employer.

1.2.2 Workers cannot move indiscriminately at short notice from one job to another throughout the economy. The special training the man has received restricts him to certain types of occupations. Inertia may be increased by custom or legislation.

1.2.3 Workers may be congenitally incapable of acquiring skills required in the better paid jobs - or else unable to pay for the necessary training.

1.2.4 Workers are generally not well informed on alternative opportunities for employment.

2. Wage rates affect productivity

The assumption of the theory that productivity affects wage rates is not correct, as they in turn affect productivity. The theory therefore fails to take into account the influence of high wage rates on productivity.

Increased wages may make employees more efficient. They have more money to spend on themselves, they may feed themselves better and have greater energy resources to draw from. Jaques (85) points out that increased wages which take cognizance of the responsibility and aspiration of the worker results in better motivation to work.

Increased wages may in turn make employers more efficient by shocking them into introducing improved techniques of production. Dunlop (40) writes categorically on this issue "The strong pressure of unions for higher wages ... has undoubtedly helped to raise the standard of living because this pressure has forced management to work harder to keep down labour costs and has thereby accelerated technological progress". Wooton (179) quotes numerous instances of this having taken place in the building, coal mining, cotton textile, railway and engineering industries of Great Britain.

If we are to reject the theory of marginal productivity, what can we put in its place? The general consensus of opinion (40,141,179) is that no new comprehensive theory has emerged which would take the place of the classical models described so far. We are told that though the theory of marginal productivity has been severely criticized, it is still widely held because its most severe critics were not able to offer an acceptable alternative.

Wage theories have done little to explain the nature of wage differentials beside formulating that they are a function of the principle of supply and demand. Each of the three major theories we have discussed goes a bit further in considering how the principle applies to wages in general and, by inference, to wage differentials in particular.

The failure of economists to explain the phenomenon of wage differentials more fully stems possibly from an uncritical acceptance of the principle of supply and demand. They do not appear to take into account the bewildering complexity which underlies this principle. This may be due as suggested by Wooton (179) to "the tendency of economists to select one element in the picture namely the equalizing process, giving this logical priority, whilst all others are relegated to the secondary role of interferences". In addition to this there is the tendency of economists to argue from simplified psychological premises, possibly due to the magnitude of their field of enquiry. The extent to which this is the case will appear from a critical examination of the principle of supply and demand.

3. Critique of the principle of supply and demand.

When a theory which endeavours to predict human behaviour fails, we can assume that it lacked initially an adequate empirical basis. This phenomenon has frequently been observed in psychology with the rise and decline of various schools. In essence the pattern is repeated over and over. Experimentation, speculation throws light on some aspects of behaviour, a theory is formulated and is either disproved by further experimentation, or else it is shown not to have taken account of conflicting evidence.

The principle of supply and demand is in actual fact a theory of human behaviour. It has grown out of observation and introspection. It shares the same starting point as economics: the needs of the individual. The community he lives in shares the task of satisfying these needs. It produces a number of commodities which are exchanged for a common unit of value, and so acquire a monetary price. Repeated observations have shown that the price of a commodity will fluctuate according to this phenomenon of supply and demand. If there is a glut of the commodity, prices go down. If the commodity is in short supply prices go up. Why then can it not be said that the wage a worker is paid, and which is after all a price, will respond to the phenomenon of supply and demand? Why can this principle not be applied to the commodity of labour with the same apparent validity that it can be applied to any other commodity?

To begin with, even with the most inert commodities, its purchase, that is, its demand will result from an involved personal decision. Such a decision, as Simon (159) has pointed out, may be rational or irrational, and when it is made it will be the result of a number of conflicting alternatives. As the individual will have a limited amount of money to spend, any decision to purchase a commodity will restrict him from deciding to purchase other commodities.

The supplier of the commodity - unless he works against a tender - is never quite certain that there will be a demand for his commodity. He goes by precedent, and assumes that if a need was felt in the past it is likely to be felt in the future. He actively fosters this need by direct or indirect advertisement. If he operates in a free market, the commodity he produces may be challenged by competing commodities. He feels reasonably safe because he knows that to produce a commodity requires an accumulation of experience and capital, and this reduces appreciably the number of challenges he may have to face. As he knows that every decision to buy his commodity restricts the individual in his choice of other commodities by reducing the price, or extending credit, he gives the purchaser greater freedom of choice.

We note therefore that a complex and often conflicting process of decision-making underlies the process of supply and demand. The theory of motivation which the principle of supply and demand postulates for the individual and the concrete decision to purchase a commodity may in practice not be directly related.

If the process of supply and demand of inanimate commodities is in actual fact so complex, it becomes even more complex when we apply it to the labour market. For the process of focussing attention on the individual decisions which underlie supply and demand becomes even more important. We no longer deal with inanimate commodities each subservient to the general decision of the producer, but with individuals each with his own needs living in a culture with highly significant norms. Wooton (179) points out that any attempt to explain trade union activity in terms of models based on monopolistic selling involves

an important fallacy. A monopolist may anticipate larger profits from limited sales at a high price. A trade union official dare not consider leaving a number unemployed so that those employed will earn a high wage. With inanimate commodities both credit and debit items fall within the same business. They are part of a straight-forward business calculation. The loss of income due to unemployment and the gain from higher wages accrue to different people. There are, therefore, a number of complicating factors all pointing to the fact that man in search of work does not behave like a bag of potatoes in search of a buyer.

Man, as a supply element, brings to bear in the labour market a process of decision-making which no other commodity can exert in any other market. His decision to sell his labour to an organization, may be the compound of a number of factors, of which the price of labour is one (28).

There is a fair amount of evidence to support our views. An economic survey completed by the United Nations in 1955 (173) quotes two studies carried out in Sweden and in Britain. It found in Sweden, that even among young workers, the prospect of higher wages was not the main motive for moving out of jobs. Wages as a motive were found in only one third of the cases. It quotes other Swedish investigations as having found that wage comparisons are less important as a motive for moving into relatively high wage jobs than as a motive for moving out of relatively low wage jobs. The study in Britain showed that wage comparisons played a minor role as an inducement to middle aged workers to move, whereas it was quite important for young workers. Similar studies carried out in the U.S.A. gave essentially the same results. The report concludes that comparisons of actual differences in earnings are less important as a motive for movement between occupations, industries and firms than is often supposed.

Another important consideration is the fact that inanimate commodities serve generally a more rigid function than would be served by an average worker. To the general buyer potatoes are used as food. Potatoes cannot be used as reading matter. They serve a single function resulting from the demand for food. A worker on the other hand by virtue of his flexibility in the work situation may

materially affect the demand of an employer. The demand for labour results from an administrative decision to create a job. The needs of the organization may however be better perceived by the incumbent who in turn may with experience and talent create a different demand than the one which leads to his appointment. The inter-relationship between worker and employer is potentially much more complex than that between a commodity and purchaser.

The labour market, as we pointed out earlier on, functions within a culture. There are many indications that strong cultural forces act on the mechanism of supply and demand of labour, and interfere significantly with it. Wooton (179) makes a very convincing case for her thesis that "pay and prestige are closely linked". She states that in spite of some exceptions, it is the rule that the high prestige person, should be also the highly paid person, and vice versa. "Once this rule is admitted as a factor in its own right, it is remarkable how effectively it explains much that on a purely economic hypothesis has to be explained away". Among the numerous arguments which she presents to support her thesis two are of particular interest. There is to begin with the well established practice of dividing the wage structure into roughly defined areas with strong social undertones. Traditionally, all the posts that involve the exercise of much power rank as salaried, and most of those in which the work is physically disagreeable or exhausting are classified as wage earning. She produces substantial evidence to prove that the distribution of earned incomes still runs parallel to social classification.

The second argument has a more direct bearing on the principle of supply and demand. She points out that according to economic theory the monetary and other advantages of any occupation will tend to balance one another. This means that jobs involving disagreeable or dangerous work or inconvenient or long hours will be more highly remunerated than those which do not. She finds the number of hours worked per week in a number of jobs belonging to the lower occupational groups. She correlates these figures with the wages paid to these jobs over a number of years. The correlations are all negative, and

significant ranging from -0.189 to -0.465 . These findings are corroborated by an independent study (31) carried out in South Africa by the National Institute for Personnel Research. The study dealt with an evaluation of jobs done by Africans. It found that the estimated amount of physical effort involved in a job correlated negatively and significantly with the wage -0.273 . A small but not significant negative correlation was found between wage and the work surroundings -0.068 . In view of the large number of jobs involved in this study ($N = 1,090$), this small correlation should also be noted.

Added support at the other end of the wage continuum comes from Simon (160). He reports that the distribution of executive salaries is not unambiguously determined by economic forces, but is subject to modifications through "social processes that determine the relevant norms". These norms establish the ratio of an executive's salary to the salaries of his immediate subordinates.

The principle of supply and demand as formulated at present is deficient in many ways. It fails to explain in full the determination of wage differentials. We doubt whether their determination could be explained satisfactorily on the basis of a single rule of behaviour. Pierson (141) expressed his doubts in this matter when he wrote that "there is an element of uncertainty or even indeterminateness in wage setting which earlier economists were inclined to minimize".

The determination of wage differentials presents us in reality with a double task. We must on the one hand collect sufficient empirical evidence to establish more accurately the relationship between wage differentials and labour mobility. This is in the nature of a long term project which will take many decades to complete. A number of methodological problems would need to be resolved. We would need to know the relationship between attitudes expressed and actual behaviour. We would investigate all possible aspects of labour turnover, the true economic behaviour, and what in actual fact makes a worker feel he is paid a fair wage.

The second task is capable however of a much simpler solution. It is the task industrialists continuously face when they are called upon to decide what wages personnel will be paid, what incremental policies to adopt. Decisions are often made in an ad lib manner based essentially on the intuition of the industrialists and administration. With time inconsistencies take place and decisions become increasingly more difficult to make. The need for determining wages on a rational basis becomes quite marked. How this can be done forms the basis of the following chapter.

4. A rational basis for wages.

The need for a rational basis for wages is clearly seen when we consider that most wage rates are administered wage rates. The failure of economic theory to provide so far a rational basis on which to determine wages is possibly due to this fact. The point was taken up by Reynolds and Taft (145). They present substantial evidence to prove that the influence of economic forces on wages is mediated through administrative decisions rather "than expressed directly in the market place".

If this is the case we must consider next the situation in which these decisions are made. Simon (159) in his study of administrative behaviour indicates that organizations are administered in a context of inadequate information. This is the reason why we speak of the art rather than the science of administration. It means that day to day decisions are generally made against a background of uncertainty. The consequence this has on the formulation of wage policies was stated in plain terms by Holden (72). "The complete absence of a rational foundation for the wage structure, the unrestricted freedom of foremen to say to one of their employees "I'll give you a rise if you tell no one else", shop politics and several practices contributing to wage inequalities have made them the serious problem that they are to-day".

The formulation of a rationale on which to base the determination of wages has the clear advantage that decisions concerning them maintain a pattern of continuity.

Contradictory decisions are reduced appreciably. Workers feel less uncertain about their pay, and consider the environment in which they work to be more predictable.

In the absence of any definite contribution from economics, there has developed in occupational psychology, the technique of job evaluation. Psychology has a legitimate interest in the field of judgment. The application of knowledge in this field to the problem of wage determination has resulted in job evaluation. The technique endeavours to establish a consistent and systematic basis on which to determine wages and to compute differentials between jobs. The technique will be described and discussed at length in the following chapter.

CHAPTER II

JOB EVALUATION

1. Definitions of job evaluation

Job evaluation is a technique in the original sense of that word, i.e. it is the skilful and mechanical application of the methods and the knowledge of an art. The art to which job evaluation belongs is that of administration. Though job evaluation, like management, is rarely referred to as scientific, this does not preclude the development of a science of job evaluation. This would be an endeavour to study the methods and problems of job evaluation, in a systematic, reliable and precise manner.

The most frequent use of job evaluation has been to establish a basis for wage differentials. This is stated explicitly by Livermash (109): "Job evaluation is a formal procedure for determining wage differentials. The approach is a systematic appraisal of job requirements and job conditions: the skill, responsibility and physical effort demanded and the favorability or unfavorability of working conditions".

Numerous definitions of job evaluation are available. As is commonly the case, these definitions reflect the major discipline and interest of their respective authors. To Jaques (84), for example, job evaluation concerns itself with the problem of "how to determine the appropriate payment and status for individuals for the work they do. By appropriate is meant a payment and status accorded in such a manner that each one has a sense of fair and just return for his work". Jaques as a social psychologist with a psychoanalytical bent is keenly interested in social dynamics. He stresses the relationship between pay and status because to him this is at the core a social problem which evokes powerful emotions about economic security and about the value society attaches to one's own work as compared with that of others. To an economist like Dunlop (41) on the other hand, job evaluation is an analytical procedure which has broadened the scope of wage theory to include institutional as well as the classical market considerations. The wage theory which Dunlop has begun to formulate, borrows heavily from the job evaluation technique developed by Benge (10).

Most of the definitions we have come across stress the relative aspects of job evaluation. The British Institute of Management (17) defines it as "the process of analysis and assessment of jobs to ascertain ... their relative worth". Bengé (10) writes plainly that: "all systems for establishing wage rates are relative". Doohar and Marquis (37) define job evaluation as "the process of determining the relative worth of a job in relation to other jobs".

Some definitions are more elaborate than others. They incorporate a brief description of the method used or else discuss the limitations inherent in job evaluation. Patton and Littlefield (137) define it as "a systematic approach to the problem of establishing fair pay differentials ... it employs of necessity judgment to a considerable extent, but it is a systematic, carefully controlled type of judgment, based upon the best factual information available". A recent I.L.O. publication on job evaluation (81) defines it as "an attempt to determine and compare the demands which the normal performance of particular jobs makes on normal workers, without taking account of the individual abilities or performance of the workers concerned".

We prefer this definition to all others because it clearly reflects the limitations of job evaluation. Job evaluation is said to be an "attempt". This denotes the lack of precision and finiteness inherent in it. It is an attempt, very much in the manner of saying "we shall try to do something, but we cannot vouch for the end result". Job evaluation like scientific research has an element of uncertainty attached to it.

The operative word in the whole definition is the word "normal" repeated twice. Job evaluation is concerned with normal performances of normal workers. This means that the technique deals essentially with a conceptual average which may have no counterpart in reality. We arrive at this mental picture of a normal performance by a normal worker through a process of cumulative estimates known as job analysis.

2. Job analysis.

Most of those who have written on the subject of job evaluation, state categorically that job analysis precedes the process of evaluation. This was implicit in the final definition we quoted, viz. the I.L.O. publication on job evaluation (81). Before the demands of jobs could be compared they had to be determined.

An interesting simile is drawn by Wooton (179). She writes that "Job evaluation is merely a convenient name for the systematic and impartial pricing in the labour market, quite closely comparable to modern pricing of merchandise. The latter is made possible by adequate cost analysis, the former by adequate job analysis".

Otis and Leukart (135) state more implicitly the relationship between job analysis and job evaluation. "Job evaluation - the complete operation of determining the value of a job in relation to other jobs in the organization - begins with job analysis to obtain job descriptions and job specifications, and includes the process of relating the descriptions by some system designed to determine the relative value of the jobs or groups of jobs".

Kershner (92) in his authoritative review of job analysis considers the field of job analysis to be the wider one and to include job evaluation.

The end result of job analysis is to produce a written description of the job or the major tasks which go to comprise it. Mallart (117) claims that the earliest recorded job descriptions were produced in the XVII century by the Spaniard Suarez de Figueroa. It is reasonably safe to assume however that tasks have been analyzed and described since the beginnings of civilization. The transmission of skills from one generation to another must have been preceded by some analysis of the particular activities to be learned. Sommerfelt (166) writes that if man is a tool maker then he is also a word maker. This view is also held by De Laguna (32) who concludes that language is correlative to the tool. There is a fair amount of evidence to suggest that this is so.

The importance of perceptual thinking for the development of tools was shown by Kohler (96) in his studies of the mentality of apes. Though such thinking was not sustained it led to sudden insights resulting in the development of a tool. Kohler showed with sufficient accuracy that some form of thinking is necessary prior to the development of a tool.

At a more advanced evolutionary level, the very structure of the human brain indicates that there is a close relation between the powers of conceptual thought and those of skilled behaviour. This is further indicated by palaeontological research on the origin and evolution of toolmaking. Oakley (131) writes that "even the crudest Palaeolithic artifacts indicate considerable forethought. The range of types of tools in the earliest Stone Age industries shows that almost at the dawn of culture tools were being made to make other tools". As it is not conceivable that each generation discovered anew the skills of toolmaking it is simpler to accept that these skills were transmitted from one generation to another. This would have involved some conceptual analysis of the task to be done.

The earliest recorded descriptions of an activity which would qualify as work in the economic sense are found in cave paintings, e.g. the hunt scenes found in the Upper Palaeolithic caves at Cueva de las Caballas in Spain (161). At a later stage the Egyptian tomb paintings were particularly illustrative of work in the earliest civilized communities. The paintings at Beni-Hassan suggest many of the features of a modern check list we use in job analysis. The activities involved in a given operation, e.g. the baking of bread are depicted in a chronological sequence. The tools used are prominently displayed. The consequence of using them is illustrated. The pictures convey in parts a strong suggestion of movement. The hunter pulls at the string of his bow, an arrow is lodged in the side of a deer.

These first job descriptions served a purpose quite different from those currently found in present day practice. They were in the nature of an artistic exercise, probably motivated by powerful religious reasons. The artist

supplemented the medium in which he expressed himself with his genius and intuition. This was shown in the abstractions he made and represented of a complex and dynamic situation. Though such representations were by necessity static they succeeded somehow in conveying the essence of the task or its climax. The ring of hunters closes on the animal. The baker places the bread loaf in the oven.

Present day descriptions of jobs serve a more utilitarian function: they are used to ensure in the broadest sense that personnel in organizations functions effectively. Some consider that the analysis of jobs is fundamental to most problems encountered in personnel administration. Horst (75) points out for example, that if we accept that the main function of a personnel psychologist is to predict the behaviour or success of persons at work, then "the prediction process must begin with a description of the activity in which success is to be predicted". The process of analysing and describing jobs is felt by Horst to give an essential picture of the context in which a personnel department is to function. This is reflected in the common practice to prepare for the introduction of a personnel department in an organization by completing a full programme of job analysis.

There are at present four main reasons why jobs are analyzed and described:

- a. to establish training schemes. It is clear that no form of training can be implemented without a detailed description of all the activities which must be learned. Such descriptions are incorporated in the body of training manuals.
- b. to introduce some form of personnel control, i.e. selection and merit rating. Selection tests are validated against criteria of job performance. The construction of tests is therefore closely determined by the essential characteristics of the job. Similarly the measure of merit is largely determined by the demands of the job.

- c. to examine work procedures and assess their effectiveness. This forms the main context of the techniques of time and motion study. Jobs are analyzed in terms of activities and then critically examined. The purpose here is to determine whether work activities achieve their set aim in the most economical and effective manner.
- d. to establish a rational wage structure. This relates to the technique of job evaluation which forms the main subject of this thesis.

Current techniques of job analysis were originated by Taylor and Gilbreth at the turn of the present century. There has been since then a long series of publications dealing with various techniques. The bibliography which Zerga (180) published in 1943, lists 401 publications dating back to 1911. The main contribution made over this period was to establish the conviction that jobs in actual fact could be analyzed and described.

There are various techniques of job analysis. Kershner (92) classifies them into four categories: observation, interview, questionnaire and work participation. These techniques will be discussed in detail in Chapter IV. Suffice it to say at this stage that the job analyst is guided in every case by a conceptual framework, which he has developed over a period of time and which enables him to extract economically pertinent information about jobs. The analysis is concluded in every case by a written description of the job in which its major characteristics are recorded systematically.

3. Development of job evaluation.

The development of formal job evaluation closely followed the development of job analysis. The short historical survey of wage differentials we gave in Chapter I, illustrated that the practice of valuing jobs could be traced back to the early stages of money economies. Formal job evaluation - the practice of consciously and systematically determining the relative value of jobs - starts much later.

Adam Smith (164) is credited with having had the original idea of evaluating jobs. He listed in "Wealth of Nations" (Book I, Chapter X) five circumstances which determine the relative value of jobs: agreeableness of the work; difficulty of learning the trade; constancy of employment; the trust reposed in the workman; probability of success. Some of these circumstances have their counterpart in factors currently used in job evaluation plans.

The first attempts to develop a formal system of job evaluation were made by the American Federal Government. Evidence of this is given by Jones (91). He points out that during the formative stages of the Federal Government, the problem of setting equitable wages was brought frequently to the attention of the legislators. These pressures became greater as the number of civil servants grew larger. In 1836, government clerks in Washington submitted a petition to Congress, demanding that some systematic method be used for the determination of their salaries. Two years later, a document from a Senate committee noted that in actual fact clerks in varying departments were paid different salaries for essentially the same type of work. Action was only taken seventeen years later. Repeated representations from government clerks induced Congress to pass remedial laws. These established four grades of clerks, prescribed certain rates of pay for each grade and formulated the policy of equal pay for equal work. Provisions were made for the loose co-ordination of departmental pay schedules.

The procedures which had been laid failed however to remove pay inequities. The laws which had been passed did in actual fact little more than indicate formal acceptance of the principle of equal pay for equal work. There were no provisions for additional staff to administer the pay procedures which had been laid down. Their interpretation was left to each departmental head. This resulted in the long run in an even greater number of pay inequities.

In 1907 the whole wage structure was re-examined. A committee of experts reported that though there was no fool proof method to ensure equitable compensation for work, steps could be taken however to ensure that "the same importance always be given to certain lines of substantially similar work performed in different bureaus". This recommendation was implemented and resulted in the development of the first known system of job evaluation.

The first authoritative book on job evaluation was written by Lott (111) fifteen years later and published in 1926. He based it on data he had collected in the civil service, and on the application of the civil service system to industry. The scales he used were based on a number of job attributes. These scales are quoted in full because they influenced materially the development of the point system of evaluation which we shall discuss later on.

- 3.1 Time required to become high skilled in an operation.
- 3.2 Time required for a skilled person to adapt himself to his employer's needs.
- 3.3 Number of men in the occupation: the labour supply.
- 3.4 Possibility of an employee locating with another company and still commanding a similar earning capacity.
- 3.5 Education required for the occupation.
- 3.6 Prevailing rate of pay in the community.
- 3.7 Degree of skill, manual dexterity and accuracy required.
- 3.8 New problems and the variety of the work.
- 3.9 Money values of the parts worked on.
- 3.10 Dependence upon honesty and personal integrity.
- 3.11 Working conditions.
- 3.12 Exposure to health hazards.
- 3.13 Exposure to accident hazards.
- 3.14 Physical effort.
- 3.15 Monotony of the work.

Jones (91) claims that job evaluation came into its own after 1929, with the creation of the vertical trade union, representing all classes of workers. With the growth of vertical unions, authorized by the Wagner Act in 1935, the old partisan struggle of craftsmen against each other disappeared. The unions had to contend however with problems of wage differentials, as they were now concerned with the entire working force of a factory. The increasing demand for job evaluation resulted essentially from the refinement of techniques of job analysis. Job analysis was divested of the minuteness of motion study (34) and more meaningful descriptions of jobs were produced. Lott's system of job evaluation was developed further to yield the points system of job evaluation. Dissatisfaction with points systems induced Bengé to develop his own technique of factor comparison.

Between 1939 and 1943, a large volume of descriptive literature was produced. This centered primarily around the points and factor comparison systems of job evaluation. The material was largely uncritical. There was much in the nature of partisan attacks, but publications concerned themselves with the description of methods, eulogizing them, and evolving in some instances variations of current techniques.

The outbreak of World War II and the eventual entry of America, resulted in a marked intensification of industrial activity. This meant that strong stresses were felt in the industrial wage structure. Random wage increases were frozen by the Wage and Salary Stabilization Law of 1942, which stated that increases would be authorized only to correct maladjustments and inequalities. This law together with the creation of numerous new occupations originated by changes in methods and by the development of new technological processes, did much to establish job evaluation in the American scene. The large body of literature since 1943 is more critical in its appraisal of job evaluation. Some research was initiated, a number of methodological and statistical problems investigated, and some of the basic assumptions examined, with an endeavour to develop more economical methods. Only one new technique of job evaluation was developed however: Jaques (84, 85) measurement of the time span of discretion.

This brief description of the historical development of job evaluation has concerned itself largely with its development in the United States. This is not surprising in view of the fact that the technique was originated and received its major impetus there. The technique is now increasingly used in Western Europe. A survey completed by the United Nations in 1955 (173) noted that "there is a trend towards more unified wage systems and towards the fixing of wages according to the nature of the work and the individual skills regardless of differences in demand conditions and profitability in particular industries and firms". The report lists several factors working towards this result:

- a - social considerations;
- b - organizational changes;
- c - inflation;
- d - the simple fact of full employment.

Job evaluation is also well established in the U.S.S.R., and in the planned economies of Eastern Europe (82). This possibly follows from Levin's tacit acceptance of the American methods of scientific management. Levin (108) wrote "The Taylor system, the last word of capitalism, in this respect like all capitalistic progress, is a combination of subtle brutality of bourgeois exploitation and a number of its greatest scientific achievements in the field of analyzing mechanical motions, the working out of correct methods of work, the introduction of the best systems of accounting and control. The Soviet Republic must at all costs adopt all that is valuable in the achievements of science and technology in this field. The possibility of building socialism will be determined precisely by our success in combining the Soviet government and the Soviet organization of administration with the modern achievements of capitalism". The practice, at present, regarding wage rates is to group them into a specified number of wage categories, based upon coefficients reflecting the skill and responsibility involved in given jobs, and taking account of such factors as the diversity, complexity and difficulty of the work. Coefficients are determined on the basis of detailed job descriptions.

In South Africa, job evaluation is increasingly used. In 1954, the Civil Service Commission completed the evaluation of all posts under its control. Private organizations in the mining, chemical and manufacturing industries have introduced job evaluation to guide them in the determination of wage differentials. The National Institute for Personnel Research was active in initiating job evaluation in the gold mining industry (77), at the steelworks of Iscor (4), and in the Johannesburg City Council (31). Some of these studies yielded information on the problems which are encountered when current techniques of job evaluation are applied to African labour.

We turn now to an examination of the procedures of job evaluation. We shall begin with a discussion of the concept of the job which is fundamental both to job analysis and job evaluation.

4. The concept of the job.

A job is defined as a piece of work. It conveys the meaning of a conglomeration of activities, varying in complexity, and set to achieve certain goals. These activities would pre-suppose that the worker is able to meet a number of requirements and that he is willing to assume various responsibilities.

Jobs occur within organizations as a result of the principle of division of labour. That division of labour would become more important as social economies become increasingly complex, was discussed by Plato in "The Republic" (142). "We are not self sufficing but have a variety of wants. Then as men have many wants and many persons are needed to supply them, one takes a helper for one purpose, and another for another and then these partners and helpers are gathered together in one habitation; the body of inhabitants is termed a state. Then men give or receive in exchange because they think it is to their advantage".

The view that a division of needs leads to a division of labour is accepted essentially unchanged in modern times. Clark (22) writes that generally speaking, people are distributed between occupations in a way which will meet the demands of the community. Thus in a

community "requiring a great deal of transport - and willing to pay for it - a considerable proportion of the working population will become transport workers" (22).

A second point may be inferred from Plato's quotation: there must be a sufficient development in community life to create such an accumulation of needs that in turn this will result in a division of labour. Cole (24) gives evidence to support this and concludes that craft specialization nowhere advances far except in connexion with the growth of towns. There resulted for example with the decline of the Roman Empire a decay of towns and a return to local self sufficiency, involving a great setback to the principle of division of labour. Return of craft specialization was slow. It began as a slow process of differentiation of labour in the household of the feudal lord, and in the manorial villages attached to them. Cole points out that this development was similar to that found in primitive groups. Craft division was found to begin with patriarchal society and as soon as there developed a chieftain's household big enough to offer some opportunity for it. Women would then handle weaving, whereas men would build and undertake metal and woodwork.

The most important reason for division of labour is the improved efficiency which stems from it. This is particularly necessitated by the great increase of individual needs we find associated with expanding communities. This is interestingly shown by Ombredane (133) when he compares the building methods of a primitive Congolese community to those of more developed communities. The construction of a hut proceeds along chance techniques. There is very little planning and measurement. Though a group of villagers may team up together, each person works virtually on his own. There is no prior measurement of the site. Wood is cut only after a casual inspection. When various units are joined there follows much adjustment. If the adjustments are too great there may well be a radical change in structure. Ombredane writes that this casual approach to work is justified as the demand for huts is not great, and because insect rot forces the Congolese to abandon them after a few years.

Clearly then where the pressure to work is not great, division of labour is rudimentary and the methods used are casual and unplanned. In more developed communities on the other hand, demands for houses and other necessities are so pressing that ad hoc methods are not tolerated. There develops in consequence through specialization of functions a high degree of skill and dexterity within a given individual worker. Such specialization in turn facilitates the introduction of increasingly complex methods of work.

Division of labour is inherent in the definition of a job given in a manual of the U.S. War Manpower Commission (177). The definition postulates three levels of activities which go to make jobs.

The simplest level is the task. Its identity is determined by the function it serves and which is readily seen. A task could comprise a number of more elemental activities, e.g. simple movements such as reaching to grab a bin, lifting it on the shoulders, etc. Each of these activities could be subdivided further. They are seen however for the sake of expediency as a whole in the context of a task. Making a cup of tea and serving it is a task.

When enough tasks accumulate to warrant the employment of one person, then a position has been created. Positions are created generally as the result of administrative decisions. They could result from the need to have a simple task repeated a large number of times, or else from the need to combine in the work of one person, a number of complex activities whose purpose is not readily determined.

A job is defined as a combination of positions which appear to be identical in respect of their most significant tasks.

It is apparent that the unit which is fundamental both to job analysis and job evaluation is the result of many approximating judgments. When one speaks of a job one speaks of a universe of possible activities whose limits defy clear definition.

There are a number of reasons for this. The basis on which labour is divided, or the decision to create a job is largely uncertain. We pointed out that positions come into existence as the result of administrative decisions. There is a great deal of evidence to suggest that these decisions are generally made in a context of inadequate information. With particular reference to the creation of jobs, this means that managers are not quite certain at the start what demands such jobs will make.

In the Cape, for example, a number of builders are using on their sites powerful concrete pumps. These are high pressure pumps which force the concrete amalgam into a pipeline for considerable distances. Builders underestimated to begin with the complexity involved in the operation of such pumps. The task was quite simple they argued. All the operator needs to do is to move two levers and to watch a pressure dial. In actual fact, the operation of the pump proved to be much more difficult. Considerable delays were experienced in building activities as the amalgam would frequently block the pipeline. The tubes in the pipe line would have to be disconnected, cleaned and reassembled. With time, builders gained experience and were able to train operators in a task which they now saw as requiring great vigilance and the perception of numerous visual, auditory and kinaesthetic cues. Cole (46) gives a similar example from the history of the industrial revolution. When the spinning mule was introduced, factory owners were greatly dissatisfied in the manner it was operated. They had imagined that its operation would be reasonably straightforward. They learned eventually that the machine required specific skills and that its operation could not be learnt summarily by workers skilled in other machines, least of all by children.

Another source of variation in job content was mentioned by Jaques (84). Every job as he sees it comprises prescribed and discretionary elements. The prescribed elements leave the worker no possible choice. The manner of doing things is set by precedent or decree. The discretionary elements on the other hand, depend on the choice of the person holding the position. He is expected to use his discretion or judgment as he proceeds with his work.

He overcomes obstacles, considers alternative actions, and chooses what appears to him the best course to pursue. But this is determined primarily by the capacity of the individual to tolerate uncertainty. It follows that the same job could vary considerably in content depending on the individual appointed to it. This factor increases in importance as the discretionary element of the job increases in magnitude.

In addition to these more domestic and institutional forces which affect the creation of jobs, there are of course important technological factors to be considered. Cole (134) discusses how the development of machinery destroyed many of the old manual skills, and replaced them by new crafts based on the operation of the new machines. Livermash (110) mentions the effect of the diesel engine on railways workshops. Its introduction has altered the composition of maintenance work in the railways by expanding the electrical phase of the work and contracting the mechanical. Another example refers to coopers. They no longer hold the importance they held in the past. They are largely replaced by the semi-skilled operator engaged in the mass production of metal and plastic containers.

It can be argued however that these sources of variation on job content have a limited effect. The point we wished to make is that they exist, and that consequently the job as a unit of measurement lacks precision and demands a fair amount of a-priori delineation. Oppenheimer (134) complained that units of analysis in science, usually turn out to be much larger and more inclusive than one at first expects. In job evaluation we take the opposite standpoint. We endeavour to compass a unit which we know to be large and inclusive of a fair amount of uncertainties, in an effort to achieve results which will be economically acceptable.

5. Methods of job evaluation.

When we examine current methods of job evaluation, we discover something in the nature of two by two contingency tables. Methods of job evaluation can be divided on the manner we look at jobs: whether we consider them as a

whole or break them down into various constituent characteristics. The old controversy between the monism of Parmenides and the pluralism of Heraclitus finds a distant echo here. The second possibility is to divide the methods of job evaluation according to the manner we judge values, i.e. a relative judgment of jobs against each other, or else judging against a given standard. We see here an application of the methods of judgment developed by Fechner, i.e. the limiting and the mean error methods.

We have, by combining these two dichotomies, four possible methods of job evaluation. These are tabled below.

	Whether the job is considered as a whole	Whether the job is broken into a number of characteristics
Whether the comparison is relative to units in the group	Job ranking	Factor comparison method
Whether the comparison is made against a standard	Grade description method	Points method

TABLE I. METHODS OF JOB EVALUATION.

We shall discuss briefly each method in turn.

5.1 The job ranking method.

The general practice is to have persons in charge of departments in an organization, and their supervisors, arrange the jobs of the department in order of importance. A special committee is then given the task to coordinate the rank orders of all departments into one for the organization as a whole. From this rank order a classification of jobs into various grades or categories is evolved.

The job ranking method is not frequently used. It is convenient because of its quick application and the ready results it yields. It requires on the other hand a considerable amount of checks and verifications to eliminate disagreements. Jobs which are ranked against each other give no indication of the scales used by various judges, nor do they indicate the distance between rank orders.

There are in addition a number of practical difficulties. It is frequently not possible to secure judges who are familiar with all the jobs in a department. It is conceivable that as judges are asked to consider the job as a whole they fail to keep a consistent point of view, and so use different bases for their judgment. Moreover as only job titles are used, these could be misleading because job content may have changed over time. Unless the judge is intimately acquainted with all the jobs, serious errors would result.

Cook (27) points out a further limitation of the job ranking method. He writes that it is almost impossible to rank factory jobs with clerical jobs. The best procedure he recommends is to restrict oneself to evaluate jobs which fall within those natural divisions common sense suggests to us.

5.2 The grade description method.

Jobs are classified into a priori categories, defined by a specially appointed committee. The definition of categories may be preceded by an analysis of all the jobs in the organization to determine differentiating characteristics of categories or grades.

The fundamental difficulty of this technique is that each grade must be defined in fairly general terms; these terms must retain however sufficient detail that a job with specific duties and perhaps unique responsibilities may be identified by them. We face here the problem frequently encountered in psychology of fitting into a single dimension a number of component dimensions. The wage scale is a weighted compound of a number of different factors, e.g. education, experience, responsibilities, each of which can be subdivided further. If the terms in which wage grades are defined are too general, this will result in an unreliable assignment of jobs. If the terms are on the other hand very specific, then the grades will not cover all the jobs being classified.

A practical difficulty which is often encountered is that a job may comprise a combination of tasks, each of which may fall at one of several levels of the grade descriptions.

Notwithstanding these difficulties, the grade classification method presents a number of practical advantages. After a job evaluation is completed, the wage structure which will evolve, must comprise a limited number of grades. Wage administrators must strike a balance between a number of grades which will differentiate adequately between jobs, and a number of grades which will not make his task of administering wages unduly complicated. Moreover as the system of grade classification supplies a definition of the essential characteristics of grades, the administration of wages is simplified further. The number of wage grades is given at the start; the definition of each grade supplies a readily seen rationale for the determination of wages. Otis and Leukart (135) explaining this advantage write "... most firms and workers have some rough conception of the general classification structure into which most jobs fall. Grades acquire a meaning for their symbols as to their relative difficulty, job content and job worth. The grade description method tends to integrate this type of meaning into the job classification structure more quickly than the other job evaluation method".

5.3 The points method.

The points method of job evaluation postulates the existence of a number of job factors. These are characteristics of jobs, assumed to be common to most jobs being evaluated, and which can be expressed in the form of continua. Each factor continuum is broken into a number of degrees, and the evaluator assesses for each factor the particular degree which will apply to a given job. The responsibilities a man must assume, the hazards in the work situation, the effort the job demands, are examples of factors.

The points method gets its name from the practice of assigning points to factors and dividing these points between degrees according to their assessed importance. It is based on the premise that not all the factors chosen are of equal importance. Factors must in consequence be weighted according to their assessed importance. Weights are usually allocated arbitrarily on the basis of logical reasoning and policy formulation. They have been computed in some instances statistically, the criterion used being the current wage structure. This was done for example in

the American Steel industry (168) and was repeated by the National Institute for Personnel Research in its study at Iscor (4).

The points method appears to be the one most frequently used in the United States (7, 65, 100). It has featured prominently in research investigations because the scores it produces are readily subjected to experimental designs and to statistical analyses.

The advantage of this method lies mainly in the fact that it is less subjective than others. As jobs are evaluated on the basis of predetermined definitions of factor degrees, group or individual bias is reduced, and the reliability of raters can be measured.

The method has however been subjected to much critical examination. The selection of factors, the definition of degrees generally involve much a priori delineation. The method has also been said to suffer from lack of flexibility (81), because a large variety of job characteristics have to be covered by a limited number of factors and degrees. If a job has some characteristics which do not fall within the purview of these factors and their degrees, it will fail to receive due credit. We shall discuss further some of these limitations when we review research done on points systems.

5.4 The factor comparison method.

This method was developed and described by Benge (10), as a reaction against the problems of the point system. The method uses a restricted number of factors, but whenever a judgment is made, it is made in terms of a comparison of one job against another. It rests on the assumption that in job evaluation "the absolute values of any set of factor ratings or job totals are not important. Only their relative values, or their values relative to each other, are basic"(171).

The method is based on only five factors so as to avoid overlap and double weighting of any factor. These are usually: skill, the mental and educational requirements, physical requirements, responsibility and working conditions. Evaluation proceeds as follows.

A number of jobs are selected from within the organization and are referred to as key jobs. Bengé (10) states that these are jobs whose rates of pay are not subject to controversy. Turner (170) is more realistic and calls a key job one which appears to differ clearly from other jobs with respect to each of the job factors.

Key jobs are ranked in respect of each factor and serve as points of reference for the subsequent evaluation and ranking of the other jobs. The ranking of key jobs and subsequent evaluation is done individually by various members in a committee. This is followed by discussions to remove any discrepancy or to resolve differences.

The committee examines next the wage rate for each key job, breaks it down to distribute it among factors. For example, if the job of carpenter is paid R30 a week, the committee may decide to apportion R10 to skill, R10 to mental requirements, R5 to responsibilities, R3 physical effort, R2 to working conditions. This is done individually by each member of the committee for each of the key jobs, and is followed by discussions to resolve individual differences. The job ranking which this approach yields is then compared to the one initially arrived at, further discussions are held and differences between the two rank orders are arbitrarily resolved.

The advantage of this method, like the points method, is that it results in a systematic comparison of jobs. The method moreover claims that it concerns itself with the true nature of job evaluation, i.e. the relative value of jobs and does not pretend to any sophistication and accurate measurement.

The method on the other hand has been attacked precisely because of its undue lack of sophistication. Bengé (10) for example, criticizes the points system for not including unusual job characteristics, but as he uses only five factors one gains the impression that he reads the meaning of these unusual factors into the factors he uses in his system. Furthermore one of the essential features of the factor comparison method, is that the wage rates for key jobs are assumed to be correct. All other rates are in consequence determined by reference to them. This may

introduce a strong biasing factor at the early stages of evaluation. Whatever errors may exist in these rates are incorporated in the system of judgment. Essentially the same error is made in the points system when weights are computed statistically on the basis of the current wage structure.

5.5 The time-span of discretion.

The measurement of the time-span of discretion was developed by Elliott Jaques, of the Tavistock Institute of Human Relations in London. The method has been described in two of his books "The Measurement of Responsibility" (84) and "Equitable Payment " (85). It has been developed to the stage where it can be used by others and critically assessed. With the exception of two publications of Hill ('70, '71), the method has not been discussed in current publications. It is nevertheless, the only original contribution made in the field of job evaluation, since Bengt developed in 1941, the factor comparison method.

The method of measuring the time-span of discretion grew as a reaction against standard practices of job evaluation, more particularly against the numerous factors which are currently used. Jaques (84) feels that factors used in job evaluation suffer much from a priori delineation. Fundamental dissimilarities are ignored in an attempt to abstract dimensions which are applicable to a variety of jobs. He discusses, as an example, a dimension frequently found in job evaluation systems, i.e. training. It is measured as the length of time required to train a worker for any given job. This dimension appears at first sight easy to use. Its inadequacy becomes however apparent when we are asked to compare values obtained from different jobs. How are we to compare, for example, a five year apprenticeship course, a four year university course, and ten years of informal training viewed as experience in a given job. Jaques feels that similar reservations could be raised against most of the factors used in job evaluation. These factors do not apply in the same manner to different jobs. Some factors may apply to some jobs but not to others. Factors which appear to apply to all jobs, are seen on closer examination not to have the same relevance or meaning in one set of jobs as they would have in another.

Jaques set to find a dimension which would suffer least from ambiguity, and which would be equally applicable to senior as well as to junior dimensions. In his search for this dimension, he was struck by a familiar occurrence. Earnings in most organizations are expressed in terms of different periods of time. The salaries of higher level jobs are expressed in longer time periods than that of subordinate jobs. Earnings are expressed in hourly, weekly, monthly and yearly rates of pay. Another relevant fact is that the longer the period in terms of which a person's salary is expressed, the longer the period of notice he must give when he resigns. This in turn suggested that the more senior the position the longer it takes an organization to get a new member settled into it. Jaques felt that there must exist a measurable relationship between size of responsibility and the time taken to assume and execute it.

Jaques spent a number of years following this idea. His investigations covered various occupational levels and took him into various industries. He convinced himself that responsibility is measurable and that the measure produced reflects the worth of jobs both from the point of view of the workers and that of management. The method of measurement which he has developed rests however on an extensive body of theoretical speculation most of which remains untested. Method and theory are extensively covered in "Equitable Payment" (85).

Jaques starts by examining various current definitions of work. He finds that they are all much too vague, possibly because of the absence of any common social frame of reference within which the whole issue of the value of work may be considered. None of the definitions satisfy him because they fail to take into account the psychological nature of work. He examines the field of work in its entirety and specifies that he will concern himself with employment work.

Employment work begins when the directors of an enterprise purchase labour services in order to get work done in pursuit of its objectives. As the Board cannot control large numbers directly, it appoints a single person as chief executive. He establishes subordinate to him,

and on behalf of the Board, a hierarchy of positions for which his subordinates and himself choose candidates to execute the Board's directives. Therein lies the hierarchical structure which is fundamental to the concept of the time-span of discretion.

Responsibility is examined next. Jaques feels that the manner in which it is used is far too ambiguous to have much meaning. He argues that responsibility for work ultimately rests with the Board and its appointed executive, and that employees share in this responsibility only to the extent that their own individual work contributes to the general outcome of group activity set by the Board. "By responsibilities, I wish to refer therefore simply to the particular activities to be carried out in the job, with the results to be achieved stated in concrete terms of the specific things to be done" (85). If one then wishes to know what the responsibilities of an individual are, one simply asks him what he is supposed to be doing. This should cover both the specific activities he is engaged upon and the decisions he is authorized to make.

Work is defined as "the exercise of discretion within prescribed limits in order to reach a goal or objective". Employment work is defined as "the exercise of discretion in discharging a contract to carry out tasks set by an employer within prescribed limits and policies which he fixes. It is the type of work for which salaries or wages are paid, and which constitutes the subject of individual payment differentials".

These definitions are consistent with common usage because they include the notion of activity or effort directed towards a goal or objective. They distinguish however between what Jaques considers to be the two major components of the activity:

- a. the discretionary content, which includes all aspects of discretion, choice or judgment which the person doing the job is expected to exercise;
- b. the prescribed content, comprising the rules, regulations, procedures and policies, the custom and practice, and all physical limits of plant, machinery, and equipment. These factors have a combined effect in limiting the discretion which may be exercised.

These definitions of work stress the hierarchical structure of organizations. They imply that the allocation of work, and the prescriptions within which it is to be carried out, are the prerogatives of managers. The distinction made between discretionary and prescribed content is however crucial to the concept of time-span of discretion. We shall elaborate on this distinction.

When a manager sets a responsibility in prescribed terms, this means that it is done in such a manner that his subordinate will be in no doubt whatever when a task has been completed and completed as instructed. The result which must be achieved is established in an objective manner "such that anyone would know when the work has been done as required". The prescribed content of responsibility exists therefore in external reality. It can be examined independently by a number of observers. Jaques writes "in order for an aspect of work to be prescribed, there must be an externally defined and observed control, such, that departure from regulations is immediately apparent without the exercise of judgment" (85).

If, on the other hand, the external control, which eliminates choice from any particular aspect of an instruction cannot be objectively identified, we must expect that the subordinate will have to use his own discretion in deciding when he has pursued particular activities to the point where the result is likely to satisfy the requirements of his manager. Jaques takes pains to stress this distinction and repeats a number of times the fact that discretionary controls are exercised from within, and that there are no external standards. He lists a number of words qualifying discretion. Discretion has to do with thought, judgment, sense, feel, discrimination, comparing, wondering, foreseeing "and other contents of mental work both conscious and unconscious". They all point to the subjective nature of discretion.

Failure to conform to the prescribed content of work constitutes negligence. The person ignores the feedback of information from outside himself which allows him to know unequivocally whether or not he has done what he was supposed to do. Failure to conform to the discretionary element is on the other hand quite different

as there is no external feedback associated with the activities of work. The person doing the job can never be sure how well he has done until his work has been reviewed by his manager. Many of the deeper lying anxieties are mobilized by this uncertainty (86). Effort in work is to be found primarily in the anxieties engendered by these uncertainties. "The longer the period of time that discretion had to be exercised in a role without the results of that discretion coming to the attention of the immediate manager, then the greater was the psychological effort required for the work".

Jaques states that his social analytical studies have revealed that it is this exercise of discretion which is mainly connected to the sensation of the amount of responsibility in a job. "We appear to derive our sensation of level of work or responsibility from the discretion we are called upon to exercise and not from regulated or prescribed actions which have been set and which we have learned and can carry out automatically" (85). This is in essence the norm intuitively known by individuals and shared in the working population of what constitutes fair payment for work. Payment which is consistent with this norm is accompanied by a sense of relative fairness of treatment. Deviations from the norms on the other hand produce "characteristic symptoms of disequilibrium in the individual", i.e. a sense of dissatisfaction strongly held grievances. If deviations are wide-spread and affect socially connected groups of individuals, they will express themselves in social instability.

Jaques recognizes however that just as there are differences between jobs in the levels of payment regarded as fair, so there are differences between individuals in their capacity to carry responsibility. There is moreover an optimum level and rate of consumption for each person "in the sense that consumption at that level and rate is consistent with dynamic psychological equilibrium, and consumption above and below that level and rate leads to increasing psychological disequilibrium". He postulates further that there is a direct correspondence between each person's level of capacity for discriminating expenditure and his level of capacity in work. Perfect equilibrium in the sense that a person is satisfied with his remuneration

is the consequence of three factors directly related to each other: the capacity of the person to assume responsibilities, his capacity of discriminating expenditure, and the time-span of discretion. If the wage paid is in relation to the discretion the person must exercise, and is in actual fact capable of exercising, then his salary should suffice his consumption potential.

Jaques admits however that it is only under conditions of economic abundance that the equitable society comes into its own. "Under these conditions there is opportunity for work and a career for each one of us at a level consistent with the growth of our capacity, and an abundant income and rate and intensity of expenditure". In present day society however the socially and emotionally disruptive effects both of poverty and overabundance are present. One finds a conflict between two sets of forces which govern the actual distribution of payments. There are on the one hand impulses of equity which cause members of that society to seek to establish a differential distribution which corresponds to the equitable distribution of salaries according to discretion exercised in the job. There are on the other hand, destructive impulses which cause members of that society to seek personal gain at the expense of others, by means of power bargaining and regardless of equity.

It is essential that these destructive impulses be checked by clear formulation of policies which will incorporate his principles of equitable payment. Jaques proposes as a first step the payment of work in terms of the time-span of discretion, i.e. "the maximum period of time during which the use of discretion is authorized and expected without review of that discretion by a superior".

Over the past five years Jaques has come to accept the fact that mechanisms of review are rarely direct. In 1956, Jaques stated in his "Measurement of Responsibility" that the measurement of the maximum time-span of discretion involved "the discovery of mechanisms of review". Five years later, with the publication of "Equitable Payment" he accepts that these mechanisms are largely indirect.

"We note therefore that our measure of how long a job requires its incumbent to exercise discretion without managerial review will have to be in negative rather than positive terms" (85). Because the mechanisms of review are indirect, it is important to formulate the concept of "marginal sub-standard" discretion. Gross errors of judgments made by a person using his discretion are clearly not important. These errors would be spotted by many people and brought immediately to the notice of the manager.

Marginal sub-standard discretion is defined "as discretion which produces results which are just outside the limits of the standard set ... Its effects are cumulative". It occurs in one of two ways. The person produces work of better quality than is expected of him, takes longer, and so runs behind schedule, possibly showing down the work of others. The person on the other hand may work a bit too poorly and so produce work of sub-standard quality.

Jaques admits that marginally sub-standard discretion is not readily observed. The limits of quality of work and time in which it is to be done are hardly ever explicitly known and available. In order to determine these limits, he relies solely on interviews with managers and uses a technique of successive approximations, very similar to the limiting method of Fechner. We are further told "that in ascertaining what constitutes marginally sub-standard work, the greatest difficulty lies not in the discovery of the margins, but in getting a clear and comprehensive account of the work instructions issued by the manager, and of the discretion which has to be exercised in following these instructions".

To measure the maximum time-span of discretion, Jaques obtains from the manager in charge of the role information on the following facts:

- a. the tasks he allocates to the role;
- b. their prescribed and discretionary content;
- c. the review points at which marginally sub-standard discretion will declare itself.

Information is obtained purely by interviewing the person in charge of the role and by leading him to estimate limits of time and quality. We have stressed this point because Jaques repeatedly mentions that his method of measurement is objective, whereas it has strong subjective undertones.

Jaques distinguishes between single and multiple tasks roles; he proceeds in each case differently.

For single task roles

He plots the sequence of tasks as straight lines in such a manner as to show;

- a. the time of beginning the task;
- b. the time of arrival at a point where marginally sub-standard quality will first declare itself in each task.

For multiple tasks roles

He plots the sequence of extended tasks allocated simultaneously to the same individual and shows:

- a. the beginning of each task;
- b. the completion time which is marginally sub-standard with respect to its targeted completion time.

By inspecting the various charts, he determines the longest time lapse between two consecutive review points. This is the maximum time-span of discretion which he equates to job worth.

The contribution which Jaques has made to job evaluation cannot be seen yet in its correct perspective because of lack of experimental data. He has produced a series of hypotheses which are well worth testing.

The contention that all groups of workers measure the worth of jobs in terms of the span of discretion remains to be proved. This contention is based on the fact that Jaques found his method to be applicable at all levels of work. One wonders whether this is sufficient justification for assuming that all groups of workers attach the same importance to the discretionary content of work. Would it not be more valid to say that discretionary work is felt to be more important only where it occurs in significant quantities? The consequence of this assumption would be that different standards of value are used by labouring and manual workers than would be used by executives or clerical workers.

Evidence for this assumption may be found in the difficulties Jaques experienced when he applied the principle of discretionary work to manual or repetitive workers. When he wrote "Measurement of Responsibility" he thought that discretion showed itself in manual work through the pace of work. He gave the example of the machine minder who was operating levers a trifle slower than he should. The foreman would notice this sub-marginal pace of work four hours after the shift had started. Work would by then have accumulated near his work place to make this noticeable. When he wrote "Equitable Payment", he ignored altogether the instance of the repetitive worker, or the fact that manual workers may use their discretion in the pace of work they adopt. He discusses the case of a turner who produced below standard quality work and who would be found out three days later when the pieces he had turned reached a grinding machine.

This example is far from convincing. It leaves a number of questions unanswered. Does the turner really experience anxiety because his work takes three days to reach the grinding machine? Jaques states that many of the deeper lying anxieties are mobilized by the uncertainty which follows the exercise of discretion (86). Are there no thresholds operative here? Must not this uncertainty be of sufficient magnitude before it mobilizes the deeper lying anxieties? Does it in turn mean that the person who has fewer anxieties and tolerates uncertainty best should feel less mental effort and be paid less money?

Another question which is not answered is whether a turner who works in a shorter production process will accept to be paid less than a turner who has served identically the same period of apprenticeship, operates possibly an identical machine, but works in production process with less frequent reviews of work? Jaques may well claim that in terms of unconscious feelings this difference of payment is justified. We wonder however whether the argument will be favourably received by hardened artisans.

Yet a third question which research should answer is whether the estimates of time-span of discretion for one occupational group are comparable to those made for another. The importance of this question is best viewed when we remember that it forms the basis of Jaques' attack against traditional job evaluation. There are good reasons to doubt that the measure of the maximum time span of discretion is possibly just as ambiguous as an estimate of the length of training required in a job. When a manager, for example, estimates the completion period of tasks he has allocated to a multiple task role - and we must remember that some of these tasks take up to two years to complete - he averages a number of indefinite impressions. He takes into account the potential of the individual in the role, the completion date of similar tasks which he had allocated in the past, the likelihood of unforeseen delays, difficulties he anticipates will be encountered, and so on. The estimate will vary in reliability as he moves from task to task. Mechanisms of indirect review will differ moreover as one goes from one organization to another or even from one department to another in the same organization. The concept of marginally sub-standard work is related to the concept of managerial efficiency. How are we to measure, for example, marginally sub-standard performance in a manager because he fails to perceive marginal sub-standard work in subordinates. As review mechanisms can only be defined in negative terms, we must assume that these terms will become increasingly negative as the nature of work and its scope become harder to define.

Any attempt to test the theory which Jaques has drawn will have to take into account a number of limitations. Some of the assumptions of Jaques cannot be tested until we find a society which combines economic abundance with strict control of its so-called destructive impulses. Many of the arguments which Jaques presents assume prior acceptance of the unconscious and the important role it plays in rational behaviour. Techniques would have to be developed which will deeply probe behaviour. Finally, we must not lose sight of the fact that the prescribed content of work is never altogether devoid of the discretionary. When activities or their consequences are described in words, a discretionary element enters both in the formulation of precepts and their interpretation.

Notwithstanding the various limitations we have seen in Jaques' method we must accept it as a significant advance on current systems of job evaluation. His concept of discretionary content of work is an important one to have in the analysis of jobs, particularly those of an executive nature. The dimension which Jaques has evolved has a psychological flavour rarely found in any of the current systems of job evaluation. Finally, we must remember that Jaques has presented his views in the guise of a theory which invites scientific investigation.

6. Research in job evaluation.

The brief review of job evaluation methods which we have just completed reveals that no method can claim scientific accuracy or perfection. Each method offers a number of practical advantages but these are limited by the shortcomings inherent in each method. The job ranking method does not indicate what distances are operative between rank orders and fails to ensure that the scales used by various judges are in fact the same. The grade description method tries to come directly to the final answer which the wage administrator wants, but combines in one scale a number of component scales, each capable of further subdivision. The method is based on a priori decisions as to how the various component scales will be combined and weighted. McNemar's warning is worth noting at this juncture. He stressed that unidimensionality is fundamental to measurement, for "measurement implies that one characteristic at a time is being quantified" (155). If two variables are involved in the one postulated continuum, then two individuals could arrive at the same numerical score by two quite different routes. The reliability of the measure is affected. McNemar's warning with regard to attitudes applies equally well to the method of grade classification.

The points method, in spite of its popularity, does not solve the problem of finding reliable and adequate dimensions. The factors which are commonly used are each capable to be divided further. They are not inclusive of all possible job characteristics, and present the problem of determining a basis on which they are to be weighted and combined. The solution is generally an ad hoc one

determined by group discussion. The factor comparison method faces squarely to present limitations in job evaluation and offers a method of judgment as arbitrary as the others. The few factors it uses are elastic enough to include unusual characteristics, and so must remain suspect. The importance which is attached to the wages of key jobs means that to some extent the status quo in wages is enforced. Differences in opinions by judges are ironed out in committees with all the bias this may cause.

The time-span of discretion is a novel concept in job evaluation. We are indebted to Jaques for his penetrating analysis of the work situation and the fresh insight he gives us into the nature of mental work. Of merit too is the concept of determining the value of work on the basis of one dimension. But Jaques does not appear to have succeeded where others have failed. One suspects him often of too ready a generalization. His definition of work, the concept of responsibility, the method itself are all strongly bound to the concept of hierarchical organizations. Much depends on the nature of the particular organization in which the job evaluation study is carried out. The discretionary content of work will no doubt increase with the relative inexperience of managers, their lack of familiarity with new work situations, and their mobility to formulate the external frame of reference which is fundamental to prescribed work.

Job evaluation has been condemned from time to time with varying virulence. Trade Unions, for example, are quick to point out that as it is based upon human judgments of a limited number of factors "human error is as likely to reveal itself under the rules of job evaluation plans as readily as in any other area of labour relations" (79). Knight goes much further in his criticism and writes that "Job evaluation as conducted in the vast majority of cases today is a pious fraud. Its claims to scientific standing are false" (95). Lutz, after examining various points and factor comparison systems concludes that "pay differentials, like job worth can never be measured by established scientific quantitative methods; these methods should assume the exercise of considered and informed judgments" (112).

In spite of this criticism and the obvious flaws in job evaluation methods, there is a remarkable dearth of research. Of the twelve textbooks published so far (17, 54, 81, 91, 101, 113, 129, 135, 137, 138, 165, 167) only three (81, 137, 165) refer to research work, and this is generally done in the briefest of manners. Most of the books concern themselves primarily with the classical methods of job evaluation, and discuss extensively the problems encountered when the results of job evaluation are applied to an organization. An exhaustive bibliography (34) published by United States Department of Labour in 1947, quotes 291 references of which only four are related to active research. This dearth of research may perhaps be due to two factors. The field does not lend itself readily to experimental design. The complexity of the concept of the job discussed in this chapter, is well worth remembering. The problems in the administration of wages are in most cases urgent and require ad hoc measures such as job evaluation, which is considerably more systematic than the chance approach usually followed.

Current references on research on job evaluation since 1947, and which are available to us in South Africa, can be conveniently divided into two categories:

1. Research dealing with specific practical problems;
2. Research dealing with the dimensions of job evaluation and their measurement.

6.1 Research dealing with specific practical problems.

6.1.1 Surveys.

Two surveys of job evaluation practices in the United States have been published. Baker and True (7) found in 1947 that most of the evaluation plans which failed did so because of inadequate administrative controls. History repeats itself. We noted that Jones (91) reported that the United States Congress failed to implement its new wage policies because it had neglected to provide any administrative controls. Lanham (100) found in 1953, that of 17 companies which he had surveyed, 16 had found job evaluation to be worthwhile and would continue to operate it.

6.1.2 The development of new techniques.

Publications deal essentially with variations of the four classical methods of job evaluation. They aim generally at speeding up the process of evaluation, but do not report on the effect these variations have had on the reliability of raters.

Brash (16) suggests that job evaluation can be broken down into a number of standard judgments each applicable to recurrent elements in work. These elements would either be constant or variable. Variable elements could be classified into a number of different categories. Tables would then be drawn of definite values for all elements. This would result in a country-wide stabilization of work elements and of their evaluation, and would materially speed up the process of job evaluation. The idea was proposed in 1945, but does not seem to have met with any measure of success primarily because of the failure to discover a sufficiently large number of job elements, and to agree on the values to be attached to them.

Eitington (44) recommends that employees prepare their own job descriptions as a means of reducing the costs of job evaluation. The method is certainly cheaper, but we are not shown how adequate these descriptions are and the effect this has on job evaluation.

Miles (126) finds that an abbreviated check list for office jobs which he has prepared is just as effective as more detailed job descriptions, when office jobs are evaluated by means of the factor comparison method. Bellows and Estep (9) find similarly that a check list will give them similar results to those obtained from more detailed job evaluation. They report a correlation of .74 between the check list scores with the total evaluated points for the jobs.

Hay (66) claims that the judgments expressed in factor comparison behave in accordance with Weber's law, in that arithmetic intervals in the evaluation of job difficulty are notched by logarithmic increments in salary. Turner (172) cautions Hay against modifying the % method (a variation of the factor comparison method) as it appears that Hay has not understood the mathematical basis involved. Turner moreover warns that Weber's law applicable to precise psychophysical stimuli cannot be summarily applied to job evaluation by claim-

ing that differences in the wage scale are stimuli differences and that the evaluation of job difficulty is the score for the perception of these differences. Hay (64, 67, 68) suggests a number of techniques which will abbreviate the factor comparison method and give essentially the same results.

The references we have quoted so far have as their main theme the simplification of current methods of job evaluation. The authors claim in each case that they come out with essentially similar results as would have been obtained with the more detailed method. Supporting evidence is given in only a few of the publications. In some cases, fundamental errors are made, as shown in Turner's stricture of Hay (172). Authors we have reviewed in this section accept the premise that in the end result complex judgments in job evaluation are essentially the same whether complex or simplified techniques are used.

6.1.3 The call for caution.

Not everyone agrees however with the contention that abbreviated and shorter techniques of job evaluation are equally effective. Edwards (43) suggests an involved 12 steps plan which should form the basis of job evaluation. Gelmour (54) lists 13 separate steps for his points method of job evaluation, each step being in the nature of a separate investigation.

Rush and Bellows (154) found that a tailor-made system of job evaluation which they had developed for a small business was highly reliable (reliabilities were .89 and .95), but that it did not correlate significantly with the check list Miles (126) had recommended.

Gray (59) argues that if key jobs carry a proper wage rate, as is postulated in factor comparison systems, then there is an adequate manner of validating the evaluation scores. This would be to compute the statistical significance of the differences between the valuation of key jobs and their wages. This may be done however only when key jobs are evaluated by factors which truly differentiate between them. To use then a ready-made or an abbreviated system of job evaluation will not do. In a later study, Gray and Jones (60) compared the effect on a group of jobs of a tailor-made system as against a

ready-made system of job evaluation. They found the two different evaluations to correlated by $+0.90$, ± 0.018 ; but they also found that out of 50 jobs which had been evaluated only 3 jobs received exactly the same evaluation by both systems. They used the tailor-made system as the criterion, and found 19% of the jobs misevaluated by the ready-made system, i.e. by half a standard difference or more. They concluded "this difference, when translated to pay differences is significant to the extent that although a tailor-made system requires more effort, the improvement in accuracy would seem to justify it". What is surprising is that such differences should occur even though both systems correlated very highly. In another study, Langstroth (99) points out to the importance of using tailor-made scales when evaluating managerial jobs.

The conclusion these authors would arrive at is that job evaluation should be carried on as extensive and systematic a basis as possible. Their recommendation is in conflict with those who would seek to use abbreviated methods of job evaluation. Rush and Bellows find that the check list which Miles recommends is no substitute for a tailor-made system of evaluation. Gray and Jones make the significant discovery that even though two systems of evaluation correlate very highly, their effect on the final wage is markedly different.

6.2 Research dealing with dimensions.

The largest body of available literature seems to fall in this category. Research dealing with dimensions in job evaluation generally concerns itself with three separate problems:

- a. is it necessary to use many dimensions or will a few do as well?
- b. how do raters behave when evaluating jobs?
- c. how are the various factors to be weighted to produce the final value or score for a given job?

6.2.1 Many factors or few?

The question as to whether simplified scales are as effective as the more involved scales is another way of asking whether evaluation should be carried out in an extensive or an abbreviated manner. The question is however asked here at a

more specific level. Rather than deal with methods as a whole, and examine the resultant wage classification of jobs, we concern ourselves simply with the dimensions on which judgments are to be made. The question was first put by Viteles (176) in 1941. He noted that the general tendency in job evaluation had been to favour many rather than few factors, "in direct violation of the law of parsimony which should find a place in this as it does in other fields of analysis". Viteles' article was followed by a number of factor analytical studies which purported to prove that few factors were as effective as many. In order to maintain continuity we shall discuss a few research studies, relating to this problem and based on factor analysis which appeared before 1947.

The first attempt to use factor analysis in job evaluation was made by Lawshe and Satter (107) in 1944. The job evaluation data from three separate factories was subjected to a Thurstone centroid factor analysis. There is no indication of the manner in which jobs were analyzed and evaluated, besides saying that the N.E.M.A. system was used. This is a points system developed by the National Electrical Manufacturers Association. The system is based on four factors broken into eleven items. These are:

1. Skill:

- 1.1 Education
- 1.2 Experience
- 1.3 Initiative and Ingenuity.

2. Effort:

- 2.1 Physical demand
- 2.2 Mental or Visual demand.

3. Responsibility:

- 3.1 For equipment or process
- 3.2 For material or product
- 3.3 For safety of others
- 3.4 For work of others.

4. Job Conditions:

- 4.1 Working Conditions
- 4.2 Unavoidable hazards.

A separate factor analysis was done on the data from each of the three factories. Lawshe and Satter found that in each case the first factor accounted for most of the variance in the total point ratings. They called this factor "Skill demands" because the items which were heavily loaded on it, represented the skill requirements which the job imposed on the individual. The factor loadings for each of the three factories are reproduced in Table II.

Factor	Factory A	Factory B	Factory C
I Skill demands	1.1 Education .976 1.2 Experience .962 1.3 Initiative, etc. .961 3.4 R. work of others .878 2.2 Mental effort .866 3.2 R. for materials .621 3.1 R. for equipment .400	1.2 Experience .915 1.3 Initiative, etc. .904 1.1 Education .845 2.2 Mental effort .605 3.4 R. work of others .555 3.2 R. for materials .545 3.1 R. for equipment .518 3.3 R. for safety of others .455 4.2 Hazards .253	1.2 Experience .869 1.3 Initiative .867 1.1 Education .729 3.4 R. for work of others .486
IIA Job characteristics	4.2 Hazards .791 3.3 R. safety others .769 4.1 Working conds. .706 5 Physical effort .634		
IIB Job characteristics non-hazardous		2.1 Physical effort .627 4.1 Working conditions .440	2.1 Physical effort .842 4.1 Working conds. .492
III Job characteristics Hazardous			4.2 Hazards .748 3.3 R. safety others .734 3.1 R. equipment .452
IV Attention demands			2.2 Mental effort .565 3.2 R. materials .621

TABLE I From Lawshe and Satter (107)

Factor IIA which is found in factory A is called "job characteristics" because it represents "aspects of the job itself which the employee must contend with and for which he should receive compensation".

Factor IIB found in factories B and C is called Job characteristics - Non-hazardous since "it apparently represents the non-hazardous aspects present in Factor IIA".

Factor III present only in factory C, represents the other portion of Factor IIA "which is not included in Factor IIB".

Factor IV which has been named "attention demands", is present only in factory C.

After explaining that the differences in factor headings are due to special characteristics in each of the three factories, Lawshe and Satter conclude that two factors "skill demands and job characteristics" are as effective as the eleven factors initially used. They suggest, without proving the point, that a classification based upon these two factors would closely resemble a classification based upon eleven factors.

It is surprising to note that with one exception (135) fundamental weaknesses in this study have gone unchallenged, and that the pattern of investigation which this study had set, was copied by others (76, 150) with essentially the same results.

Lawshe and Satter in explaining their factors revert in essence to the old "man vs. environment" dichotomy. The skill demands factor is meant to imply those personal characteristics a man brings to his job, whereas the job characteristics refer to the environmental features a man has to put up with and for which he should be compensated.

Lawshe and Satter fail however to reconcile the abbreviated model which the factor analysis has produced, with the logical model of four factors and eleven items which they had used for their job evaluation. The discrepancy between the two models becomes even more marked when we examine the relative position of some of the items.

Item 3.3, Responsibility for the safety of others is considered as a job characteristic, i.e. an aspect of the job which the employee must contend with in the case of Factory A. In Factory B, this same item is lumped with the other items of responsibility as a skill demand, i.e. the requirement which the job imposes on the individual.

The factor of effort in the logical model of the N.E.M.A. job evaluation system means unequivocally this. Effort is seen as an exertion, and the willingness to make the necessary effort. The logical model postulates moreover that there are two types of effort. Physical effort which is essentially muscular, and mental effort which would cover such concepts as eye strain, concentration, etc.... In the factor analytical model effort splits up. Physical effort becomes an external characteristic, something the man has to put up with, whereas mental effort remains internal. In factories A and B it is seen as a skill demand, and in factory C, it regains some of its original connotation of effort exercised when it is referred to as attention demands.

The first factor in the factor analytical model, i.e. Skill demands, which accounts for most of the variance is itself quite variable. It carries for all three factories the original three skill items, i.e. education, experience, initiative and ingenuity, and a responsibility item, i.e. responsibility for the work of others. But the similarity stops at this point. For factory C it carries no other items; for Factory B it carries all the other responsibility items, the mental effort item, and the item of unavoidable hazards (which common sense tells is the most characteristic of the environmental features a man has to put up with and for which he should be compensated); for factory A it includes mental effort and most of the responsibility items. To say then that this is the same factor, and to try to define it as "skill demands" is not altogether correct.

These dissimilarities become clear when we consider the essential characteristics of the three factories. Factory A comprises a number of different plants manufacturing aircraft engines. The jobs include a high proportion of machine operations requiring varying degrees of skill. Factory B manufactures airframes. The proportion of machine operations is small, whereas the proportion of riveting,

assembling and other semi-skilled hand operations is large. Factory C manufactures small caliber ammunition. A large proportion of the jobs comprise machine minding and visual inspection. This would explain the occurrence of the fourth factor in the factor analytical model. In this factory, "failure to attend to machine adequately will result in material damage and material damage can scarcely be affected in any other way".

Lawshe and Satter failed to prove convincingly that "there is considerable agreement from plant to plant in so far as the presence of factors is concerned". What they have found, and what others have found (76, 150), is that the application of factor analysis to job ratings generally yields a first factor which accounts for most of the variance. But this factor differs from situation to situation. These differences are even more marked if different systems of job evaluation are used (76, 150).

Lawshe and Satter have on the other hand stumbled on a finding which to them did not appear as very important. The special characteristics of the jobs in a factory tend to influence markedly the relation between factor ratings. Table B becomes much more meaningful if one bears in mind the special characteristics of the three factories. If different judges evaluated the jobs in each of the three factories, then one notes that in spite of the fact that the same method of job evaluation was used, a different grouping of the items occurs. This is possibly due to the influence certain groups of jobs have on the judgment of evaluators. This effect of the environment or the universe of jobs on the process of evaluation should have been studied further, as it is quite apparent that different factors emerge in different situations.

Subsequent research appears to have ignored completely this observation. In further publications Lawshe and others (102, 103, 105, 106) examined the effect abbreviated scales would have on the classification of jobs. They found, as Gray and Jones (60) had found, that though the results of the two scales correlated highly, a large number of jobs would be displaced by one wage grade or more. "If the three items abbreviated scale were employed in plant A, 62% of the jobs would remain in the same labour grade, 37.2% would be displaced

one labour grade, and 0.8% would be displaced two labour grades" (102). In a similar study carried out by Oliver and Winn (132), it was found that 28% of the jobs would be displaced by one grade if an abbreviated scale were used.

The specific effect occupations have on the factors which emerge was further shown by Lawshe and others (104) in a study carried out in 1948. They intercorrelated the ratings of 20 analysts on 40 jobs using the N.E.M.A. system and an abbreviated system Lawshe had developed. A factor analysis was carried out and now five instead of two factors emerged: skill demands (general) supervisory demands, job characteristics (hazardous) job characteristics (non-hazardous) and job responsibility.

The contention that abbreviated scales are as effective as more involved scales is not substantiated by the research we have reviewed. To begin with each particular study provides its own particular combination of factors. Even if we were to accept the desirability of abbreviated scales, there is no way of knowing in advance which combination of factors would be used until a complete job evaluation is undertaken using the longer scale. The results of the factor analysis would moreover be influenced by the particular universe of jobs which were evaluated. Secondly, the definition of the new factors becomes increasingly complex. This is only to be expected when we try to force into one dimension, a number of different and quite complex dimensions. Thirdly, as Kershner (92) pointed out "job evaluation systems are judged upon pragmatic considerations, and if the elimination of given categories will result in unhappiness for even small numbers of employees, there is little reason to believe such evaluation categories would be dropped". In view of the feeling of some trade unions (79) that job evaluation errs because it considers too few factors, there is doubt that the number of factors will be reduced even further because statistics appear to say so.

6.2.2 Rating behaviour.

In more recent times, the attention of research workers seems to have gone away from the development of abbreviated scales to a study of the behaviour of raters who use current methods of job evaluation. They have mainly concerned themselves with studies of reliability, and with factors which affect rating behaviour.

Chesler (21) and Cohen (23) have studied separately job evaluation procedures to measure the reliability of raters. Chesler found reliability coefficients ranging from .99 to .93. His study included clerical, administrative and supervisory jobs. Cohen found a reliability of .95, though he noticed some differences in the reliability of separate factors.

Lower reliabilities were reported by Ash (5). He found that ten trained analysts who were asked to evaluate 27 similar jobs were least reliable on a factor of mental effort, i.e. attention which had to be given to the job. Ash concludes that the lack of reliability was caused by insufficient information from the job description to evaluate this particular factor. In another study, carried out by Jones (89) at the University of Illinois, the ratings of lay people were compared to those of trained analysts. Descriptions of non-academic jobs were given for evaluation to supervisors, employees and trained analysts in the personnel department. Though all three groups agreed closely in the relative level of jobs, supervisors rated jobs higher than the employees. Ratings by employees agreed closely to those of the trained analysts.

A more thorough study of rating behaviour was undertaken by Holt and Wherry (73). Fifty raters were asked to rate the same twenty jobs by using five different job evaluation scales. For three of the job evaluation scales variance among raters was greater than variance among the jobs. On one of these scales in which the factors were not defined, variance among raters was three times as large as variance among the jobs. In only one of the five scales was variance among the raters less than variance among the jobs. Commenting on this study, Kershner (92) suggests that the so-called factors used in job evaluation are seldom the result of research, and that it is very doubtful whether research would yield as many levels of discriminability as postulated for most job evaluation factors.

The manner in which a rating committee reaches a judgment when evaluating jobs, was investigated by Elliott (45). He selected eight groups of five raters, and attached to each group a senior officer from the personnel department. Each group was asked to rate the same two jobs under nine headings,

i.e. intelligence, accuracy, education, skill, working pace, acceptability, range of work, responsibility, overall status. Before each group sat to discuss the jobs, it was told that no figures were to be quoted, and that each member would be asked to make a private record of the number of points he would award under each heading after the discussion had been concluded. Group members were all male, they came from different backgrounds, and different levels of management, and "were characteristic of members which go to comprise job evaluation committees in industry". They were all well acquainted with the two jobs being evaluated, i.e. a shorthand typist dealing with the general correspondence for an executive, and a cost clerk dealing with analysis and allocation of prime costs.

In four of the groups, the personnel officer was instructed to bias group members towards rating typists higher than clerks. In the other four groups, they were to bias the ratings in favour of the clerks. The important feature of this experiment, was that personnel officers were at no time allowed to originate opinions. They were to support merely the appropriate views presented by other members in the group.

The results clearly indicated that the personnel officers succeeded in biasing the groups to rate in the desired direction. Elliot concluded that "the status loaded committee may not in fact achieve objects it sets out to: it may neither be less subject to bias than an individual nor make use of the entire range of experience of its members".

The few studies which we were able to report offer conflicting evidence. Some authors claim that ratings in job evaluation are highly reliable, others are not certain, Holt and Wherry found them to be highly unreliable. Much depends of course on the particular circumstances in which the ratings were formulated. The experiment of Elliot strongly suggests the direction which research should take when examining the process of rating in job evaluation, i.e. the examination in an industrial setting of factors which influence evaluation.

6.2.3 The weighting of factors.

Here too we notice at the start a marked dearth of research data. The problem of weighting is in many ways fundamental to the whole process of job evaluation. The weights which will be given to mutually inconvertible factors reflect the particular philosophy we wish to incorporate in our process of wage determination.

The International Conference on job evaluation which was held at Geneva in 1950 discussed extensively the problem of weighting factors. The final report (80) which it produced reflects no major advance in this matter. It noted that there was in general use two manners of determining weights, i.e.

- a. deducing them from the current wage structure;
- b. assessing the relative scarcity of the required abilities.

The report goes on to say that the majority of those at the Conference favoured the principle of deducing weights from the current wage structure, because "job evaluation is not normally acceptable to the workers if it results in major changes in the existing hierarchy of wage rates". The conference felt moreover that as wages adjusted themselves in terms of supply and demand, current wages would reflect the relative scarcity of required abilities.

Deducing weights from the current wage structure can be done either arbitrarily or statistically. Arbitrary weights are allocated, for example by committees, using the factor comparison method and dividing the wage of each key job between the various factors. A similar approach may be used in the points system. A committee specially formed for this purpose considers which of the factors used are most important to the organization, allocates weights accordingly, and may examine the result on a sample number of jobs.

Stieber (168) reports that in the joint evaluation adopted by the American Steel industry, weights were computed by standard multiple correlation formula, i.e.

$$\text{Job Rate} = K + X_1 F_1 + X_2 F_2 + \dots + X_{12} F_{12}$$

where K is an unknown constant, X_1 is the weight for Factor 1,

F_1 is the preliminary score of the job on Factor 1. As twelve factors were used, the equation had 13 unknowns and required for its solution 13 simultaneous equations. This meant that 13 jobs had to be found, whose rates would be accepted as exactly correct by all the participants in the study.

It was of course not possible to find 13 jobs whose wage would be so precise that it could serve as a basis for determining someone else's wages. It was argued that because factor scores were the result of human judgment, any error involved in the evaluation of the 13 jobs would have a considerable effect upon the factor weights. Once again we find evidence that wages cannot be treated as coldly as debit and credit items. Each man's wage is of greater importance to him than it is to anyone else.

All the 2,565 jobs were used in the solution of factor weights, but a new problem presented itself. It was not possible to eliminate the so-called distortions in the linear factor weights caused by intercorrelation between factors. "When the coefficient of intercorrelation between two factors approaches +0.9, weight may be shifted from one to the other freely with little or no effect upon the total evaluations resulting from the plan". The consequence is that some of the factors acquire high positive weights, whereas others acquire negative weights. Stieber reports that in the American Steel Industry plan, the factor of "Hazards", and that of "Responsibility for Safety of others" had negative weights. Arbous (4) in a similar study undertaken for Iscor found that five out of 12 factors had negative weights.

There are a number of reasons for the occurrence of negative weights. The two which are most likely is that the factor correlates negatively with the criterion, i.e. the current wage, or else that the factor correlates very highly with others which have received in the final computation large weights.¹

1 Roberts, A.O.H. Personal communication.

The negative correlation between a factor and the wage was already reported in this study as evidence against the unfettered operation of the principle of supply and demand. Such negative correlations mean in actual fact that the initial determination of wages did not take account of a given factor, and that with the passing of time, high demands on this same factor were made of those who were lowest in the wage classification. Patently when we include the factor in our job evaluation, we aim to remedy a past inequity. But when we turn to the current wage to determine weights for our factors, we indicate that we wish to retain the status quo, and so dilute the remedy for past inequities to the level where it is no longer effective. By using current wages as the criterion on which to anchor our job evaluation, we tend therefore to perpetuate past inequities.

The high intercorrelation between ratings on various factors has often been observed in job evaluation studies. Stieber (168) writes that in the Steel Industry plan, "pre-employment training", "employment training and experience", and "mental skill" were so highly intercorrelated that it could be said that these factors measured the same quality. These high intercorrelations have often been labelled as instances of the halo effect. We shall do well to remember what Johnson (87) wrote on this matter, i.e. that until such time that we can develop experiments which will separate objective from subjective correlations, we cannot speak of the existence of the halo effect. That analysts fail to discriminate in job evaluation between two dimensions may well be due to the complexity of evaluating the dimensions, and possibly because as Kershner (92) pointed out, some dimensions are mere "word figments". Equally possible however is the fact that there may exist an objective correlation between highly correlated factors. One sees in industry a rule of the thumb principle extensively used. "Expect the most from those you pay most". People in the higher occupational echelons are generally speaking persons of higher education with extensive experience who must assume substantial responsibilities, show most tact, and work almost entirely on their own. Such an objective correlation was also apparent in the study of Lawshe and Satter (107) we discussed above. The authors pointed out that in factory C - the munition factory - the nature of jobs was such that the responsibility for material "was a direct consequence of the visual attention a person gave to his job".

The problem of negative weights was handled in a practical and expedient manner by the American Steel Industry. The factor responsibility for the safety of others was given a small positive weight because "the companies wanted to stress the idea of responsibility for safety of others as a part of the general safety programme". The companies recognized moreover that past wages had failed to take account of hazards. "Weights were accordingly adjusted and a level of hazard above the top of any benchmark job was added to place properly such jobs as high tension lineman, bridge erector and others".

Such arbitrary adjustment in weights raises the problem of establishing the equivalence of one system of job evaluation in terms of another. This problem was illustrated by Edwards (43) when he compared the United Steel industry plan, emphasizing heavy responsibility, and a plan for light industry weighting skill. As indicated in Table IIIa, important jobs in the steel industry would rank differently under the two systems. We show in Table IIIb weights given to the same factors under four different points systems of job evaluation. These weights reflect the relative values attached to factors by industries facing different problems. Electrical manufacturers place a very high premium on skill,

Job	Light industry plan	Steel plan
Toolmaker	1	3
Roller, blooming mill	2	1
Machinist	3	4
First helper, open hearth	4	2
Common labourer	5	6
Assembler, light bench work	6	5

TABLE IIIa. Comparative ranking of jobs under two different evaluation plans (43).

Factor	N.E.M.A. and N.M.T.A.	General Electric	Westinghouse	U.S. Steel
Skill	50%	62.5%	60.5%	24%
Effort	15%	12.5%	22.5%	16%
Responsibility	20%	12.5%	13.5%	45%
Job Conditions	15%	12.5%	3.5%	15%
TOTAL	100%	100.0%	100.0%	100%

TABLE IIIb. Relative point values in four job evaluation plans (122).

Westinghouse gives a nominal weight to job conditions, the U.S. Steel plan stresses responsibility.

Some doubt has been expressed as to whether it is at all necessary to weight factors. The I.L.O. publication on job evaluation (81) mentions an experiment carried out by Professor Rogers on factor weights. He took a group of 80 jobs which had been evaluated on 12 factors. He set up a committee to assign weights to each factor, put the weights on chips, dropped the chips into a hat and stirred them up. The weights were then re-allocated to the various factors in the order in which the chips were taken out of the hat. The scrambled weighting of the various factors yielded results which correlated highly with the results based on the original weights.

The validity of Professor Rogers' experiment has been challenged by Fisher (48) who claimed to have tried a similar procedure on 2,000 jobs covering a much wider range of skills. The best correlations he could get were from $+ .70$ to $+ .73$.

We must note that the high correlations found by Professor Rogers and by Fisher are due in part to the fact that factor scores remain the same whether weighted under one set of conditions or another. The experiment of Gray and Jones (60) we discussed above, showed that even though two different approaches to job evaluation correlate highly, the ultimate wage classification is altered substantially.

There are at present no better dimensions in job evaluation than the dimensions we currently use. These are in most cases the consequence of "a priori" logical reasoning. We expect these dimensions to discriminate in the reality of the work situation as adequately as they appeared to have done when we evolved our logical model. When we realize that this is not the case, we consider the possibility of weighting.

But as the preceeding discussion has indicated, the problem of determining factor weights has not satisfactorily been solved. Each solution presents a number of additional problems. In the absence of definite principles, ad hoc solutions are given which are often the result of hard bargaining.

The problem is clearly not an easy one to solve, possibly because we know far too little about the judgment of complex conceptual material. A more scientific solution would require the answer to many difficult questions, some of an even philosophical nature. We would have to consider such matters as the nature of value, the principles of equity, the manner workers are motivated, the importance they attach to wage differentials, characteristics which differentiate suitably between jobs, the judgment of evaluators, in actual fact all those factors which are involved in the determination of wages. The failure to solve satisfactorily the problem of weighting is in actual fact a reflection of the limitations of job evaluation. It is a failure encountered in psychology whenever techniques endeavour to solve complex problems with inadequate tools. It is clearly the function of research to understand more fully the complex problems job evaluation encounters, and to improve the efficiency of the tools it uses.

CHAPTER III.

BACKGROUND TO THIS STUDY.

1. The Bantu in the South African economy.

It is generally agreed (25, 33, 38) that the first major structural change in the South African economy was the sudden transformation from 1870 to 1890 of a mainly self-supporting agricultural economy to a more capitalistic, mineral, and agricultural economy. There followed during the 20th century considerable developments in the manufacturing industries. Since 1917, farming and mining decreased in their contribution to the national income, whereas the contribution of manufacturing industries steadily increased.

The consequence of this expansion in the manufacturing sector of the economy has been an increased utilization of Bantu workers. The Commission of Enquiry into industrial legislation noted in its report of 1951 (25) that even "if the country were to gain European migrants at the rate of 5,000 a year, it would come to depend more and more on the Bantu as representing the largest number of workers".

The introduction of the Bantu to the South African industrial scene occurred in the first diamond fields. Doney (38) gives a vivid account of the first Bantu labourers. "Few of the Africans had any sense of the exchange market". They had, in the European sense, few needs to satisfy, but flocked nevertheless to the diggings in their hundreds, often at tremendous risk and personal effort. They were very primitive, did solely unskilled work, and were primarily motivated to come to work in order to acquire a gun. There is no doubt that in the subsistence economy from which they came a gun was highly valued.

As the supply of diamonds on surface diminished, the need to dig deeper into the ground resulted in the development of a truly capitalistic society. The simple unscientific methods of the average digger were no longer effective; the costs involved in mining to any great depth were beyond him. Small companies began to take over individual claims and they in turn amalgamated into larger companies.

At the very start of this industrial development, the Bantu worker was precluded from entering the more skilled jobs. Doxey writes that the pattern which emerged in the labour situation was that "of the Europeans showing every sign of preparedness to use their collective strength to ensure their exclusive supremacy in the labour market. Gradually the concept of trade unionism, and for that matter, of socialism, became accepted in the minds of European artisans as the means of maintaining their own position against non-White inroads".

This rigid pattern was maintained for a while wherever fresh industrial activities developed. The primitive Bantu who had come to an advanced technological society with no skills was in no position to bargain. He remained essentially a labourer, undertaking tasks which required little or no training.

With time, however, this rigid position was changed somewhat. The pressures on the economy of the country of two world wars, and the continuous demands which an expanding manufacturing industry made for semi-skilled labour resulted in a significant occupational development for the Bantu. He was allowed to undertake a wide range of semi-skilled jobs, all of which required no prior technical training but could be learnt at work.

A further change took place in 1951 with the publication of the Native Building Workers Act. The Act was seen as the natural outcome of the governing party's policy of separate development. It provided for the first technical training allowed to Africans on the understanding that they would not compete with Europeans outside the Native Areas.

The large Bantu settlements near the major cities of the Republic contain at present heterogeneous occupational groups. The majority of Bantu workers are still engaged in unskilled and labouring jobs, but an increasing number are entering semi-skilled occupations. There has also emerged a class of professional men, largely teachers, and another of artisans ranging in occupations from bricklayers to plumbers and motor mechanics.

Most of the Bantu workers are employed in organizations managed by Europeans. As they work in "European" areas, they are subject to various acts of legislation. Melinsky and du Randt (105) write that the source of all present laws controlling the life of Bantu workers in urban centres is a policy statement made by the Minister of Native Affairs in 1956: "The fundamental principle is the traditional policy of separate development. The European enjoys rights and privileges in one part of the country - the European area - and the Native has similar rights and privileges in the Native areas, i.e. the Reserves, whether tribal territory or areas, purchased for him by the Government".

Current legislation restricts the activities of Bantu workers in the following manner:

1. He may not enter a skilled trade, unless it is to work in Native areas (The Apprenticeship Act No. 37 of 1944; the Native Building Workers Act No. 27 of 1951).
2. He may not undertake any specified class of work which has been reserved for persons of a race other than his, unless special permission is given by the Minister of Labour (The Industrial Conciliation Act, No. 41 of 1959).
3. He may not form trade unions which will receive official acceptance; he may not instigate a strike (The Native Labour Settlement of Disputes Act, No. 59 of 1955).
4. He may not seek employment in urban centres other than the one he resides in. If he has recently entered the urban area from rural districts, he is restricted to work only for one employer in the category of work for which he was initially employed. When his contract of work terminates, he returns to his rural district (Native Laws Amendment Act No. 54 of 1952; Government Notice No. 63 of 9th January, 1959).

The Bantu remains however an important factor in the European sector of the South African economy. Any expanding economy such as the South African economy is chronically short of capital. The depressed wage structure which exists among Bantu workers reduces the need to finance the purchase of mechanical plant. The presence of a large pool of unskilled

labour enables moreover more flexible planning of industrial activities. Labour is largely trained on the job, and the allocation of tasks is modified to suit any current economic needs. There is no compunction, for example, to use machine operators on packaging or material handling, as all three activities can be learned on the job, in a reasonably short period of time.

2. The Determination of Wages for Bantu workers.

Wages for Bantu workers in urban occupations are largely determined by the Wage Board operating under the Wage Act No. 5 of 1957. The Board consists of three members (the chairman is at present an economist) appointed by the Minister of Labour, with "the object of investigating and making recommendations upon the general conditions of work and rates of pay in work spheres falling within the scope of the act. These include the major areas where Africans are employed, i.e. secondary industry, local authorities, catering services, etc...."

The Wage Board collects evidence in one of two ways: by means of postal questionnaires and from public hearings. advertised in the press and at which anyone may elect to give evidence. The Board may, in addition, examine work premises and any document it considers relevant to the particular investigation.

There are three principles which guide the Board in its determination of wages:

2.1 The payability of the industry, i.e. the ability of employers to carry on their business successfully should wages be raised. The Board is specifically directed in the Wage Act to examine pertinent economical facts such as the distance from markets, the cost of transport, etc....

2.2 The cost of living in any area in which the determination is to apply.

2.3 The value of any additions to the wage given by the employer, e.g. fringe benefits, board, rations, lodgings, etc....

The determination of wages is always prescribed in terms of minimum payable. The recommendations of the Board are incorporated in a report submitted to the Minister of Labour. If he finds them acceptable, he will gazette them in the form of a new wage determination which becomes legally binding on all employers.

The Wage Board is largely guided by current practices; it tries to assess how much of the status quo can be disturbed or needs to be disturbed. Though the Board is specifically debarred from differentiating or discriminating on the basis of race and colour, it must perforce take account of the large differentials which exist between the earnings and standard of living which exist between European and Bantu workers.

Employers of Bantu labour are at liberty to pay higher wages than the minimum stipulated by wage determinations. There has been in recent times a unique development in the emergence of the Bantu Wages and Productivity Association (158). This is a voluntary association of business men whose motive as expressed in their Summary of purposes is:

"to urge employers of Native labour in commerce, industry and public administration to take immediate and systematic steps to increase the weekly earnings and productivity of their Native workers".

The main consideration of this association stems from the views which Keynes expressed that an increase in earning power generally means an increase in business turnover. With particular reference to the South African economy, Goldberg (57) writes that "If it were possible on a sound economic basis, as I believe it is, to raise the present level of unskilled wages in commerce and industry from less than R28.00 per month to something over R40.00 per month, the market for food and other consumer goods would expand by over R140.00 million per annum".

These views are however not generally held. Conservative opinions among economists and business men stress the importance of raising productivity before changes in wages take place. Meter (124) for example, fears that any manufacturing industry which cannot operate on higher wages would have to cut into their reserves and so cause some form of disinvestment.

The production of raw materials would perhaps be most vulnerable as these have to be sold on international markets against keen competition, from countries with a lower wage structure or which have achieved a higher level of productivity. "In the case of the gold mining industry providing a substantial share of these exports of South Africa, it is not possible to ignore these considerations since the selling price of the product is fixed" (124). Meter feels therefore that at present an increased wage for all workers in all spheres of economic activity would be unrealistic. They would result in reduced activities in some of the most important sectors of the national economy.

Viljoen (174) reaches the same conclusion on quite different grounds. He doubts whether increased wages would actually result in an increase of productivity, "and for this reason, it appears to be desirable that wage increases should be preceded by increased productivity, rather than the other way about". If increases in wages for Bantu workers will not result in an immediate increase in productivity, the burden of increased costs would have to be borne by the employer. This would result in a curtailment of his margin of profit. "The question therefore is whether he, as well as the investor, would be satisfied with a smaller dividend. One great problem which makes it so difficult for the South African industries to encourage the flow of investment capital locally, and especially from overseas, is the fact that the dividends which they are able to pay are so small". Increased wages are therefore seen as a threat to future capital investment. Viljoen moreover doubts whether increased wages would have the effect of making the Bantu work harder. He writes: "I do not wish to generalise in expressing these views, but there are numerous examples in our industries where increased wage income had resulted immediately in a drop in the productivity of Bantu employees, and a sharp increase in the labour turnover and absenteeism. Because of his meagre necessities of life, the Bantu is sometimes prone to squander surplus income unproductively, or go for a rest until his funds are exhausted. Only then does he return, not necessarily to the same concern. The result is that he has to be trained all over again at his new place of employment, and that a further decline in his productivity has possibly set in in the interim. In other words, he does very little on his own accord to improve his own standard of living and to increase his productivity".

There are marked differences in the views held by business men and economists. Some of the reservations they have are possibly well worth noting. On the other hand, one wonders how valid their attempts are at predicting behaviour. Viljoen cautions that he does not wish to generalize from his views, but proceeds to do so. His views are in conflict with the findings of Glass (55). She reported that absenteeism and turnover among Bantu industrial workers was no greater than that of his counterparts overseas, and possibly much lower than European industrial workers in South Africa. She found moreover, that absenteeism and turnover were lowest where management had taken an active interest in their Bantu workers by formulating specific personnel policies and encouraging their implementation.

Most economists quoted in this section agree however that the onus for increased productivity lies with management. The Bantu worker with his relative lack of skills and the social restrictions imposed upon him can do very little to decide how work will proceed. Meter stresses the indivisibility of the firm. We cannot concern ourselves with the productivity of Bantu labour and ignore the productivity of European labour, of supervisors and managers.

It is in this context that perhaps the most significant changes are taking place. The presence of a plentiful supply of cheap labour has had in the past an inertia effect on managerial development. Cheap unskilled labour reduced the need for capital requirements and lends itself to more flexible utilization. The development of the South African economy is however, reaching the stage where cheap labour alone will not compensate for managerial inefficiency. Just as the small diggers in the diamond fields combined forces to finance more expensive methods of extraction, one finds now-a-days the grouping of individual capitalists into larger public companies. This in turn places greater pressures for the development of efficient managers. All available organizational techniques are used to improve the efficiency of the firm. These would include costing, budgetary controls, marketing research, work study and personnel administration.

This improvement in managerial sophistication is reflected in the manner job evaluation has increasingly been used to rationalize Bantu wages. Until recently, the determination of Bantu wages was entirely regulated by the minimum laid down by the Wage Board. From being straightforward, these discriminations are increasingly differentiating between levels of skills.

There have been in addition an increasing number of instances where firms established wage plans for Bantu which discriminated between jobs on a more systematic basis than provided by the Wage determination board. The gold mining industry undertook since 1955, a number of job evaluation studies for its African employees. Though the bulk of the work done is found in a series of confidential reports, some of the problems which were encountered and the method which was developed have been reported by Hudson and Murray (77). They noted that the increasing complexity of jobs performed by Africans had made management in South Africa aware of the need to relate remuneration more closely to job requirements.

The experimental work reported here was based on a job evaluation study carried out by the National Institute for Personnel Research on behalf of the Johannesburg City Council. The study covered all the jobs done by Africans.

3. The background to this study.

The city of Johannesburg is the largest in the Republic of South Africa. It extends over an area of 94 square miles, and ranks among the largest employers of labour. Its African labour force ranges from 19,000 to 21,000 with a yearly wage bill of approximately R7,000,000. Present government policies of separate development have encouraged the employment of Africans in an increasing number of skilled occupations. The Johannesburg Municipality employs them as medical practitioners, social workers, sports organizers, office supervisors, internal accountants, as well as artisans, machine operators, and varying degrees of semi-skilled workers. The largest proportion of the labour force is engaged however in unskilled work.

The municipality experienced over the years difficulties with the determination of wages for Africans. Attempts to develop a more systematic basis on which to determine their wages were first made in 1947. There were complaints that the majority of the employees were paid the minimum rate laid down by the wage determination operative (Wage Determination No. 105 of 1943). Workers doing superior work such as blacksmith strikers, survey assistants were paid slightly more. The basis of determining the additional compensation was left however to each department, with the consequent development of irregularities not only between departments but also within departments. Various attempts were made to classify jobs more systematically and to introduce a uniform pay policy for the whole of the City Council.

This move was precipitated by a dispute between the City Council and the Johannesburg Municipality African Workers' Union. The dispute was based mainly on the Union's claim for a minimum wage of 10 shillings a day, but it covered too the need to classify jobs more accurately. The dispute was taken to arbitration; arguments were placed before the Tribunal by representatives of Council and the trade union. The arbitrators examined in situ many of the jobs done by Africans and appear to have satisfied themselves of the need to classify jobs into a number of wage grades. The arbitrators were presented with two systems of job classification: one from the union, the other from the Council. Both the Union and Council suggested five grades of pay, based essentially on the degree of skill required in the job, the responsibilities which had to be assumed, and work conditions, e.g. doing unpleasant and hazardous work. Council stressed responsibility over skill, whereas the Union stressed both as being of equal importance. The Union moreover placed greater emphasis on unpleasant work conditions than did Council.

The award made by the arbitrators late in 1947, and which came to be known as the "Botha award", recommended six grades of pay. The distinction was made on the basis of skill and responsibility. The award appears to have compromised between the Council's suggestions and those made by the Union. The arbitrators rejected the Union's request for a minimum wage, and was guided in its award of wages largely by the current practice outside Council.

The administration of African wages in the City Council since 1947 was largely based on the Botha award. No special machinery for its implementation was introduced however. Each department in Council had discretion to interpret the award in its own way. Many irregularities between departments and within departments developed; with time, the system of classification failed to take account of changes in the African job structure. New jobs came into existence and some of the original jobs disappeared altogether. Dissatisfaction was expressed by management on the differentials which the Botha award had established between grades.

In 1956, the Johannesburg City Council sought the advice of the National Institute for Personnel Research. An operational study was carried out by the Institute. In its report, the Institute recommended the inception of personnel departments which would regularize and maintain personnel practices for Africans and Europeans. Priority was given however to problems dealing with African labour, as these required the most urgent attention. Of these the most urgent problem was seen to deal with the establishment of a systematic and uniform wage policy for all African workers.

The appointment of a number of personnel officers was authorized. It was decided that they would start by establishing descriptions of all jobs done by Africans and survey in full the area in which they were to be employed. The descriptions would then be used for job evaluation. As, however, the number of jobs which would be described and analyzed was acknowledged to be very large, the description of each job would need to be so detailed that it would meet two requirements. A description should be accepted as reliable without the job being studied independently by a second observer. It should supply sufficient information for an evaluation of jobs on twelve dimensions which had been postulated a priori, as well as provide information on any other additional dimension we had failed to take into account at the start.

The job analysts were given twelve weeks of full-time training on job analysis. This involved them in attending a number of lectures and in extensive practical work. They were shown how to survey jobs in a department, how to interview supervisors and incumbents, and how to observe analytically activities on the job and satisfy themselves that

they had grasped the essential features of a job. They were guided by a number of schedules which they used as the basis of their descriptions. These schedules had moreover the advantage of producing a uniform set of job descriptions and so reduced appreciably the labour of editing them. We must point out again that there was no record at the start of the jobs done by Africans, and that the labour force had grown over the years in an unplanned and obscure manner.

A number of experiments were undertaken in the course of this project, to test some of the assumptions we made. Some of these experiments are reported in full here as they have direct bearing on the theory and practice of job evaluation.

The first experiment concerns itself with the behaviour of raters. We wished to know whether the schedule for job descriptions we had developed a priori yielded consistent results with the different analysts. We argued that job descriptions involve in themselves a fine process of judgment and wished to know whether these judgments - largely determined by the schedule - would be the same for all raters. We chose to study as a specific source of bias the effect the particular group of jobs studied would have on the analyst.

The second experiment was more fundamental to the theory of evaluation. Records of the past dispute between the African Trade Union and the Council had indicated that different emphasis was placed on the concepts which underlie the evaluation of jobs. We wanted to know what concepts are used by lay people, whether they were the same for a sample of management officials in the Council as they would be for samples of African employees at varying occupational levels, and if possible, to get some indications of the relative emphasis placed on these concepts.

The aims of this investigation can therefore be formulated as follows:

4. Aims of this investigation.

This investigation concerns itself with certain aspects of the evaluation of jobs currently done by Africans in the city of Johannesburg. It comprises two experiments which tested separate hypotheses:

- 4.1 That European analysts evaluating African jobs will be influenced in their judgments by the particular group of jobs they happen to be studying.
- 4.2 That the concepts used in the evaluation of jobs and the relative importance attached to them are the same for a sample of European management officials as they would be for Africans at various occupational levels.

CHAPTER IV.

THE JUDGMENT OF JOB ANALYSTS.

1. The conceptual nature of job analysis.

There is little doubt in our minds that job evaluation is based entirely on human judgment. When we evaluate jobs, we are called upon to make complex judgments which we sense to be more difficult than perceptual judgments or affective judgments of a simple nature. Abstracting any value concept, as Johnson (87) pointed out, offers more possibilities for interference in the thought processes. "The stimulus material is heterogeneous, with no one prominent aspect or dimension to which the judge can be easily prepared to respond ... The response is correlated with more than one aspect of the stimulus material".

What appears to be less obvious however is the extent to which human judgment enters in the very process of sorting out the stimulus material on which the job evaluation will be based. Job analysis, which precedes job evaluation, is in itself a highly subjective process. It is based on concepts which often carry a greater load of inferences than they do of observations.

The first plea for a less subjective approach to job analysis was made by Kitson (94) way back in 1921. He argued that the scientific method should be applied to job analysis. He meant by this that jobs should be studied in minute detail. He wrote "Just as the science of human anatomy in the course of its development was obliged to adopt the microscope and to make minute differentiation between structures, so must job analysis proceed to divide the job into its very minute elements". Forty years later, we find the same dissatisfaction among critics of job analysis (52, 90, 92), the same plea for a more scientific approach, but still no suggestions as to the manner in which this is to be achieved.

The reason why job analysis has not become more scientific may well be due to its inherent subjective nature. This becomes apparent as we examine current techniques of job analysis. They all rely on varying degrees of observation and subjective elaboration of the material observed. The

process of job analysis may depend largely on the person doing the job or may involve an external observer to the work situation, namely the job analyst. We propose to examine the subjective element in the four techniques of job analysis currently used:

- 1.1 The questionnaire or self-description.
- 1.2 Direct observation of the work situation.
- 1.3 Interviewing the worker and his supervisor.
- 1.4 Work participation.

1.1 The questionnaire or self-description.

The questionnaire or self-description relies almost entirely on the worker to analyse the work he is doing. He performs such analysis essentially on his own, but may be guided by a pattern set in a questionnaire. Items may be open-ended, e.g. "What are your duties and responsibilities?"; "How many people do you supervise?" The questionnaire may, on the other hand, take the form of a check list comprising items such as "I plan the analysis of quantitative data"; "I write or dictate at least 25 letters per week"; "I formulate wage policies".

It is reasonably clear that whether the questionnaire takes the form of a check list or includes open-ended questions, the analysis of the job is done essentially at the level of abstractions. When we discuss duties and responsibilities, we endeavour to summarize myriads of activities and impressions which go to form a job. Even in a specific question like "How many people do you supervise?" one has to consider a number of side issues. Must we take into account direct as well as indirect supervision? What is the nature of supervision? Do staff consultants supervise the work of those they have advised?

The element of subjectivity in this form of analysis is most apparent in the balance which must be struck between using terms which are too general and ensuring that statements made carry a uniform meaning. It is in this balance that the quality of the final job analysis lies. However advantageous this technique may be (it divides the burden of job analysis between all employees in an organization, and produces a great

quantity of material over a brief period of time) the quality of analysis varies markedly from individual to individual. Some may use a unit which is very detailed - as in a minute chronological sequence of events - others would develop abstractions which are so general as to be meaningless. Few persons possess without prior training an analytical and detached manner of looking at their own jobs. This is possibly due to the fact that the subjective process of abstraction is a skill requiring extensive training and self-discipline.

1.2 Direct observations of the work situation.

The technique of direct observation is extensively used in time and motion study. Such a technique is perhaps most readily used where the analysis needs to be carried out at a superficial level, e.g. what movements of limbs take place in the task, or else where the task is of a simple and repetitive nature. In such cases the major components of the task are readily observable. Observations may be supplemented by the use of the cine camera. The record it takes of the main activity can be studied over and over at leisure.

The extent to which activities in a work situation can be observed is however restricted. There are in the first place, practical limitations in our techniques of observation. Our experience in psychology tells us that we cannot predict behaviour by merely observing it. We do not know for certain how behaviour is controlled and integrated by the higher nervous system. In turn, when the major activities in a task are carried out at the mental level, these activities cannot be observed but must be inferred from some action which is visible. It can be safely assumed therefore that when we analyse a job, direct observations are not adequate. We constantly draw subjective inferences from what we observe and check these inferences through discussions with the worker and his supervisor. Sheer minute observations as Kitson (94) suggested would not only be uneconomical, but also inadequate.

The subjective element in direct observations of jobs is further seen in the fact that in all cases, direct observations must be preceded by a fair amount of familiarization with the work to be done. No job analyst can operate efficiently if he were to be cast directly into the work

situation without being told something of the activity carried out. Even if he were, he would draw on his past experience to guess what was going on. As only a sample of all possible activities can be observed, the analyst uses his discretion (with all the subjective connotations this word carries) at three levels: selecting the particular activity to observe; deciding on the number of observations to be made; deciding on the detail with which his observations will be recorded and elaborated.

It seems then that even the least subjective technique of job analysis has a large subjective component.

1.3 Interviewing the worker and his supervisor.

In an interview situation, the analyst relies entirely on the observations which the worker has made of his own job and the inferences which he has drawn from them. The analyst may guide the worker to make more valid inferences, but he is wholly dependent on the recollections of the worker.

Interviews vary in degree of specificity. The job analysis formula "What? How? Why?" (148) may be used. The formula is deceptively simple and relies extensively on the analyst to judge whether sufficient data have been collected.

When more precise information is needed, the critical incident technique of Flanagan (49) is used. Before the technique may be used the purpose of the job must be determined. Flanagan writes that this very first step depends on human judgment: "It is necessary to accept someone's judgment as to what the relevant purpose is. If people will not agree, a decision must be made as to whose judgment to accept" (50). When the purpose of the job and its consequences are sufficiently clear, then critical incidents are collected. An incident is defined as "any observable human activity that is sufficiently complete in itself to permit predictions to be made about the person performing the act". An incident is critical when it is judged to contribute significantly to the purpose of the job.

Critical incidents are collected from persons connected with a job. They would either be actively engaged in it or else responsible for its control in some manner or other.

The procedure for collecting critical incidents is rigorously laid down. Questions are asked in precisely the same manner to reduce bias. The person narrating the incident does so in specific terms and with a minimum of generalizations. After a sufficient number of incidents have been collected, they are examined to formulate a number of categories. The incidents are then categorized, tabulations are drawn, and the critical requirements of the job established.

The critical incident technique, lengthy as it may be to apply, has a number of advantages. It consciously endeavours to reduce subjective bias by emphasizing that specific instances of behaviour must be reported. Few a priori concepts restrict the collection of incidents. The person narrating the incident endeavours not to confuse the analyst with generalizations which may lack a factual basis.

The weakness of the technique lies however in its subjective component and in the difficulty narrators have to stick to the specific. The technique is at its basis no more than the collection of verbal reports, quite dependent on the perspicacity of the incumbent and his supervisor. They must actively think, understand the concept of the critical incident, and relate it to the purpose of the job which has been presented to them in a summary form. The resultant behaviour is often disappointing and reminds us of a pertinent remark made by I.A. Richards (147) "Thinking - in the sense of a thorough attempt to compare all the aspects of a situation, to analyse its parts, to reconcile one with another in all its various implications - is an arduous and not immediately profitable occupation". When Richards wrote these words he had in mind the outstanding success of mass publications and the levelling down of ideas which results from the unwillingness of people to think because they are tired. We deal essentially with this mass of people when we try to elicit critical incidents. The process of levelling down, of resorting to the stock response, of not being able to substantiate with facts the generalizations one has formed about a job, occur quite frequently when critical incidents are elicited.

Another characteristic feature of the technique is its sampling procedure. This is desirable for it recognizes that it is not practical to collect all the facts about a job.

The manner in which sampling is done, however, depends entirely on human judgment. Flanagan mentions that from 50 to 100 incidents are sufficient to describe a simple job. On the other hand, from 1,000 to 2,000 incidents would be required for skilled jobs. There are no indications of the manner in which these numbers were derived. One assumes that they were arbitrarily set from experience about the technique and its application in a variety of jobs. Some doubt must be cast moreover on the very process of sampling events. When we sample events we do not sample discrete units in the manner in which we would when sampling persons from a given population. Events in a job differ vastly in importance. Though Flanagan restricts himself to critical incidents, the criterion of that which is critical is broad enough to include events of varying importance. We must conclude therefore that sampling of events must remain for the time being an essentially subjective process.

The subjective element enters markedly in the categorization of events. The manner in which this will be done will be largely influenced by the concepts the psychologist has acquired. Bruner (18) argues that there exists a near infinitude of ways of grouping events in terms of discriminable properties, and that the categories which we use reflect deeply the culture we have acquired. This is not only seen in the way various psychologists would categorize critical events, but also in current publications related to job analysis. We could compare for example the manner in which Jaques categorizes work as against the manner recommended by Otis and Leukart (135) in their book on job evaluation.

Whatever procedure of interviewing is used in job analysis, such procedure would be strongly steeped in subjectiveness.

1.4 Work participation.

The conceptual background which the psychologist may have acquired is particularly important when jobs are analysed through work participation. This approach usually followed by a trained psychologist, means that the analyst learns to do the job himself. The technique which is largely introspective, endeavours to analyse intensely the perceptual cues the worker uses in his job.

Work participation was first reported by Viteles (175). An illustration of a successful application of the technique was given by King (93) in her study of the job of loopers in the hosiery trade. She had been asked to study the job herself in order to shorten the period of training. Prior to her study, it was traditionally held that a looper took six months to learn her job and become proficient at it.

King noticed that the loopers worked with a material which looked essentially like cheese cloth. Their task consisted in setting the loops at the end of the material on hooks in a revolving dial. The dial attached to a knitting machine revolved on a horizontal plan. The hooks on the dial were equidistant from each other. The essence of the task lay in the ability of the loopers to work at speed and miss no loops. If a loop were missed, then the whole sock would be rejected.

The knack of looping appeared to come all of a sudden. King observed that the material used showed two patterns. There was a pattern of vertical ribs clearly seen, and a pattern of horizontal stitches which became apparent only after forced training. The looper in other words had to organize her perception "to make relevant cues stand out in a conflicting background". King found that the best way to do this was to concentrate on one loop, then on a few, and finally on a whole row. She used the movement of the dial and its position on the horizontal plane as a major reference point. She notices too that kinaesthetic cues were quite important. They were continuously used to judge whether the right tension was placed on the material, so that the spacing of loops and hooks coincided. As she became more skilled, she found that the kinaesthetic cues were in fact more extensively used than the visual cues. She succeeded in reducing the training period of loopers from six months to two weeks.

Ombredane and Faverge (133) have systematized work participation by endeavouring to graft concepts of information theory to job analysis. This approach has also been followed in Great Britain (2, 3, 26). Perceptual cues are viewed as information which the worker receives from his immediate environment and from within himself. As was the case in King's study, full use is made of the concept of figure and ground, and of the fact that a worker uses perceptual cues selectively and learns to anticipate them.

Work participation rests almost entirely on the concepts the psychologist has acquired and the manner in which he applies them to his introspections. This process of analysis can be viewed as almost entirely subjective.

1.5 Concluding remarks.

Our examination of the four current techniques of job analysis has revealed that they all contain a large subjective element. This is partly due to the fact that the unit to which we analyse the job is itself an indefinite entity. It is also due to natural difficulties we encounter when we endeavour to represent through a static medium an essentially dynamic activity. Job analysis most commonly ends with a written description. This is in essence a summary of the observations which have been made, and of the inferences the analyst was able to draw from them. As the description must be of "manageable length", the analyst is highly selective. One cannot for example incorporate in the description of a professional job, the full body of knowledge which was acquired over the years. The ideal which Gagne (52) set, that job descriptions should enable the person who reads them to go back to the original behaviour, is rarely met.

The selection of information which will finally go into the job description is an entirely subjective process. It is primarily influenced by the purpose for which jobs are analysed. Where the development of training courses is contemplated, the analysis of jobs will be extremely detailed and involved. In job evaluation, on the other hand, the analysis is more perfunctory and therefore more dependent on human judgment.

2. The method used in this study.

We faced at the outset of this study, three limiting factors. We were to evaluate an unknown number of jobs done by over 20,000 Africans. We had to complete the study in as brief a period of time as possible. We could only use seven job analysts, most of which had had no training in occupational psychology.

The exact number of jobs which we would encounter was unknown to us. We knew that the range extended from semi-professional occupations to labouring jobs. A brief survey of the weekly paid jobs had been carried out two years before by an industrial psychologist from the National Institute for Personnel Research. The survey had been carried within the context of an operational study and was aimed at determining whether there was sufficient differentiation among labouring and semi-skilled jobs to warrant the use of selection procedures. He estimated that more than 400 jobs would be found.

We were given eighteen months in which to complete the study. The consequences of administering a wage scheme which had kept pace with current industrial development were increasingly felt. There had been substantial developments in the manner in which African labour was used. A consistent rise in African wages outside the Council had made the terms of the initial award redundant. They were modified by means of additions to the cost of living allowance, but these were felt to be short-term remedies. The Minister of Labour had moreover instructed the Wage Board to prepare a new determination for local authorities. All these pressures added a great sense of urgency to the investigation.

Research funds restricted the number of potential job analysts to seven. The men who were finally selected had considerable administrative experience, but were mostly unacquainted with the techniques of job analysis and evaluation.

The cumulative effect of these three limitations was that we had to develop a technique of job analysis which would ensure that jobs were seen only once. Sufficient information would have to be supplied for the job to be evaluated by someone who had not seen it.

After some discussions we decided to use a point system of job evaluation. This system would place least burden on job analysts, and would ensure at the end of the evaluation that a classification of jobs could be derived in a reasonably brief period of time. The large number of departments in the City Council, and the wide range of jobs precluded the use of ranking methods. The unknown nature of the demands these jobs made prevented us from using a system of job classification. The technique of factor comparison was also

excluded. The technique requires that a number of "key jobs" found whose wages are considered as fair or equitable. We could find no such jobs. Most officials we interviewed expressed strong dissatisfaction with wages paid to all African jobs.

The point system we used was based on twelve factors which we had culled from the literature and from our past experience in the evaluation of African jobs. These were:

- a. educational background, i.e. the amount of knowledge or schooling required before a worker is considered for the job;
- b. work background, i.e. the training the worker must have before being considered as suitable for the job;
- c. job training, i.e. the degree and extent of on the job training necessary for satisfactory performance;
- d. extent of knowledge on the job, i.e. some measure of the amount of knowledge a worker needs to have to do his job satisfactorily;
- e. mental skills, i.e. an assessment of the degree to which judgement, insight and mental ability are necessary in the job;
- f. mental effort, i.e. an assessment of the attention and vigilance a worker needs to give to his job;
- g. physical skills, i.e. an assessment of the co-ordination required between sensory cues and motor responses;
- h. physical effort, i.e. the exertion required by the job and the frequency with which it occurred;
- i. responsibility for equipment and material included a section dealing with the responsibility for material which is guarded;
- j. responsibility for personal contacts included a section dealing with supervisory responsibility;
- k. work surroundings dealing with those environmental or physical conditions under which the worker must perform his job and over which he has no control;

1. work hazards which dealt with the degree of exposure to accidents and the probability of resulting injury.

We felt that these twelve factors would be comprehensive enough to cover all the job characteristics to be found among Africans in the Johannesburg City Council. We were aware of the fact that some of these factors would predominate in one occupational sector, whereas other factors would predominate in another. For example, physical effort work surroundings would appear as important in labouring jobs. Physical skills, responsibility for equipment would occur in the new type of semi-skilled jobs. Education, work background would predominate in clerical and semi-professional positions.

We feared however that these factors, exhaustive as they appeared to be, would acquire different connotations as the analyst moved from one group of jobs to another. Work hazards for example could mean quite different things when applied to labourers working in sewers, to the policeman patrolling a township at night, or to a nurse working with tubercolotics. Though one could see specific hazards present in these three situations, one would be hard put to establish some common scale between them.

We felt in addition that the job analysts would encounter serious difficulties in developing a common conceptual framework to guide them in their job analyses. The brief discussion on the subjective nature of job analysis illustrated the importance of such a framework. Job analysts would need guidance from the start on the selective manner with which they were to collect information. Sufficient information would have to be produced at one sitting for the evaluation of any job. As explained above, the pressures placed upon us to complete the evaluation of all jobs in 18 months, clearly precluded any job from being analyzed twice.

It is for all these reasons that we developed the J.D. 3 M. job analysis schedule, which appears in the appendix. The design of the schedule was suggested in part by Gilmour (54) and in part by the attitudinal studies carried out by Marriott (118, 119) and Cortis (29). The schedule presented for each of the twelve factors as many component scales as was possible to determine on an a priori basis. The analyst had to supply moreover a verbal justification or an example for every rating he gave. The schedule included a number of open-ended items.

After the analysts had been trained in various techniques of job analysis, the J.D. 3 M. schedule was discussed extensively with them. It was modified and tried on five jobs. After further discussions, a number of bench mark examples were included in the schedule to help anchor some of the scales. We must point out that though the schedule had been based on practical experience, its design was essentially a logical one.

We decided to test the schedule on a range of jobs before recommending its use in the full job evaluation programme. The possibility of doing experimental work presented itself at this juncture. Biesheuvel¹ formulated the basic question to the experiment which follows "Does a man who concerns himself with skilled jobs evaluate any differently from a man who concerns himself with unskilled jobs?" We felt that with the schedule as the one we had available, we could examine not only the actual ratings analysts gave, but probe into the conceptual analysis which preceded these ratings.

3. Rationale of the experiment.

The review of the literature has indicated that there is a dearth of research material in job evaluation. We know little of the manner in which evaluators rate jobs. The research findings we discussed led to contradictory conclusions.

An important limitation in research which has already been carried out, is that it is based on written job descriptions. Ratings in five (5, 21, 23, 73, 89) out of the six studies we reviewed were based on written job descriptions. The sixth study (45) deals with the ratings of a committee of people purported to be acquainted with the jobs discussed.

Research has ignored an essential feature of job evaluation. This is the fact that evaluators are often not provided with ready-made descriptions of the job. They must produce their own descriptions of jobs after observing the work situation, and discussing many of its features with the worker and his supervisor. Experiments have ignored altogether the process of judgment which is inherent in job analysis and precedes the rating of jobs.

1 Biesheuvel, S. Personal communication.

Trathner and Kubis (169) indicate that this may well be a serious omission. They found that the ratings of evaluators who read job descriptions were more consistent than the ratings of evaluators who examined the job directly. Supporting evidence comes from a related experiment carried out by Rupe (153). He found that when the same jobs were studied by analysts using different methods, the material which was extracted differed. Both these studies indicate the importance of studying the process of judgment which is inherent in job analysis. An evaluator who is presented with a ready-made description is clearly not in the same position as the analyst who must sort out the complex stimulus material presented by a work situation.

There are, however, good reasons why the process of job analysis has not been investigated. Job evaluation raters are more readily trained than job analysts. When job descriptions are available, these can be given to a large number of judges. All which really needs to be done is to explain to them the dimensions which will be used and how to relate them to the descriptions before them. Job analysts, on the other hand, take much longer to train. They must select material from complex and dynamic situations. The net result is that much fewer subjects are available for experimental study. Trathner and Kubis had 8 analysts study 10 jobs. Rupe reported on the job descriptions of 12 analysts dealing with 12 jobs.

Another difficulty which is encountered in experiments of this nature, is controlling sources of variance. As job content varies frequently from day to day, it is often not possible to control the experimental situation. Analysts may in actual fact be presented with different stimuli if they were to study the same job on different days.

We felt that notwithstanding these practical difficulties, an experiment which encompassed the process of judgment inherent in job analysis should be carried out. The hypothesis we intended to test was formulated as follows:

"That European analysts evaluating African jobs will be influenced in their judgments by the particular group of jobs they happen to be studying".

The hypothesis would be tested in a situation where the analyst would have to extract directly from the work situation the information he needed for his judgments.

Our hypothesis can be seen as an attempt to study the effect of the environment or the atmosphere on the judgment of raters. The broad effect of environmental conditions on judgments was first studied in the context of psychophysical experiments. Such matters as the composition of the stimulus series, background stimuli and other contextual stimuli were found to be highly relevant to the judgments made by subjects.

There is fair evidence to suggest that these findings are equally applicable to complex judgments made with verbal material. Sells (156), for example, found that the acceptance of the validity of the conclusion in a syllogism depended on the atmosphere created by the premises. Negative premises set up a negative atmosphere in which negative conclusions were preferred; positive premises created, on the other hand, a positive atmosphere. Sells found that he could predict the judgments his subjects would make from the atmosphere he created. In a related experiment, Ash and others (6) found strong evidence of the relevance of the general background to complex judgments which were made. They could significantly change the judgments students made of various occupations by manipulating the background or introducing fictitious standards.

It is reasonable, therefore, to expect that job analysts are influenced by the particular group of jobs they happen to be studying. Environment could then be construed as the common feature found in jobs belonging to the same family. The results of research in this particular topic would be beneficial in many ways. We would know, for example, whether the frequent practice of alternating analysts from one category of jobs to another is justified. This is largely determined by expediency but may in actual fact have a deleterious effect on the process of job analysis. The experiment would indicate moreover the effect which the emergence of Africans in skilled occupations has had on the judgments of European analysts.

4. The experimental method.

Six job analysts took part in this experiment. They received, prior to the experiment, three months of intensive training. They participated in the development of the job analysis schedule, used in the experiment. They used it on a number of jobs to acquaint themselves fully with its concepts and scales. A copy of the schedule - J.D. 3 M. - is shown in Appendix A.

The job analysts were randomly assigned to three groups of two persons each: groups A, B, and C. Groups A and B came to be known as the experimental groups, and group C as the control group. The experiment was conducted over a consecutive period of two months and was divided into two stages.

In the first stage, all three groups studied twenty jobs of an intermediate kind. The six analysts visited the work site at the same time; they observed the job for a couple of hours, and indicated on a special form which questions they wanted asked of the incumbent and his supervisor. Questions were asked by the same analyst throughout this stage of the experiment.

In the second stage of the experiment, the three groups were assigned different tasks. Group A studied ten skilled jobs, group B studied ten unskilled jobs. The two analysts in group C studied alternatively skilled and unskilled jobs, being paired in turn with analysts in groups A and B. Interviews were individually conducted by all four analysts studying a given job.

After observations for any particular job had been completed and the interviews conducted, the analysts returned to their offices and completed the job analysis schedules independently of each other. They were asked not to discuss with each other their impressions of the job or the manner in which they had filled their own schedule.

The selection of the forty jobs to be covered by this experiment, presented us with some problems. There was available little systematic information about jobs in the Johannesburg City Council. We held a series of discussions with chief clerks in the various departments and identified 109 different jobs. We selected 40 to meet the following requirements:

- (i) the jobs formed a skill continuum. We relied at this stage solely on information supplied to us by the chief clerks;
- (ii) each job had not less than 5 job incumbents. We wanted to ensure that it offered sufficient scope for observation. In actual fact, the same incumbent was seen by all analysts. We had to avoid the possibility, however, of the incumbent being absent when his job was to be studied.
- (iii) jobs would represent the following categories of work known to exist in the Council, i.e. clerical, artisan, gang work, single task jobs, multiple task jobs, supervisory jobs.

A panel of psychologists from the Institute examined the forty jobs and divided them into three groups. The first group comprised 10 jobs which required most skill and involved the worker in substantial periods of training. These were the skilled jobs studied in the second stage of the experiment by groups A and C. The second group contained 10 jobs which required no skill, and involved a routine which could be learnt in a matter of hours. These were the 10 unskilled jobs studied by groups B and C during the second stage of the experiment. The third group of jobs comprised 20 jobs which extended from the skilled to the unskilled groups, and overlapped slightly with both. They were the intermediate jobs studied by groups A, B, and C in the first stage of the experiment.

The forty jobs covered in this experiment are listed and described in Appendix B.

5. Analysis of the data.

We wish to determine variations due to experimental conditions. The analysis of the data must show us whether job analysts who concentrate on a particular universe of jobs tend to rate differently from those who do not.

There are, however, a number of problems which face us and which could obscure the results of our experiment. We stressed the importance of studying jobs directly and not basing the analysis on a predetermined job description. Jobs, however, vary in content from day to day. The incumbent could specialize

on one function one day and on another the following day. If such variations were not controlled, then any differences observed between analysts would have been obscured by this artifact. We controlled this source of variation by having all analysts study the same job at the same time. True, the presence of six job analysts must have had side effects on the performance of incumbents, but this is a limitation we must accept. Chapanis (20) discusses at length the need to compromise when experiments are conducted in industrial situations.

Another important problem we have to consider, deals with the possibility that there may have been individual differences between raters. Our samples were very small. Though we placed analysts at random in each group, the chance possibility of placing analysts in a manner which would bias this experiment was great. Analysts were moreover told not to discuss with each other their impressions of jobs. There was no levelling out of differences, as would have resulted if we had permitted free and uninhibited discussions between them.

We must realize that in an experiment of this nature, there is no absolute scale against which to measure the validity of individual ratings. We can do no more therefore than aim in our analyses for a straightforward comparison between ratings given in one situation to those given in another. We proceeded therefore in the following manner.

We scored the various scales in the schedule with simple arithmetic progressions. As we proposed to study differences on each item separately, we did not need to concern ourselves with the controversial issue of how to weight items in the schedule.

The schedule generated two sets of data: ratings which were treated statistically and verbal comments which were examined for content. The statistical analyses which we conducted indicated the presence of differences and measured their significance. We explained the nature of these differences through qualitative analyses.

In the first stage of the experiment we computed the differences between groups A and C, and groups B and C for each of the 20 jobs. In the second stage of the experiment, we computed differences between groups A and C for each of the ten skilled jobs studied together, and again between groups B and C for each of the ten unskilled jobs studied together. The

differences thus obtained were made to fall into ordinary distributions with their own means and standard deviations.

Groups A and C gave us a distribution of differences for the first stage of the experiment, and a second distribution for the second stage of the experiment. A Welch test was computed to measure the significance of the difference between means of the two distributions.

The same procedure was repeated for groups B and C.

The reader may raise a pertinent question. Why did we not concern ourselves with distributions of original ratings? Hall¹ points out that the same results would have been obtained but through much more laborious computations. We would have to take account of individual raters' means and S.D.'s as well as the intercorrelations between raters for the two stages of the experiment.

In addition to the Welch tests, we computed F ratios for each of the 56 items which we retained in the final analysis. A few items were rejected because analysts found the scales confusing and interpreted them differently.

We related results of all statistical tests to the original distribution of ratings and to the content of verbal comments.

6. Results of the experiment.

We shall discuss the results of this experiment under two separate headings:

6.1 Computations based on total job scores.

6.2 Computations based on item scores.

In each case we shall discuss separately the differences observed between:

a - Group A and group C.

b - Group B and group C.

1 Hall, R.S. Personal communication. (See Appendix C).

6.1 Computations based on total job scores.

$d_i = (\text{sum of experimental group, i.e. either A or B total scores for job } i)$

$(\text{sum of control group total scores for job } i)$

Means and Standard deviations were computed for the distributions of d_i 's. The significance of difference between means was tested by means of the Welch's test. This is a modification of the t test used when the samples are of unequal size. The results are given in Table IV.

Groups	Mean differences	S.D. of differences	Welch's test value
1. <u>Groups A & C</u>			$W = 3.403$
a. 1st stage	9.9	17.16	<u>significant beyond 1% level</u>
b. 2nd stage	31.2	14.71	
2. <u>Groups B & C</u>			$W = 1.72$
a. 1st stage	4.75	17.31	<u>not significant at the 5% level</u>
b. 2nd stage	13.70	10.10	

TABLE IV. SIGNIFICANCE OF MEAN DIFFERENCES.

The differences on which the Welch tests were computed are indicated in Tables V and VI.

Jobs - 1st stage	d_i Groups A & C	d_i Groups B & C
2.1 A.D.V. driver	+45.0	+16.0
2.2 Survey employee	- 9.0	- 5.0
2.3 Bossboy: road construction	- 4.0	+ 7.0
2.4 Area bossboy	-10.0	- 5.0
2.5 Senior compound clerk	+22.0	+ 2.0
2.6 Lorry driver	+23.0	-33.0
2.7 Concrete mixer operator	+23.0	+30.0
2.8 Road rammer operator	+11.0	-14.0
2.9 Chief Timekeeper's clerk	-11.0	-21.0
2.10 Pneumatic drill operator	+32.0	+20.0
2.11 Compressor boy	- 7.0	+16.0
2.12 Pointsman: tramways	+ 9.0	+17.0
2.13 Senior recorder	+39.0	+26.0
2.14 Nursing assistant	+ 5.0	- 1.0
2.15 Clinic clerk	+25.0	+11.0
2.16 Cycle truer	+ 4.0	+15.0
2.17 Steam roller fire boy	+ 7.0	- 4.0
2.18 Plasterer	+ 5.0	+32.0
2.19 Sergeant induna	-19.0	-22.0
2.20 Mechanic's hand	+ 8.0	+ 8.0

TABLE V. Differences between experimental and control groups - 1st stage.

Jobs - 2nd stage	di Groups A & C	di Groups B & C	Jobs - 2nd stage
1.1 Technical assistant	+41.0	+18.0	3.1 Sewer blockage worker
1.2 Ambulance driver	+59.0	- 8.0	3.2 Watchman
1.3 Motor mechanic	+31.0	+16.0	3.3 Battery boy
1.4 Clerk cashier	+ 4.0	+29.0	3.4 Coal offloading worker
1.5 Carpenter	+42.0	+16.0	3.5 Subway cleaner
1.6 Bricklayer teamleader	+25.0	+10.0	3.6 Office cleaner
1.7 Foreman bricklayer	+26.0	+24.0	3.7 Compound cleaner
1.8 Senior nurse	+24.0	+ 4.0	3.8 Road gang worker
1.9 Drainlayer	+18.0	+20.0	3.9 Foundry pot boy
1.10 Traffic inspector	+42.0	+ 8.0	3.10 Bricklayer's labourer

TABLE VI. Differences between experimental and control groups - 2nd stage.

We note, at the outset, the following points:

1. That the mean differences between 1st and 2nd stage of the experiment are significantly different for Groups A and C, i.e. the experimental group dealing with skilled jobs and the control group of raters.
2. That the mean differences between 1st and 2nd stage of the experiment are not significantly different for Groups B and C, i.e. the experimental group dealing with unskilled jobs and the control group of raters.
3. That both experimental groups, i.e. Groups A and B rate higher than the control group in both stages of the experiment, but that they rate much higher in the second stage of the experiment, i.e. vide Table IV, mean differences are positive for both sets of comparisons and are larger in the second stage of the experiment.
4. We note moreover that the S.D. of the differences tends to drop in both cases from the 1st to the 2nd stage of the experiment. The drop is much larger between groups B and C (F ratio = 2.94, significant at 5% level) than it is between groups A and C (F ratio = 1.38, not significant at 5% level).

We must conclude therefore that in the second stage of the experiment, groups A and C rate significantly differently from each other than they did in the first stage of the experiment. On the other hand, groups B and C tend to rate more like each other in the second stage than they did in the first stage, but that this tendency is checked by the fact that the experimental group (group B) rates consistently higher in the second stage than it did in the first stage (vide Tables V and VI).

In an effort to understand this phenomenon, we turn to the computations based on item scores. This detailed analysis moreover is forced upon us by the fact that we did not weight individual item scores. Unless such an analysis were to be carried out, it could be construed that the differences we observed are caused by the very structure of the schedule used in this experiment.

6.2 Computations based on item scores.

Computations were carried out on the differences between groups on each of 56 items in the J.D. 3 M. schedule. Group differences were computed for each item over the 20 jobs in the first stage of the experiment, and again over the 10 jobs in the second stage. Means and standard deviations were computed and are here indicated as follows:

$\bar{X}_{1,i}$ = mean difference between control and experimental group in 1st stage of experiment, for item i.

$SD_{1,i}$ = standard deviation of differences between control and experimental group in 1st stage of experiment, for item i.

$\bar{X}_{2,i}$ = mean difference between control and experimental groups in 2nd stage of experiment, for item i.

$SD_{2,i}$ = standard deviation of differences between control and experimental group in 2nd stage of experiment for item i.

F-ratios were computed to test the significance of variance between the two stages of the experiment for all items. We shall discuss here only those items whose F-ratios were significant at the 5% level or lower. In our endeavour to understand the significant change in variance from one stage of the experiment to the other, we examined the original score sheets, the distribution of differences as well as the verbal comments given in substantiation of ratings.

6.21 Item differences between groups A and C.

F-ratios were significant (5% or lower) for thirteen of the items. These are shown in Table VII.

J.D. 3 M.		Item No.	\bar{X}_1	\bar{X}_2	S.D. ₁	S.D. ₂	F-ratio	Significance level
page	No.							
3	1.2	1	.2	.9	.83	1.7	3.98	1%
3	4	4	.15	.9	.81	1.4	2.84	5%
4	2	6	.9	.3	1.4	2.4	2.7	5%
6	3	11	-1.25	1.0	1.02	2.4	5.6	1%
7	3	15	.2	-.5	1.01	1.8	2.8	5%
10	1	22	.95	1.8	4.6	2.3	3.99	5%
14	2b	33	-.4	.9	.6	1.1	3.4	5%
14	2c	34	-.05	.7	.22	1.1	22.4	1%
16	1b	40	-.05	-.1	.99	.57	3.1	5%
17	8	46	-.1	.7	.55	1.3	5.1	1%
18	10	48	.2	1.3	.62	1.3	4.7	1%
20	4	54	.1	-.6	1.8	3.1	2.9	5%
21	7	56	.3	-.1	.47	1.2	6.5	1%

TABLE VII. F-ratios for items (Groups A and C)

We shall discuss briefly the causes of each significant F-ratio, as far as we were able to ascertain them from the material available to us.

Item 1. Assessed level of education.

Group A tends to rate most jobs in the second stage higher than group C. The lowest rating given by group C is for the job of drainlayer, which strikes them as being essentially semi-skilled, and like the jobs they saw in the first stage. F ratio is high mainly because of increased number of jobs in the second stage where group A and C differ from each other. In the first stage of the experiment, 12 out of the 20 jobs yielded no difference in the ratings given by both groups. In the second stage, there was only one job where there were no differences between groups. Group A is generally more explicit in the description of additional educational requirements required in the job.

Item 4. Arithmetical computations: degree of complexity.

Group A gives in all jobs of stage 2 (second stage of the experiment), the more detailed and comprehensive examples, rating higher because more is seen in the job. The clerk

cashier, for example, is seen by group A to do fairly complex calculations at the end of the day when he balances the machine total with receipts issued. This involves him in partial totals, the computation of fractions. Group C only considers the simple subtraction and additions which are involved in the giving of change. A similar instance occurs with the senior nurse. Group A credits her with computations involved in the dilution of drugs, but not group C. In stage 1, Group C rates much more like group A, than they do in stage 2. This increase of the magnitude and range of differences accounts for the increased S.D. of stage 2 and the high F ratio.

Item 6. Complexity of operations to be known prior to employment (work background).

Increased variance in stage 2 is due to the fact that group C rates two jobs much higher than group A, whereas for the remaining eight jobs, group A rates higher. Where group C rates high, this is possibly due to an error on their part. The supervisors of the technical assistant and the traffic inspector said that incumbents needed no previous experience as they were fully trained by the Council. Group A gave no score for these two jobs. Group C credited the two jobs with extensive experience - considering on the job training as experience. In the other eight jobs, group C perceived the job as being less complex and requiring experience only in the less complex operations, e.g. the bricklayer, teamleader is not credited with experience for his supervisory functions, but merely with the fact that he must lay one brick on top of another.

Item 11. Assessment of length of on-the-job training.

This item gives the appearance of having an extremely simple and logical scale, which requires, however, for its rating, a number of complex and involved decisions. In stage 1, group C rates either higher than group A, or gives the same rating. In stage 2, group A rates much higher than group B on five jobs, the same score is given on four jobs, and a lower score on only one job. Verbal comments indicate that group A is more comprehensive in its analysis of training needs, e.g. the ambulance driver must learn how tactfully to treat sick people and distraught relatives; moreover, the townships are laid out irregularly and the houses are numbered erratically. The bricklayer foreman must learn involved clerical procedures dealing with bonus payments; he must develop the knack of inspecting adequately the quality of work of a large number of

artisans. In both cases, group C mention that there is little the man must learn. Group C rates the clerk cashier higher than group A. They mention that much would depend on the prior experience the man may have received, but as this is likely to be very restricted with Africans, they rate on-the-job training highly. Africans come to jobs with no clerical experience, and must be taught on-the-job all they need to know.

Item 15. Degree of knowledge involved in the use of equipment.

Both groups rate alike for most jobs and in both stages of the experiment. F-ratio is largely due to the relatively high score given by group C to three jobs in the second stage. One of these jobs is supervisory, i.e. foreman bricklayer. Group C see the man as a working supervisor and stress the need to be fully acquainted with building tools. Group A stress, on the other hand, his organizational functions and under-rate this item, arguing that the foreman rarely use them. In the three jobs, both groups A and C enumerate the same tools or instruments, but group A rates higher the knowledge involved in their use, e.g. "the motor mechanic does not use unduly complicated equipment; the valve grinding equipment is set and he does not need to use a micrometer" (comment given by group C).

Item 22. Degree of attention required in the job.

F-ratio is caused by a significant drop in the second stage of the S.D. of differences. The relatively higher S.D. in the first stage was due to the fact that group C tended to rate at times very much higher than group A. In the second stage, possibly because of greater experience, group C appear to fluctuate less wildly, and to rate consistently lower than group A. Verbal comments show a tendency of group C to underplay the importance of attention. With the senior nurse, for example, group A notes that any error the nurse would make from inattention could easily result in a fatality. Group C is less emphatic and notes that attention is needed only when stocks are checked or reports are read. Similarly, with the ambulance driver, group C does not mention the attention the driver must give when driving the ambulance with a sick person in it.

Item 33. Assessment of the probability of damage to equipment handled.

When the responsibility for equipment was discussed, a distinction was made between equipment used and equipment handled. This distinction was considered to be important when evaluating African jobs. It was forced upon us, namely through past resistance from European trade unions to Africans using tools of any kind. This opposition gave way with time to a concession that Africans could use certain tools but only to dismantle machinery. We felt that in practice, the African did much more than this, and would use tools and equipment of a more complex nature than he was credited for. This fact comes out in the answers given by group A. The motor mechanic uses welding equipment; he is credited moreover with the probability of damage to machinery he repairs, e.g. trucks, cement mixers. He does not himself use the machinery, but "handles" it when he repairs it. The carpenter is credited with the handling of corrugated asbestos, and the drainlayer with earthenware piping. Group C, on the other hand, makes no mention of these points. The significant F-ratio is largely due to the fact that in the first stage, group A consistently rated on this item below group C, whereas in the second stage, the position is reversed. In the second stage of the experiment, group A sees more responsibility devolving on the African than group C.

Item 34. Assessment of damaging equipment worker has occasional contact with.

No meaningful interpretation can be given for this item. It was rarely scored in the first stage, and was scored only three times in the second stage. It is significant, however, that credit for responsibility is given again only by group A.

Item 40. Degree with which worker comes into contact with non-European public.

Interpretation for the ratings on this item can be given only tentatively as few jobs were scored on it. In the second stage of the experiment, for example, only four jobs, ambulance driver, clerk cashier, senior nurse, and traffic inspector bring the incumbent directly in contact with the public. In the other jobs, contact is incidental. Groups A and C rate more like each other in the second stage than they did in the first stage. Verbal comments show, however, that

though group C gives essentially the same ratings as group A, it perceives the African as being of inferior status than would be accepted by group A. The clerk cashier, ambulance driver are seen by group C as being categorically servants of the public. Group A accepts this but mentions that the education of both these men places them on a higher status vis a vis the public. The ambulance driver, because of his knowledge of first aid, and because he knows how to handle sick people, makes the public very much dependent on him. The clerk cashier explains regulations, advises tenants and is therefore seen in a position of authority. With the technical assistant though, both groups accept the fact that he comes into contact with the public only incidentally, e.g. having to enter private property to site his theodelite, the nature of his education is stressed by group A. Groups A and C, however, perceive equally well the status and importance of the senior nurse and traffic inspector. For the remaining jobs, group A is more likely to enhance the status of African incumbents than group C.

Item 46. Technical knowledge supervisor must have about the work done.

F-ratio is largely due to the fact that in the first stage, both groups tended to rate alike. In the second stage, group C persisted in under-rating the supervisory function, more especially where it was not formally defined or quite obvious. Verbal comments indicate that group C fails to probe informal supervisory relationships. The roof carpenter, the ambulance driver and the motor mechanic each have an assistant. Group C merely mention that a trained man knows more than his assistant. Group A is more explicit, and mention, for example, that the carpenter must plan in advance his work site and direct his assistant accordingly. The ambulance driver is responsible for the well-being of his patients and must control the manner in which his assistant lifts the stretcher.

Item 48. Types of tasks supervised.

F-ratio is again mainly due for the same reasons mentioned for item 46. Groups A and C were much closer each other in the ratings they gave to this item in the first stage than in the second stage. This may largely be due to the fact that in the first stage, supervisors generally controlled simple tasks. In the second stage, group A rates higher than C in eight out of 10 jobs. In only one job where the person is patently a

supervisor, i.e. senior nurse does group C rate slightly higher. In the case of the drainlayer, where the tasks are highly repetitive, both groups rate alike. Verbal comments reveal that group C gives a comprehensive analysis of the tasks supervised only in the case of the nurse, i.e. she allocates duties, takes command of emergency situations, handles personnel difficulties.

Item 54. Assessment of the possibility of injury to the worker.

F-ratio mainly due to the fact that group A markedly under-rated two jobs in the second stage of the experiment. Verbal comments in the page indicate that group C is more sensitive to hazards than group A.

Item 56. Degree of knowledge worker must have of safety regulations.

Both groups rated remarkably alike in the first stage, i.e. identical scores in 14 out of 20 jobs. Where they were different, group A rated a bit higher. In the second stage, the differences between groups are marked. Group C rates on average slightly higher, more especially where the danger in the job is less tangible, e.g. motor mechanic, clerk cashier, bricklayer teamleader.

The detailed analysis of differences between groups for various items enables us to make the following conclusions:

1. In eleven out of the thirteen items listed in Table VII, the higher F ratio is due to an increase of the S.D. in the second stage of the experiment. This means that the groups differed from each other much more in the second stage than they did in the first stage.

2. Again referring to Table VII, we note that of those items whose S.D. increased in the second stage, group C rated higher only the last two items dealing with work hazards (items No. 54 and 56). Group A rated higher on most other items, excepting item 15 dealing with knowledge of equipment, and item 40, dealing with personal contact with the non-European public.

3. Recurrent evidence from the verbal comments indicate that group A and C view differently the same ten jobs in stage two. Group A tends to see these jobs as being on a higher level. It tends to give incumbents the "benefit of the doubt", e.g. when discussing contact with the public, and again in the case of supervisory functions. The verbal material it presents is more elaborate and comprehensive. Group C tends to retain the conception that African jobs are not worth much. This reveals itself in the comments they fail to make, but very often in the comments they make. The clerk cashier is rated high on item 11 because Africans have had little opportunity in the past to do cashier's work. The foreman bricklayer is seen more as a bricklayer than as an organizer, viz. their insistence on the fact that he uses tools of the trade. The attention of the senior nurse is mentioned with reference to the task of counting stock than in looking after her patients. This tendency may be due to the fact that until recently, the policy of entrusting Africans with the responsibility for materials and cash was strongly resisted, and is in fact, quite novel. Group C, on the other hand, tends to be more conscious of the hazards in the job than group A.

4. The evidence we have before us suggests strongly that groups A and C started with the common set that African jobs are of limited content, and that Africans can be entrusted with very limited responsibilities. In the second stage of the experiment, group A appears to have discarded this set, whereas group C retains it. The consequence is that group A rates higher, particularly those items which are the paradigm of high status jobs, e.g. education, complexity of experience, unhindered responsibility for materials and cash. Group C, on the other hand, tends to stress more the physical aspects of jobs and less its conceptual features. Supervisors are seen as working supervisors and less as organizers. The hazards in jobs are emphasized. But most important, however, from the point of view of job analysis, is its relative lack of elaboration of material collected and the fact that it fails to probe job characteristics as extensively as group A.

6.22 Item differences between groups B and C.

F ratios were significant (5% or lower) for seventeen of the items. These are shown in Table VIII.

J.D. 3 M.		Item No.	\bar{X}_1	\bar{X}_2	S.D. ₁	S.D. ₂	F ratio	Significance level
page	No.							
3	4	4	.15	-.1	.59	.32	3.45	5%
4	1	5	1.45	.5	1.96	.71	7.68	1%
4	2	6	.35	.1	2.1	.32	45.6	1%
4	3	7	.3	.4	1.9	.52	13.5	1%
7	1	13	.25	1.2	1.8	.79	5.1	1%
7	3	15	-.25	1.0	1.3	.48	7.5	1%
9	1	19	.4	.3	1.7	.48	11.9	1%
9	2	20	-.65	-.1	1.47	.32	21.4	1%
9	3	21	.4	-.1	1.14	.32	13.1	1%
10	2	23	.35	.1	6.3	2.1	8.8	1%
15	3	35	-.65	-.1	1.7	.88	3.9	5%
16	4a	43	.35	-.1	.99	.32	9.8	1%
16	4b	44	.2	.2	1.0	.42	5.7	1%
19	1x2	49	-.5	.4	1.2	2.1	2.9	5%
19	3	50	-.4	.6	.7	1.2	2.4	5%
19	4	51	.45	.5	1.2	2.4	3.8	1%
21	7	56	-.05	.1	.61	.32	3.7	5%

TABLE VIII. F ratios for items (Groups B and C)

The F ratios of four of the items listed in Table VIII are simply explained by the fact that the items were rarely, if at all, scored in the second stage. These are:

Item 4. Arithmetical computations: degree of complexity.

Group C mention that the battery boy is required to read numbers and count the number of buses examined. Group B gives no credit for calculations.

Item 20. Ability to solve new problems.

Excepting with the watchman who may have to deal with unexpected situations when patrolling the grounds, all other jobs in stage 2 are not scored. Group C rates slightly higher than Group B.

Item 43. Degree of tact required in contact with European public.

Only two jobs require the incumbent to come into contact with the public, i.e. the sewer blockage worker and the watchman. All other jobs receive no score. Group C rates slightly higher and tends to emphasize more in its verbal comments the importance of these contacts, e.g. sewer blockage worker must refrain from punishing curious children and vicious dogs.

Item 44. Degree of tact required in contact with non-European public.

The same two jobs, i.e. watchman and sewer blockage worker, are the only two to score on this item. We note that though group B scores slightly higher, both groups give essentially the same negative comments, viz. the nature of the contact is seen as passive; the incumbent must refrain from rudeness and respect private property.

We shall examine next the reasons for the remaining significant F ratios.

Item 5. The degree of training involved in operations to be known prior to employment.

Group B rates much higher in the first stage of the experiment than it does in the second. This is partly due to the fact that most of the jobs in the second stage require little experience. Groups B and C differ much less in the second stage than they do in the first. This accounts for a significant drop in S.D. and the high F ratio. Verbal comments are on par, both groups emphasizing the fact that jobs in the second stage can be done equally well by a raw African from the tribal home.

Item 6. Complexity of sequence of activities to be known prior to employment.

Both groups rate almost alike in the second stage, but there were some differences in the first stage. Verbal comments are almost on par but group B tends to credit the watchman with having a knowledge of police rules, whereas group C only stresses the fact that he must know how to direct incoming and outgoing traffic.

Item 7. Knowledge of equipment prior to employment.

Though group B accept the fact that little or no experience is needed in the jobs they study, they tend to credit more frequently than group C the knowledge of everyday implements Africans acquire by virtue of living in an urban community, e.g. brooms, shovels, levers. Group C takes this knowledge for granted. This may mean that either group B anchors its scale of experience on the concept of the "raw African", or else that it tends to rate slightly more generously and so give jobs the benefit of the doubt.

Item 13. Degree of complexity of activities in the job.

Though both groups rate very much more alike in the second stage than they did in the first stage, the highest scores are given by group B. Group C appears to be influenced in its ratings by its continued association with skilled jobs. This is seen more especially in the unit of activity used by groups B and C in the interpretation of this scale. Group B uses a much finer unit than group C. Finer units are practical in highly repetitive and simple jobs, but not in more involved jobs as groups A and C had studied in the second stage. In the case of battery boy, for example, group B rates the activity as a long repetitive sequence and notes that "he opens the battery flaps, checks water levels, turns flaps back, inspects terminal and cradle, marks completion on card, etc." Group C, on the other hand, rates the activity as simple sequence and notes that "he proceeds from bus to bus, topping up batteries and marking off the check list".

Item 15. Degree of knowledge involved in the use of equipment.

Both groups rate more alike in the second stage than they did in the first stage. Group B, however, from rating low in the first stage, rates uniformly high in the second stage. The enumeration of equipment used is the same but group B tends to see greater demands involved in its use. The office cleaner, for example, is said by both groups to use a vacuum cleaner. Group C sees in that no more than knowledge required of every day implements, whereas group B rates a degree higher. The scale as it stands can be anchored differently. Group B acquainted only with unskilled jobs, tend to emphasise the occurrence of any activity higher than a sweeping job. Group C, on the other hand, possibly because of its association with skilled jobs, tend to anchor the scale higher and so group together the use of a broom and that of a vacuum cleaner.

Item 19. Degree to which judgment is necessary.

Both groups rate more alike in the second stage than they do in the first stage. This is largely due to the fact that jobs in the second stage generally rate low on this item. Verbal comments indicate that group B emphasize the presence of judgment more than group C is prepared to do, e.g. the coal offloading worker must judge where the shovelful of coal is going to land.

Item 21. Degree to which mental ability is required.

Differences between groups are much less prominent in the second stage than they were in the first stage. The agreement between groups is much higher in the second stage as most jobs are seen to require little or no ability. A comment commonly made by both groups is that the incumbent requires only to understand the simplest instructions. Where mental ability is needed, e.g. the night watchman, it is readily noted by both groups. Verbal comments made by both groups are essentially the same. Both groups at times tend to force their explanation as to why ability is needed in a job, e.g. the office cleaner may find an unusual object in waste paper basket and has to decide whether it has been deposited there intentionally.

Item 23. Degree of vigilance required.

Differences between groups are greater in the first stage than they are in the second. We note that vigilance is an item which scores above minimum in all jobs of stage two. Verbal comments made by both groups are essentially the same.

Item 35. Cost of equipment used by workers.

It is interesting to note that differences in the ratings given would occur even on so specific an item as this. Yet these differences occur. They were larger in the first stage than in the second stage. This is mainly due to the fact that the cost of equipment used by unskilled workers is generally low, so reducing the likelihood of variations in the second stage.

Item 49. Degree of exposure to weather.

This is the first item where the F ratio is caused by an increase in the S.D. of the second stage. In the first stage, the differences between groups B and C were only negative; in the second stage, group B begins to rate higher than group C, but not on all jobs. Differences are now both negative and positive, the range is doubled and the S.D. is greater. Verbal comments are essentially the same. In two jobs, i.e. battery boy and coal worker, group B gives them the benefit of the doubt and mentions that they may have to work in the open in bad weather.

Item 50. Degree of discomfort in the job.

The pattern repeats itself as was the case with item 49. Both groups differ much more in the second stage than they did in the first stage. Group C tends to be much stricter in the manner in which it rates this item than group B. The jobs of the watchman and the coal worker are seen to be more comfortable by group C. There were no verbal comments for this item in the second stage of the experiment.

Item 51. Enumeration of factors which cause unsatisfactory work surroundings.

Differences between groups are greater in the second stage than they were in the first. This is generally due to the fact that group C mentions in some jobs fewer factors than group B. They do not credit the sewer labourer with the presence of fumes and dust, the coal worker with the fact that he works in cold weather, in noisy and dark surroundings. The difference is, however, most clearly brought out in the case of the subway cleaner. Group C writes: "conditions in the subway are not as unpleasant as expected. The smell was not particularly overpowering - much the same pungent odour as one encounters in stables ... the manure from the animal bowels raises the temperature of the water and this in turn warms the feet of the incumbent. He has to handle unpleasant objects, e.g. unborn calves and diseased udders. Against this, however, it must be borne in mind that he has the opportunity to pocket edible pieces of meat which slip through". This mitigating factor is not mentioned by group B who are more categorical on the issue of discomfort and write: "The job is performed in a subway where considerable heat or cold may be experienced in summer and winter respectively ... An unpleasant smell from cuttings, blood and stomach content is ever present. Worker has to actually handle cuttings and stomach contents throughout slaughtering time. While using hose to clean walls and channels, worker is continually damp".

Item 56. Degree of knowledge worker must have of safety regulations.

Jobs rate in both stages low on this item, i.e. there is little need to know any safety regulations; where these regulations are important, they are stressed in the second stage, with almost equal emphasis by both groups. Verbal comments indicate that though the same dangers are mentioned by both groups, there is a slight tendency for group C to rate low.

There are a number of points which arise from the analysis of the differences in item ratings:

1. We note in the first instance the relative magnitude of the F ratios. Their significance in 12 out of 17 items is at the 1% level or better.

2. Most of the F ratios are due to a drop in the S.D. of the second stage of the experiment. Excepting for the three items dealing with work surroundings, groups B and C tend to differ much less in the second stage than they did in the first stage.

3. Much of this agreement appears to be due to the fact that items in the unskilled group of jobs generally rate low. Where something out of the usual is featured, both groups spot it readily and comment in essentially the same manner. The similarity between groups in the second stage is most clearly seen in item 21, dealing with mental ability required in the job. Both groups see unequivocally the African as doing jobs which require little ability.

4. Group B appears to anchor its scales at a lower level than group C, possibly because it has last contact with Africans doing skilled jobs. This was apparent in two instances. When discussing the use of implements, group B was guided by the image of a raw tribal African who needed to learn how to use a broom; when discussing the composition of a job, it used finer units of activity. We noted that though a fine job breakdown was feasible for highly repetitive or simple jobs, it was not practicable when dealing with more complex jobs.

5. Group C underrates the three items on work surroundings and is more at variance with group B in the second stage than it was in the first stage. This phenomenon is difficult to explain. If we argue that group C underrates work surroundings because it comes in contact with jobs where these surroundings are generally pleasant, then the opposite argument would appear to be valid. The contrast between pleasant and unpleasant surroundings would be sufficiently large to induce group C to overrate rather than underate work discomfort. The comment we quoted at length about the subway cleaner makes us suspect, however, that group C sees the African as a labouring type, devoid of sensitivity. Discomfort would then be evaluated with reference to this concept. Group B, on the other hand, may rate high on these items for quite different reasons. Its

contact with largely unskilled jobs may have made it keen to find areas where some credit could be given, and these are naturally found in the field of work surroundings and possibly that of hazards.

7. Discussion and conclusions.

The hypothesis we tested is partly confirmed. Full confirmation would have come if both groups A and B had differed significantly more from group C in the second stage of the experiment than they did in the first. This only happened with group A.

A better insight can be had of the results if we look at the experiment in a slightly different manner. Rather than say that groups A and B looked at different categories of jobs, we shall say that group A looked at skilled jobs, that group B did not, and that group C looked at skilled interspersed with unskilled jobs. We focus our attention on group A, and introduce in the second stage of the experiment a rough scale of contact with African skilled jobs. Group A is seen to have had in the second stage of the experiment, direct and undiluted contact with ten skilled jobs. Group B had no contact with skilled jobs. Group C had contact with them, but interspersed with regular association with unskilled jobs.

The results we have reported will then be explained in terms of a second hypothesis which we shall formulate as follows:

"The six European analysts started with the common set that African jobs are not very demanding. The set was retained throughout the first stage of the experiment. In the second stage of the experiment, Group A discarded this set and rated significantly differently from Group C. Groups B and C retained the set and rated very much alike".

There are sufficient reasons to postulate, even on a priori basis, the presence of this set. Current research on thinking, reviewed extensively by Johnson (87, 88), has indicated the existence of a common set underlying complex evaluative judgments. He refers to it as judgment on the basis of a general impression. "The case is prejudged essentially on the basis of one dominant factor ... the other factors contribute only by reinforcing or at least not opposing the dominant factor". The studies of Sells (156) and Asch (6)

which we have already discussed support the presence of a set in complex evaluative judgments. Further evidence is to be found in the work of Edwards (42) on stereotypes. The presence of a common set moreover, could explain the fact that in the factor analytical studies of Lawshe and others, the first factor accounts for most of the variance.

European analysts may have acquired a common set about African jobs through a life-long association with the African in a subordinate position. Until quite recently, the vast majority of Africans were employed in occupations without any responsibility.

In the first stage of the experiment, the six job analysts came across only three jobs which could disturb this set. These were the jobs of the plasterer, the senior recorder and the chief timekeeper's clerk. The analysts were quick to note, however, that the delegation of responsibilities in these three jobs was qualified with many reservations. Officials told them that as these responsibilities were given to Africans for the first time, methods of work incorporated extensive checks. The other seventeen jobs were all designed according to the traditional pattern, i.e. the African, regardless of his status, was directly responsible to a European supervisor for all he did. When a European official granted an African discretion to act on his own, he did it informally and on his own initiative. The European would be held accountable for any errors his African subordinate committed. In some jobs, however, this could not patently have been the case, yet this fact was not reported by any of the analysts. The A.D.V. driver, for example, could not be directly supervised because he covered a wide geographical area. Analysts pointed out that the European overseer was ultimately responsible to the public for the services rendered by the A.D.V. driver. Area boss boys kept a close check on his activities. He was only authorized to drive an animal-drawn vehicle which restricted his speed, the area he could cover, and therefore, the extent of his responsibilities. In the European district, motor-powered refuse vehicles were driven by Europeans.

When the six analysts entered the second stage of the experiment, they encountered a novel situation. Two analysts studied jobs consecutively which would seriously disturb this set. These were jobs like the surveyor, the ambulance driver, or the senior nurse in which responsibilities for work were unequivocally granted. They may not have been fully granted in practice, but senior European officials conceded that it was no longer practical to supply for them full European control. The person in a job was on his own for too long a period of time to consider the introduction of intensive review mechanisms. Moreover, the complex nature of the tasks which had been delegated precluded the introduction of any such control.

The two analysts who studied exclusively these jobs lost their set. This is revealed repeatedly in the analysis of items where they differed significantly from the control group. Group A rated higher than group C on items which are the paradigm of high status jobs, e.g. education, complexity of experience. Group C, on the other hand, rated higher the physical aspects of jobs which are important in lower status jobs, e.g. hazards. In some instances, both group A and C enumerated the same equipment the man would use in his job, but arrived at a different evaluation, again because group A had discarded its set and group C had not. This was particularly clear in the insistence of group C that the building foreman was a working foreman who had to be credited with the know-how of equipment. The implication was that the building foreman, as a working supervisor, carried little responsibility for organization.

Whereas group A discarded its set in the second stage of the experiment, groups B and C retained theirs. Group B was exposed entirely to labouring jobs and had its set reinforced. Group C alternated between skilled and unskilled jobs and also retained this set, reinforced by contact on alternate days with unskilled jobs.

The retention of this set had an important consequence on group C analysts. When they studied skilled jobs, they failed to elaborate as extensively as group A had done. This is shown particularly in the verbal material which had been collected. We asked ourselves whether this failure was in fact due to the set and to due to some personal limitations of the two analysts who went to form, by chance, group C. We examined

the manner in which groups A and C had collected and elaborated material during the first stage of the experiment. We found that both groups were on par with each other; the comments made by the one group were essentially the same as those made by the other.

We found in fact substantial evidence to prove that group C failed to elaborate on material it had collected because of the set rather than because of any personal failings. Two jobs in the second stage of the experiment, i.e. the senior nurse and the traffic inspector, were seen in essentially the same manner by groups A and C. Both groups presented the same quantity of material and drew identical inferences. Group C proved in consequence that it could collect and elaborate material in essentially the same manner as group A. It is important to note that such elaborations were made in jobs which are nearer the public mind. Nursing, and the control of traffic are occupations which are better known than building, surveying or any of the trades. It could be assumed that group C discarded their set temporarily when examining two jobs of which they had already formed a status image.

Further evidence of the fact that group C failed to elaborate on material because of the set, rather than because of personal failings, came from a detailed analysis of the answers given to question 6, on page 6 of the J.D. 3 M. schedule. The question asked whether the learning of the main tasks in any job involved more than could be communicated by verbal instructions. The question was open-ended. The analyst had to indicate those features of the job which could not be adequately described in words, but which required the worker "to have to learn the correct feel for himself". Implied in the question were skills which depended on kinaesthetic cues as well as those social skills which could not be sufficiently explained in words. During the first stage of the experiment, groups A and C made essentially the same comments. Group C gave instances of its ability to probe sufficiently deeply even during the second stage of the experiment. It mentioned, for example, that the carpenter learned to apply pressure on the plane merely by feel; that the drainlayer learned special tactile cues which told him that the pipes were at the desired slope. Group C omitted to mention, however, some of the skills in jobs it did not consider as demanding. It did not mention, for example, that the clerk cashier could learn to touch-type on his adding machine. Nor did it mention the social skills

which had to be acquired by the ambulance driver, the foreman bricklayer, the traffic inspector, and the bricklayer teamleader. These skills were mentioned by group A.

The presence of a set limits therefore the probing of the job analyst. As we pointed out in the first section of this chapter, the technique of job analysis is so subjective that the analyst is invariably his own judge as to whether he has collected sufficient information about the job. This is particularly the case in job evaluation. A large number of jobs must be examined over a brief period of time and their analysis must by necessity be quite perfunctory. The effect of this set is to make the analyst satisfied with less information about jobs than he would otherwise have collected, and to cause him to stop his probing at an early stage.

We can only speculate on the manner in which this set operates. We mentioned at the start of this chapter that all techniques of job analysis endeavour to give the analyst a conceptual framework which will guide him in his analysis and enable him to select critical stimuli from within a highly dynamic and flux complex, i.e. the work situation. In practice, the major techniques of job analysis start with an inventory of all the activities likely to be present in a job. The inventory concerns itself essentially with that which is done in the job; the verb plays here an important role in the description of the job.

After having completed this inventory, the analyst moves to the stage of the description where the qualifying phrase, the adverb, plays a predominant role. He concerns himself with the qualifications of the action, the "how", "when", "where" and "why" of the job analysis formula. It is at this stage that he becomes actively involved with the material he has collected, that he elaborates, and possibly decides to return to the work situation, examine it further and probe it in depth.

The analyst is guided all along by certain criteria of adequacy built in the conceptual framework guiding his analysis. The criteria are used when he draws the inventory of activities in the job. They help select the broad unit into which his various activities will be broken. They help him decide how elaborate his analysis of the work situation needs to be. Must he learn to do the job himself? Will he record

literally the comments made by the worker? Will he use psychological concepts to interpret comments made in an interview situation? Does he need to reconcile discrepancies between the comments made by a supervisor and those made by his workers? All these considerations merge in his final decision: that the job description he has produced represents adequately the job he has studied.

The criteria of adequacy are possibly the result of two influences: the purpose of job analysis as conceived by the analyst, and the set he holds about the jobs he is studying. We indicated that the purpose for which jobs are analysed, controls to some extent the choice of methods used in the analysis. The purpose forces the analyst to compromise between the economics of the situation, what is in actual fact possible to do, and what he himself would like to do. The purpose of job analysis in evaluation is to enable judges to scale conceptual entities in a reliable and possibly valid manner. The manner in which he perceives this purpose may vary widely from individual to individual, and in turn, influence the criteria of adequacy he will develop to guide him in his analysis.

The presence of a set about the jobs he is studying will also influence the development of criteria of adequacy. For if he thinks in advance that certain jobs are complex and demanding, then he will analyse them with greater care. If as it so happens, the jobs are complex, then his analysis will unearth more relevant information about the job than if he had started with the set that the jobs were not quite so demanding. The same phenomenon is seen in the analysis of any material which is largely conceptual, e.g. the works of a poet or the historical antecedents of a known event. In all cases, the analyst is at an advantage over those who may judge or criticize him. Unless the critic is prepared to cover the same ground the analyst has covered, he will not be in a position to examine critically the material which the analyst has produced. Viewed from another angle, the least effective critic is the job incumbent himself. He knows his job and senses its demands better than anyone else. Because of this, he will accept a scanty job description and unconsciously extrapolate from the material presented to him.

The presence of the set will not explain, however, all the results of this experiment. Group B, it was noted, generally rated higher than group C in the second stage of the experiment. Another factor may have been operative here: this was the manner in which scales were anchored, possibly as the result of the particular group of jobs being studied. Group B gave many instances of having anchored their scales on their conception of the raw tribal African, whom they encountered frequently in the unskilled jobs they studied. The raw tribal African may in actual fact exist no more than the myth of the average man. The image which Europeans have of him is of a person with no technical sophistication, drawn from tribal areas "where the marginal productivity approaches zero" (124). For such a person learning how to use a broom is considered as a significant achievement.

The consequence of anchoring the lower end of scales on this image of the raw tribal African, as well as their continued association with unskilled jobs may have made group B sensitive to any demands in jobs above the barest minimum. This explains why group B rated in the second stage of the experiment consistently higher than group C. This anchoring made group B break down jobs into much finer units of activity than group C. We suggested earlier on that group C did not a finer unit because they were partly associated with skilled jobs.

We must conclude from all this evidence that job analysis is in fact subject to a number of influences. The set the analyst may have formed in advance of certain jobs, controls the degree of elaboration of the material collected. The immediate association with a category of activities may either disturb this set, or else indicate to the analyst where to anchor his scales. Because he deals with complex patterns of stimuli, these are appraised against the broad background of immediate experience. The analyst starts with a frame of reference, and continuously modifies it to take cognizance of any new fact he may have learnt or experienced. Sooner or later, however, this frame of reference crystallizes and actively controls this process of analysis: "Certain facts, meanings, implications, connotations, associations are admitted, others are thrown out. The data which are admitted are then organized into a context, and within this context or frame or reference, the act is judged" (87).

These influences are apparent in spite of the fact that all analysts used a highly structured schedule as the J.D. 3 M. Within the schedule, a large number of items required the analyst to develop his own scale of judgments. In so doing, he used a combination of preconceived ideas about the jobs he was studying, and the experience he gained from a particular group of jobs.

The results of this experiment must understandably be accepted with many reservations. We were not able to isolate completely the effect of either set or experience with a particular group of jobs. The model of the experiment was much too limited for us to study in a controlled manner the effect of either of these two factors. The samples involved in each group are quite small. We were not able to reduce altogether the effects of chance variations. All analysts could not examine, for example, the same job on the same day. The range of factor scores is quite narrow in unskilled jobs; there is therefore, a reduced possibility for inter-group differences to occur. Our inferences were in consequence largely speculative, and must be verified in future experiments.

There are, however, a number of recommendations we could formulate, notwithstanding the limitations of this study. It is clear that we should warn European analysts to guard against their social prejudices when they are called upon to evaluate African jobs. The recent emergence of the African into responsible and demanding occupations should be seen in its proper perspective and not evaluated against the traditionally held view that the African will always remain the ward of the European. Analysts moreover may have their set reinforced by the European executive who controls the creation of more responsible jobs for Africans. One wonders whether there is not a case for training African analysts to analyse jobs done by Africans.

The subjective nature of job analysis must be appreciated fully by persons who have requested the analysis of jobs or are about to participate in a job analysis exercise. A job, we repeatedly stressed, is an indefinite entity; its analysis requires the extraction of a mass of details against a preconceived frame of reference. When the analyst is trained, particular attention should be paid to this fact.

Jobs must be presented to him in such a manner that he obtains as rich and as varied a background as is possible. After the training has been completed, he should concern himself with one particular group of jobs at a time. The practice of having analysts shift from skilled to unskilled jobs in an ad hoc manner should be discouraged, regardless of the expediency this may present.

Finally, the criteria by which the adequacy of job description will be judged, should be developed before a job analysis study is initiated. Analysts should discuss the purpose for which jobs are analysed and clearly perceive the detail of elaboration which will be required of them. It should be noted, moreover, that the current practice of submitting written job descriptions to executives in charge of departments is not adequate unless the executive has received himself extensive training in job analysis. McQuitty and others (116) have shown, for example, that supervisors view the essential requirements of jobs differently than analysts. Supervisors in our experience rarely go beyond the inventory of activities. The elaboration of material, the drawing up of inferences, requires a skill which few people acquire without planned training.

CHAPTER V.

THE VALUE OF WORK.

1. The nature of value judgments.

Value, whether used as a noun or a verb, has acquired two distinct meanings. A value is either a quantity or magnitude which must be expressed with reference to a standard; or else it stands for an abstract concept which defines for the individual what is a desirable activity.

We use value in the former sense when we consider the monetary worth of a commodity. In a more restricted sense, a value would mean a magnitude resulting from some form of measurement. The length of this carpet is nine feet, it costs forty pounds. In both cases, value as a magnitude is expressed with reference to a convenient standard.

Value as a concept which the individual uses to control or direct his own behaviour, appears in many psychological definitions. Goldsmidt and Edgerton (58) write, for example, that "Values may be defined primarily as those individual personal qualities which are considered to be desirable by people in a given culture... But values are more than vague abstract attributes; they are also the patterns of behaviour which are the manifestations of these values... Furthermore, the concept of values includes also the public and external expression of these attributes... In every culture there are material things, titles, required expressions of deference and the like which are public and concrete manifestations of value attributes". Value is also considered as an aspect of culture by Biesheuvel (11). He defines personality as "the particular compromise in the expression of his own needs and impulses which the individual has struck with the demands and needs of others, as collectively embodied in the culture of his group, more especially its customs, beliefs, values and laws".

When value is used as a verb, it also reflects this double meaning and represents one of two activities. To value may mean the act of attaching a magnitude to some object, or else that we hold something dear and precious, that we honour it and regard it highly. Dewey (35) points out that when we attach a magnitude to an object, or a phenomenon for that matter, we concern ourselves with a relational

property of objects. When we use value in the personal sense, the whole activity is subjective and cannot be observed by others, nor can its ultimate validity be tested.

There is, however, an important association between these two distinct meanings of value. Both meanings postulate that some judgment will be made and that it will be formulated against a criterion or a standard. A value whether an objectively derived magnitude, or an abstract concept has meaning only with reference to a standard of measurement or of judgment. We cannot, for example, speak of a value of eight and leave it at that. We must qualify the value by the standard on which it is based. Even if we imply by eight no more than that, we have at the back of our mind the series of numbers which includes eight. Similarly, when we talk of values as determinants of behaviour, we think of an ultimate standard which underlies the value, e.g. the approval of the community, the self actualization of the individual.

The process of judgment underlying both concepts of value is stressed by Pepper (139) and Lamont (98). Pepper selects, as the start of his inquiry on the sources of value, the problem of how to make well-grounded decisions in human affairs. Lamont considers valuation as a choice between alternatives both of which are regarded as good, when objective circumstances enforce such a choice.

Experiments on judgment have repeatedly shown that the results of simple psychophysical experiments apply to more complex situations. Postman and Miller (144), for example, have shown that subjective scales of judgment are extremely flexible, and that they shift, contract and expand as their anchorages are changed. They showed this effect to occur in a variety of situations ranging from the judgment of visual inclinations to the evaluation of moral and aesthetic materials. Wever and Zener (178) proved, as far back as 1928, that absolute judgments were dependent on absolute series. They meant by this that judges were guided by their conception of the stimuli as a series.

These experiments and many others which Johnson (87) reports extensively, indicate that there is a tendency to judge stimuli in essentially the same manner regardless of their complexity or the subjective involvement of the judge. The same could be said of value judgments. The process of objective measurement in which value as a magnitude is derived, is carried out against some standard of measurement. More subjective values may in turn be judged against less tangible concepts whose function, nevertheless, is to provide some standard of comparison. The effect in both cases is to give us a sense of finality and the impression that the decision made is equally valid. We shall clarify these points by two examples.

When we measure the area of a plot of ground, we use a tape measure. This acts as a standard against which comparisons will be made to deduce a value, e.g. the length of the north border. The magnitude is objective and both reliable and valid. It denotes a relation between the length of a piece of ground and a standard of measurement.

Similarly, when we judge whether an act is desirable, we project it against an abstract norm which we have learned to approve. We may be particularly attracted to a painting in a gallery. We wish strongly to own it, but cannot possibly pay the price. An opportunity presents itself in which we can steal it. We reject the possibility because we respect the right of property. We compared the whole action of theft against a standard of behaviour.

In both instances, a judgment was made. It was made each time against some criterion. In both cases, we arrived at a sense of finality. There was no call made on us to examine the accuracy of our tape measure, or to question the acceptance of the rule "Thou shalt not steal". Because the standards against which our judgments have been made are not questioned, the judgments appear equally valid.

This in turn could give rise to a confusion between the two meanings of value. The distinction which philosophers carefully draw between value, the objective magnitude, and value, the subjective appraisal, is lost in common usage. Values held by a community may acquire the status of scientifically-proven facts without, in fact, being so. The

confusion could largely be due to the inadequate manner in which most people draw their inferences. It could also be due to the fact that we judge stimuli in essentially the same manner regardless of their complexity.

The confusion between the two meanings of value may easily occur when we evaluate. The concept of evaluation has incorporated both meanings of value. Evaluation stands for the fixing of a quantity (value in the sense of a magnitude) to some value (value in the sense of a concept) inherent in an object or an event. It is for this reason that Pepper (139) discusses at length the rules or criteria which accompany evaluative judgments. He isolates two principal kinds: qualitative criteria, by which the presence of some sort of value is established, and quantitative criteria, by which the amount of the given value is measured. "Qualitative criteria consist of definitions of values involved; quantitative criteria consist of standards which are related to the defining characters of these definitions".

It follows that the whole problem of evaluation centres on the definition of values. Pepper argues that if such definitions are arbitrary, then one definition is as legitimate as another. If, on the other hand, the definition of value is grounded on empirical facts, then the process of evaluation is substantially more restricted and potentially more valid. Simon (159), however, points out an important limitation. Value propositions are open to confirmation only in so far as they describe a future state of affairs. If events occur as the value proposition postulated they would, then it is confirmed. But value propositions also possess an imperative quality. This means that they select one pattern of behaviour over another, without being in a position to supply an ultimate factual basis for such selection.

The extent to which evaluation can be based on an empirical foundation is therefore limited. These limitations are, however, not accepted by all philosophers. The main question which is still debated runs as follows. When we call a thing valuable, are we referring to some quality, property, or characteristic which the thing has in itself, and which is irrespective of its relations to other things or to an evaluating person; or are we referring to a characteristic which it may be said to possess, only when it stands in relation to some other thing, or to some appreciating subject, or to both?

The objectivist school, represented in particular by Ross (152), claims that "value is a something, a property, relation and that one should inquire about its status in the objective world". The subjectivists, whose standpoint is adopted by Lamont (98), say that "in apprehending or attributing value, this apprehension or attribution is an activity occurring within the mind of a subject" (98). They then go on to analyse the nature of this activity. No useful purpose will be served in presenting the points of view of both schools and debating their respective merit. Our approach to the study of value is much more empirical and much less speculative. We shall refer in the following section to findings of psychological investigations. But before turning to them, we wish to discuss briefly the views of Lamont on the nature of value judgments. The subjectivist standpoint which he has adopted is cognate with that adopted in psychological inquiries. He has moreover borrowed heavily from the theory of economics which in turn is related to that of job evaluation.

Lamont was struck by the fact that the value judgment employs concepts which are extraordinarily like those employed in the economic order. He argues that the comparative value judgment is an expression of choice when objective circumstances enforce on us the disagreeable necessity of renouncing one thing if the other is to be attained. Valuation therefore is the choice between alternatives, both of which are regarded as desirable. This is very similar to the nature of economics which has been defined by Cairncross (19) as "the study of the influence of scarcity on human conduct in circumstances where men have freedom of choice in allocating scarce resources between competing wants".

Lamont borrows from economic theory a number of concepts, but modifies them to make them relevant to his theory of valuation. There must first of all be a demander. Anything which is valued must of necessity occupy a place in a valuational order. Since a valuational order is an order of choice or preference, this implies that the order is wholly within a unitary consciousness which attributes value to things. A demander is thus a self-conscious individual who attributes value to various things and "chooses rationally between alternatives to which he attributes varying degrees of goodness with a view to the realisation of his total personal conception of the 'good'".

Some important points are made in the discussion of this first concept. Lamont indicates, to begin with, that he will concern himself purely with rational behaviour. A value judgment is understood as choice exercised in a rational and self-consistent manner. To assume the existence of irrational forces would magnify tremendously the difficulties he must encounter. He says that he has developed a philosophical model essentially rational, though the process of judgment depends on the individual and on some "organic activity characteristic of his nature". He refuses, however, to consider this aspect of mental life and argues that such speculations do not fall within the province of the theory of value judgments, but belong to the more empirical science of psychology.

The second point is that the person who values, attributes goodness to various alternatives with a view to realizing his own personal conception of the good. This denotes primarily a close association between value on the one hand, and motivation, purpose on the other. The point was particularly made by Perry (140) in his enquiry on a general theory of value. He defined value as "the peculiar relation between interest and its object, or that special character of an object which consists in the fact that an interest is taken in it". Interested and purposive action are considered as similar and are defined as behaviour which has been adopted because the "anticipatory responses which it arouses coincide with the unfulfilled or implicit phase of a governing propensity".

"His own personal conception of the good" refers, therefore, to those specific motives the individual has accepted as a guide to his own life. Lamont makes this point particularly clear when he discusses the nature of economic relations. In anyone's total conception of good, there will always be some end which is not specifically an end to another person "who is yet in a position to help the former". Each person is conserving scarce resources in the pursuit of his total conception of good, and that neither will waste resources on the production of an end not included in his conception of the good "when A is pursuing an end x (which may in fact be a common good for A, C, D) and B is pursuing an end y (which may in fact be a common good for B, C, D), and neither x, nor y is a common good to A and B, and neither A nor B has a duty to assist in the production of y and x respectively; and when

nevertheless, A and B do render each other assistance such as to make possible the attainment of x and y; then here we have the establishment of the common economic relation".

The motives behind the individual behaviour, and the whole process of value judgments, are clearly referred to in the discussion of the concept of demand, defined as a conative disposition, the content or end of which is the creation, maintenance or destruction of some stage of affairs. According to Maslow (120) a motive which has been largely satisfied, no longer acts as a motive. So with demands, they always refer to the realisation of a future state of affairs. The value judgment in its simplest form - the mere attribution of goodness rather than the attribution of degree of goodness - is what the economist would call the expression of 'want' or 'desire'. It is 'demand' in the general sense". It is that psychical attitude by virtue of which the economist attributes "desiredness" or utility to that to which the attitude is directed. It is a psychical state with the emphasis on the conative disposition towards the creation or maintenance of a state of affairs. "Demand in turn connotes the existence of supply which is the total quantity of a thing actually available at any given time, some at least of which is actually, and of which the remainder is potentially, an object of demand".

The remaining three concepts are of particular importance to Lamont's model. Purchasing power denotes that which a person possesses and uses to realise the content of a demand. Cost is not used to mean the resources expended in producing something, but mainly in the sense of opportunity cost: "the unrealised content of a demand which could just have been realised by utilising in its favour the purchasing power actually utilised towards the realisation of the content of an alternative demand, i.e. the amount of demand A which is left unsatisfied when resources are employed towards the satisfaction of demand B." The third concept is that of economy. It is defined as "the principle which makes a demander direct his purchasing power towards the realisation of his total conception of good". It refers as we already pointed out to the co-ordination of an individual's motives in a coherent system. It operates because "we have the ability to hold together, in the one unitary consciousness, the conception of a totality of diverse demands and to utilize all available resources for the greatest possible realisation of this totality".

According to Lamont, comparative value judgments are made only in conditions of scarcity. Value connotes above everything else choice enforced upon us by objective conditions which require the surrender of one thing if the other is to be secured, both alternatives being considered "good" (both being demanded) by us. Consequently, value is measured entirely in terms of opportunity costs. Lamont argues extensively to prove that this is so and that the order of value is the inverse of the order of estimated opportunity costs. "Since things are evaluated relatively to each other in terms of estimated opportunity costs, then if we know that the cost of x is estimated as higher than the cost of y, we know at the same time that the person making the estimate will place y higher than x on his valuational scale. He will choose y in preference to x. If the descending order of estimated opportunity costs is A, B, C, D, then the descending order of values will be D, C, B, A".

The proposition that value is related to opportunity costs implies that all things evaluated against each other carry a reference to a common demand. As this common demand is generally complex, the things evaluated against each other are viewed as determinative combinations, "each combination capable of satisfying to a greater or lesser degree the complex common demand as a whole". Opportunity costs can therefore only be inferred by reflection on choices he actually makes.

Let us consider, for example, the head of a family who has already succeeded in meeting his major commitments. He has succeeded in providing his family with an adequate house, they are reasonably well-fed and clothed. He must decide next how he will use his remaining cash and time resources. He could participate in the activities of a political party; he could devote his leisure time to his family circle; he could undertake an expensive hobby; or else he could start studying in the evening to gain further professional qualifications. As his time and money are restricted, he cannot undertake all four activities. Objective circumstances force him to choose from various means of satisfying a common demand, i.e. how to make the most beneficial use of his leisure time. Each choice will in turn imply sacrificing the satisfaction he would have derived from adopting some other alternative. The final choice he makes would in turn indicate the order of values in which the four activities were placed. Such a choice expressed itself,

however, in a combination of sequences. He may, for instance, decide to spend the majority of his leisure time studying, and the balance equally divided between his family and attendance at political meetings. He may, on the other hand, decide to devote most of his time to political meetings, and the balance between ad hoc studies and his family. In each case, however, the combination of activities which were finally accepted was judged capable of satisfying to a greater degree "the complex demand taken as a whole".

Lamont reasons further that while it is possible for different valuational orders not to influence each other, though they exist in the mind of the same individual, "this separation can persist only so long as the common demands of the different orders can be satisfied without the one involving opportunity costs for the other". Valuational orders and the common demands on which they are based are thus potentially related to each other. When the necessity of choice between various common demands presents itself, then the potential relation turns into an actual relation. The common demands of the different orders are viewed in a more comprehensive valuational order, seen to be in relation to a more comprehensive common demand. Such must have been the case when Gauguin, the banker, asked himself whether his part-time hobby of painting should not be turned into a full-time activity. The common demand of what to do with one's leisure time was then viewed in the context of the more comprehensive demand of what to do with one's life.

A further important consideration is that every demand will on careful inspection turn out to be a complex demand. This is yet another aspect of that involved question of the unit which we have encountered in our discussions of job analysis and job evaluation. Lamont writes that no matter how simple and homogeneous a demand may seem to be when considered in relation to other demands, "when we consider its nature in relative isolation as a response to a given situation, it will be possible to detect various aspects within it, corresponding to the complexity of the situation to which it is the response".

When we evaluate, however, we force ourselves to consider such demands as being simple and homogeneous, regardless of their inherent complexity. This is done mainly to enable us to measure in an ordinal manner the satisfaction various choice alternatives have towards the common demand.

Lamont notes that to attribute comparative value to anything is to attribute by implication goodness. The conception of goodness, however, while a necessary ground of the comparative value judgment, is not sufficient ground. The conception of goodness, i.e. the qualitative definition of value, does not explain why one good thing should be considered better or worse than another. In both instances, however, the attribution of goodness implies the prior and continuing cognition of an objective order. Approval arises only as a response to the perception or awareness of objective situations. Cognition enters particularly in our value statements when we communicate them to persons who do not share our set of values. "When we are aware of a contrary set of approvals and disapprovals in the people to whom we are talking - if we wish to persuade them into the acceptance of our set, it is the cognitive attitude which finds a suitably increased emphasis in our expression of approval. The expression takes on the character of what is properly called the value judgment and may even assume the appearance of a bold statement of fact. But it is important to notice that this statement of fact is addressed to some other existing conative disposition in the hearer. The purpose is to lead evidence and suggest inferences with regard to the nature of the objective order such that when he sees their implications for his own conative dispositions, he will respond with the new disposition which we want him to acquire".

There is, therefore, this important association between what we know and what we want to do. Lamont is not particularly happy about the distinction philosophers make between cognition and conation. He accepts it nevertheless, because in our inner experience, we can draw significant distinctions between knowing, feeling and willing; and perhaps the terms cognitive, affective and conative are merely representative of the attempt to furnish a systematic account of the human mind". The distinction highlights the relative importance of various components in the value judgment, as well as stressing the fact that these components are related to each other.

The various points we have summarized so far to denote the nature of value judgments are particularly relevant to job evaluation. Both meanings of the word value are involved in it, and the close association which exists between them results in a delusion. The tendency is often to ignore

the subjective basis of evaluation and to accept the various magnitudes as objective measures. The sense of finality which they suggest may preclude in our minds the need to question the validity of the various standards which were used.

It is because of this tendency that great stress has been placed in job evaluation on the definition of factors which will be used to value work. Writers on job evaluation systems realise the truth of the point which Pepper has made: the whole problem of evaluation centres unequivocally on the definition of values. A problem, however, presents itself at this stage. What values shall we use? Attaching simply monetary values to work cannot be done without a great deal of prior thought. Value in the strict economic sense, i.e. "the judgment of what an activity will bring in exchange" (46) is also inadequate. Wooton (179) if we remember, provided substantial evidence to prove that the value of work in the strict economic sense is related to the value of work in the broader social sense. The allocation of a monetary value to an occupation may be the result of a judgment which incorporates a number of values society and the economy attach to work. The theory which Lamont has evolved may be of use in this context.

Lamont has stressed that no evaluation may take place without the prior and continuing cognition of an objective order. This order would pertain to the experience both employers and workers have gained from living in a complex technological society. It is a society which has developed a monetary economy and a high degree of social specialization. But perhaps, most pertinent to job evaluation is the manner in which Lamont views a value judgment. It is made in conditions of scarcity and is an expression of choice when objective circumstances enforce on us the necessity of renouncing one thing if the other is to be attained. This involves the surrender of alternatives which may have appeared at the outset to be particularly desirable.

The evaluation of jobs requires of us to consider two valuational orders. There are two demanders, each of which acts as a source of supply or object of demand to the other. We have, on the one hand, the employer in need of labour, and, on the other hand, the worker in need of employment. Each may be viewed as an object of demand by the other, and each has limited resources at his disposal which he wishes to distribute with a view to realizing "his own personal conception of the good".

The employer may be primarily interested in his business aims. He needs labour to reach these aims, and presumably may have already decided how to distribute his resources between labour and equipment. With particular reference to labour, he must choose between a number of alternatives. Will he use a high proportion of skilled labour? Will he depend largely on unskilled labour? How much of his own time can he devote to direct supervision? How effective will it be, and what supervisory ratios does he need? Finally, he will have to ask himself how much he will pay each person. And it is at this stage that the value judgment becomes rather complex. Lamont has pointed out that every demand is potentially complex. The demand for labour is perhaps the most complex of all. There is no definite finality for the reason labour is needed. The employer develops his organization in a continuous manner. Labour is potentially able to create new demands which the employer had not considered initially. Demand for labour is continuous rather than discrete; the demand continues for the whole duration of the association between employer and worker.

The common demand which underlies the valuational order an employer uses to evaluate jobs is therefore quite complex and comprehensive. It may incorporate in turn a number of different valuational orders each with their own common demand. Because the demand for labour is a continuous one, the employer must be assured that the worker will give him a uniform return for the time spent on the job. Methods of control are limited in their effect and so the employer must find ways and means of motivating his workers. He may, on the other hand, seek a particular image in the public mind. He may formulate a number of personnel policies which will reinforce this image, e.g. factory in a garden, pension schemes, attractive promotional plans. Finally, he may consider that his product or his services will be in great demand only in a period of national prosperity. He may therefore take the lead in progressive wage policies and actively campaign for them among his fellow employers. As Lamont points out, separation between the various valuational orders will persist only when opportunity costs can be satisfied without the one involving opportunity costs for the other. If an employer formulates his pay policies with regard to society as well as to his organization, then opportunity costs involve each other, and the different valuational orders are incorporated in a more comprehensive order.

Similar arguments could be developed for the worker. He too is faced with the problem of conserving his scarce resources. A decision to select a particular employer in preference of another will have important consequences on the manner in which he spends his time. He will have to sacrifice a number of possible alternatives. The society he lives in has intensively specialized functions. This has the advantage that an individual no longer needs to do a number of different things to satisfy his various demands. On the other hand, his choice of occupation will bind him strongly to certain lines of activity which will occupy a major portion of his wakeful life. His own conception of good may not necessarily coincide with that of his employer. This is possibly the reason why he has entered into an economic association with him. Though this association expresses itself in an exchange of money, the value he attaches to work may well go beyond the economic exchange. McGregor (114) points out that however important wages may be in providing satisfaction of various needs, they will satisfy most of his needs, only when he leaves his job. "Wages cannot be spent at work. The only contribution they can make to his satisfaction on the job is in terms of status differences resulting from wage differentials. This is one of the reasons why small and apparently unimportant differences in wage rates can be the subject of so much heated dispute. The issue is not the pennies involved, but the fact that the status differences which they reflect are one of the few ways in which wages can result in need satisfaction in the job situation itself". There is therefore sufficient reason to consider that the decision a worker makes to work for an employer at a given wage is also based on a comprehensive set of valuational orders.

The purpose of this lengthy discussion on value judgments has been to show their empirical and subjective nature. However fundamental the discussion of value may be, it cannot be held in isolation of the person who makes the value judgment or is said to hold certain values. As we have shown already, this is of particular relevance in job evaluation. It is therefore essential for us to examine next the empirical evidence which is available which will indicate to us how people value work.

2. The attitudes to work.

It is generally accepted in present-day Western society that occupation has become a fundamental index of status and a standard of self-respect. Describing the transition which has taken place over the past hundred years, Gross (61) writes: "In a period of stable residence, when one family lived on the same farm for several generations, a name gave a reputation to those who bore it, and those who knew the name, knew the reputation. But under conditions of mobility, migration, the reduction in size of family and urbanization, neither place of origin nor name is likely to tell one much about the man. Instead, one asks of a stranger "What do you do?", and the other will understand that the "what" refers to the other's occupation".

In a similar vein, Jaques (85) considers that the work a person is engaged in, not only satisfies his material needs, but in a very deep sense gives him a measure of his sanity. Work forces a person to come to grips with his environment. "It confronts him with the actuality of his personal capacity - to exercise judgment, to carry responsibility, and to achieve concrete and specific results".

A number of specific studies have been carried out in recent times to determine certain aspects of values attached to work. Singer and Steffere (162, 163) have shown, for example, that there are age and sex differences in the manner in which values are attached to jobs. A larger number of male than female adolescents wanted jobs which permitted self-expression. Urban adults selected jobs "where you could work more or less on your own". Adolescents, on the other hand, did not attach much importance to independence. Rosenberg (151) examined at length whether occupational choice was in any way related to the values the individual held. He found that it was so and concluded that "to ask what an individual wants out of his work is to a large extent to ask him what he wants out of his life. It is, therefore, indispensable for an adequate understanding of the occupational decision process to consider what people want - or consider good or desirable, - for these are the essential criteria by which choices are made".

With the possible exception of Rosenberg's, these studies fail to consider the manner in which individuals view work per se. Rosenberg goes some way in this direction, but he too is primarily concerned with ways and means of predicting ultimate occupational choice. The attitude to work per se, more particularly with reference to South Africa, appears in an overview of attitudinal studies which Biesheuvel directed at the National Institute for Personnel Research, and which he included in the context of his Hoernlé Memorial Lecture (11). As this review directly concerns the African worker in South Africa we shall discuss it at length.

Biesheuvel discusses first the part that work holds in our lives. He notices that work has acquired in the Western technological world, a significance for moulding the personality of the individual which it did not possess in the earlier stages of our history. There is an incessant search for new problems to solve, a restlessness which finds satisfaction only in our deep involvement with work. Consequently our technological civilisation has come to depend for its continued well-being on the capacity for sustained effort of a considerable proportion of its citizens. He notes, however, that this compulsion to work is primarily applicable to the upper financial managerial and business classes. It tends to taper off as we go down the occupational hierarchy and is replaced by "the social satisfactions to be derived from participation in work with others... Human relations at work increase in significance as the range of satisfactions to be derived from life becomes narrower and opportunities for social involvement diminish".

He considers next the attitudes to work which Africans possess. The unique structure of our multiracial society enables him to examine these attitudes to work at various levels of social development. The attitudinal studies which he discusses were carried out among migrant labourers in the mining industry, workers in secondary industry, and a varying range of professionally qualified men including clerical workers, teachers, nurses and social workers. He includes, in addition, his own interpretation of various reports made by anthropologists of tribal African life.

Work motivation among primitive tribesmen does not appear to have risen much above the subsistence level. They work for food and to maintain the family and clan organisation. Commenting on this aspect of tribal life, Glass (56) adds that, initially, work organization was based, almost entirely, on the household unit of the extended family. "The cohesion of this group was maintained through a set of reciprocal duties... Since acceptance of, and compliance to, the group were the norms of valued behaviour, this was not an economic situation which rewarded initiative and difference". In such a situation, work discipline was determined by the agricultural seasons and the pastoral routine. This meant that except for milking, work discipline was exceedingly lax.

Biesheuvel considers next the migrant worker who retains strong associations with his tribal community. He adopts a migratory work pattern because it disturbs least his traditional way of life. "This life (of contracting to work on a mine for a limited period of time) provides many opportunities for the leisurely tribal activities... after minimal material needs have been met". Biesheuvel stresses the importance migrant labourers attach to leisure, and mentions that loss of leisure is a major deterrent against continuous employment in White areas.

There is at present no evidence which will explain how the transition between casual migrant labour and full-time urban employment takes place. He assumes that the process is a gradual one and depends on the weakening of the migrant labourer's kinship ties and an increasing confidence in his ability to handle his own affairs. The development of secondary industry, the fact that could not bear the costs of training fresh migrant labour at regular intervals, and accelerated rural impoverishment are additional factors which may have precipitated this transition.

Attitudinal studies of the established industrial worker reveal that he no longer looks upon work as an interruption of the more meaningful and satisfying life of the African areas. "He sees workers committed to their daily tasks, experiencing needs beyond those of a mere subsistence level. This group does not show, however, a high degree of social cohesion. This is probably due "to the recency of their association with a paternalistic tribal society, the relative coarseness of occupational stratification in their urban communities, and the absence of any labour organization".

When he moves to higher occupational groups, Biesheuvel finds that they do not lack any of the specific work motivations which characterizes Western industrial people. Africans, however, differ outstandingly in the high social value attached to work. He feels that this may be due to the need experienced by many Africans to restore a sense of belongingness which was lost with the break up of the tribal societies. That in fact, individualism is often more prominent in African occupational behaviour than social service, he accepts "in view of the many socio-economic pressures and statutory disabilities to which the individual is exposed, and the absence of a realistic and generally approved plan whereby actions could be guided and inspired".

He finds too that the theme of self-realisation - "being something, making something of myself" - is quite prominent among the African middle class. He quotes a study of Allport and Gillespie (1) which found that this theme of self-realisation was expressed far more frequently by African students than by students from any other nation. He considers that this attitude is not necessarily in conflict with the desire to place interest of group before self, because there is little the individual can do on behalf of his group without having received adequate vocational or professional training. He considers that "because of the effort Africans have to make with the limited resources at their disposal, to reach Western standards of competence and to acquire Western habits of conduct, that this motive is so much stronger among them than among their American counterpart".

Comparing their attitudes to work with those of industrial operatives, Biesheuvel finds that in keeping with similar occupational groups elsewhere, the African middle class expects to derive much of the meaning in their daily task from job interest or dedication motive. He concludes that "the more deeply Africans are drawn into that essentially Western culture, the world of work, the more thoroughly do they acquire the personalities functional for that culture".

This survey is very pertinent to the field of job evaluation. By indicating that the attitude to work varies as one moves along the occupational spectrum, it questions the assumption made by Jaques (85), i.e. that all occupational groups base their evaluation of work on one single dimension.

Biesheuvel and Glass have each pointed out how attitudes to work are largely predetermined by the culture which the individual has acquired. The African being in a state of cultural transition may have in consequence varying conceptions of the bases on which work must be remunerated. If we were to use the terminology of Lamont, we would say that the "common demand" experienced by various occupational groups varies as we move from one group to another.

A number of independent writers have come to the conclusion that this is in actual fact the case. Biesheuvel suggests it when he considers the varying satisfaction derived from work by executives and operatives. Executives derive a keen interest from the work they do, and appear to labour under some compulsion to give increased mental effort to it. Operatives, on the other hand, derive their satisfaction mainly from group association. Otis and Leukart (135) write that both management and workers each have their own ways of classifying jobs. Management is largely directed by the scarcity of labour, the learning time required, and the amount of responsibility involved. Workers evaluate differently. They are guided primarily by the pleasantness of the job, i.e. whether it is desirable or undesirable, the difficulty or ease of the job, and whether it requires a great deal of effort. Sayles (155) writes that his experience in job evaluation has made him conclude that the way workers "see" and compare jobs requires an analysis of complex interests and forces which must be considered in addition to the formal evaluation of job content. Otis and Leukart, and Sayles fail, however, to present any experimental evidence for the conclusions they have reached.

We devised, therefore, and carried out, an experiment which would formally test the assumption that the manner in which work is valued varies in actual fact as we move from one occupational group to another. The experiment was designed with particular reference to work done by Africans.

3. Rationale and model of experiment.

The hypothesis we propose to test was formulated as follows:

"That the concepts used in the evaluation of jobs and the relative importance attached to them are the same for a sample of European management officials as they would be for Africans at various occupational levels".

We are concerned in this experiment solely with the evaluation of jobs currently done by Africans. We shall examine how these jobs are viewed by European managers and by Africans at various occupational levels. This is a twofold task: we must not only determine the concepts used by these various groups in their evaluation of jobs, but also to establish the relative importance attached to these concepts.

A brief survey of psychological experiments reveals that techniques to measure empirically values, have not progressed very far. Dukes (39) ascribes the difficulties psychologists have encountered to the controversy which Titchener initiated in 1915, when he excluded the study of values from the science of psychology. There are moreover, he writes, a number of difficult problems involved in the measurement of values. The definition of values must remain essentially subjective. Value judgments are in consequence highly conditional. Dukes mentions, in addition, the apparent lack of transitivity in some evaluations, and the question of a common denominator for the possible approaches to values. The various techniques which have been developed to measure values are essentially based on the straight answer. Even though a number of standardized tests of value are available, the large majority of investigators employ the Allport-Vernon Scale of Values.

The measurement of the value of work has essentially been based on the common sense dimensions found in job evaluation systems. These dimensions vary, as we indicated, according to the system used. Jaques (85) bases his evaluation on the time span of discretion. Job ranking methods depend on the manner in which a committee views the relative importance of jobs. The method of classification relies on the definition of grades in which a number of dimensions are compounded.

The points and the factor comparison system are based on the concept of the factor. Five factors keep recurring in most systems. We shall discuss them at length as they come nearest to defining the basis on which work is evaluated.

There is, first of all, the broad concept of knowledge. In this is incorporated all that the person needs to know in order to perform his functions satisfactorily. This would include the education he has received, any training he may have been given on the job, and the experience he may have gained in a similar or related job. The knowledge which a person acquires is essentially conceptual; it may be used directly in the day-to-day work; it may, on the other hand, form the background against which current problems are perceived or solved. Knowledge is therefore valued, not only because of the actual use the incumbent makes of it, but also because of the potential use he may make of it at some future date.

The second concept is skill. Though it initially meant the ability to distinguish or separate (skill is derived from the Old Norse SKILJA meaning to separate) it is now used in the sense of "being able to do things". Under this factor would be included the dexterity, motor controls, and special knacks involved in essentially physical, and therefore, visible tasks. We may, however, speak of mental skills meaning by that, intelligence, but skill as currently used in job evaluation, has entirely physical connotations. Skills are related to knowledge, and the two are often difficult to separate; the expression of skill is most clearly seen in the completion of a mechanical task which involves the use of hands and fingers, aided by tools. Skill is also used to denote the ability to achieve certain concrete results. We call a person a skilled interviewer because he can extract information and can apply involved interviewing techniques. The emphasis here is on the doing, rather than the knowing.

The third concept is responsibility. We enter here perhaps into the most complex and contraversial area in job evaluation. Jacques (85) summarily dismisses the ambiguities of the concept by stating that in any business organization, the board is ultimately responsible for the activities of their employees. The responsibilities of an individual are to him simply the particular activities he must carry out in his job. Writing specifically of the nightwatchman, Jaques

states "If he carries out his job, he contributes to the security of the factory; but he cannot be said to be responsible for it". A person, according to him, has responsibilities only to the extent that he is called upon to contribute to some aspect in the work of an organization.

Jaques' argument is based essentially on the strong relationship which exists between factors in job evaluation. In a way, his argument gains strength from the fact that responsibility and wages have a common etymological meaning. Wages are derived from the old French GAGE, meaning a pledge. They share a common root with wager, to wage, meaning primarily to hazard into a conflict. The connotation is clear: one stakes something of value as a pledge for a probable return. Ancient wisdom may well have placed the payment of wages, the returns of labour into as hazardous a category as the throwing of dices or the waging of war. Responsibility is derived from the Latin spondere, which means to promise, to speak; the prefix re, means to promise back, to speak back. Murray (130) writes of the original Latin root sponse: "There is something final in this word, like the FIAT (let it be done) of an emperor, or the IMPRIMATUR (let it be printed) of a pope. For this word means SPOKEN! from the Latin spondere, spons: to speak to pledge". We have from the same root, the words spouse, sponsor, and even response which meant initially that which is spoken back. Murray traces further the root of the word spondere to the Greek "sponde" which meant a libation made on a solemn occasion, such as the agreement of a truce, and the Hittite word "sipand" which meant to pour a libation.

This long deviation into the etymology of the word responsibility may well explain the many popular connotations of the word. A sense of responsibility is to modern society the acid test of maturity and the freedom to exercise choice. When we speak of responsibilities of a job, we imply primarily as Jaques points out the activities of a job. We go, however, beyond these activities, and take into account not only direct visible action, but restraint from certain lines of action which we do not value. When we speak of the responsibility of a watchman, we mean primarily as Jaques does, that the man remains wide awake on his job and carries out his rounds of visits. But we also allude to a number of negatives: that he will not be rude to the public, that he

will not be open to bribery. Some responsibilities in a job are expressed essentially in negative terms. Responsibility for the safety of others means that the worker will prevent certain lines of action which will injure his fellow workers. Responsibility for material and equipment means that the worker will avoid operating the machine or use material in a manner which will damage them. Other job responsibilities are expressed in positive terms, i.e. responsibilities for supervision, for personal contact where a given line of action is prescribed or expected.

The crux of the meaning of responsibility therefore is that the person holds himself accountable for certain results. There is implied in this all the solemnity of an oath-taking ceremony. The individual in exchange of a definite undertaking, e.g. to be paid a wage, promises to achieve certain results both in actively pursuing a line of action, and in avoiding to follow some opposite course. The stress we have placed on the negative aspect of responsibility is quite important. For no activity, whether it be work, or a truce at war, has controls which do not force us to depend on the discretion of some other person when we talk in terms of responsibility at work, this means that we have given a person a certain amount of discretion, that we cannot keep rigid controls over him and that we shall hold him accountable for certain results.

The fourth concept is that of effort. A distinction is made here between mental effort, i.e. the need to apply oneself to certain forms of mental activity, and physical effort, generally related to muscular movement. The connotation which is common to both mental and physical effort is the tempo, the pace with which a person works. In all forms of work, activities can be carried out with a pace which ranges from the frankly leisurely to that degree of high pressure which we associate with American executives. Related to this, however, is some judgment of the expenditure, either at the muscular or mental level, the individual has to make to achieve results expected of him in the course of his normal work. Effort connotes therefore some combination of motivation with the degree of force the individual judges must be exerted.

The fifth concept covers all aspects of the environment in which work is carried out. This implies the actual physical surroundings, and some measure of the hazards inherent in them.

The largest number of job evaluation systems endeavour, as we indicated, to measure the value of work in terms of these five factors. But such factors are in reality quite complex as they try to encompass a large number of specific situations. We could not, therefore, use directly these five in the context of our experiment. We wanted managers and workers to evaluate jobs, but to ask them to evaluate jobs in terms of these specific factors would have presented us with an insuperable methodological problem. We could not define these factors in a manner which would cover all possible connotations various occupational groups gave to them. Difficult enough as it would have been to ensure their uniform interpretation, their use at the outset of the experiment would have run counter to one of its major aims. Asking our subjects to evaluate jobs in terms of these factors meant that we assumed that they would use these factors anyway. We could use the factors as a model to categorize the various judgments subjects made, but we could not ask them to make their judgments in terms of the factors.

Our experimental design was in essence quite simple. We showed our subjects pictures of jobs and asked them to make a choice. Biesheuvel (12) used a similar method of pictorial presentations when he investigated the presence of Western values among tribal groups. Pictures were also used by Goldshmidt and Edgerton (58) in their study of values among the Menomini of Wisconsin. In both studies, subjects were shown pictures which described various situations. They were either asked to comment directly upon them, or else to choose from a number of alternatives, a desirable line of action. In each case, the picture would act as a stimulus for the formulation of a value judgment, i.e. choosing between alternatives.

The pictures we presented our subjects represented certain facets of well-known jobs. Though the job would, in reality, involve much more than could be conveyed by a static picture, we expected subjects to elaborate the stimulus material presented to them, and to arrive at a value judgment.

We held a number of discussions with the team of job analysts and with officials from the City Council to select jobs suitable for this study. The prime criterion these jobs had to meet was that they would be well-known to Europeans and Africans at all occupational levels in the City Council. The purpose of the experiment would have been defeated if either European or African subjects were presented with pictures of jobs they knew vaguely or not at all. The jobs moreover had to be of such a nature that the major activity in each one of them could be represented by a photograph; we also wanted jobs which involved a number of easily identifiable features, which again could be incorporated in the composition of a picture. Jobs finally had to range from skilled to unskilled. We short-listed 34 jobs, and photographed ultimately twenty of them.

We carried out next a small pilot study in which 40 subjects, taken at random from one of the municipal compounds, were shown the 20 photographs. They were asked to identify the jobs and describe the various activities the picture suggested to them. We purposely selected labourers as subjects because we argued they would be least informed about jobs in the Council. After the pilot study had been completed, we chose nine pictures which subjects identified readily, which elicited most comments, and which showed jobs ranging from skilled to unskilled.

The nine job, whose photographs appear on the plate in the following page, were as follows:-

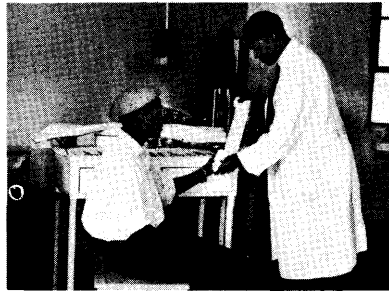
1. Pneumatic drill operator. The operator is shown holding a drill over a broken road surface, and working in a heavy oil jacket. The picture was intended to convey the notion of physical effort in holding a heavy implement (the operator stands with both feet apart and leans over the machine), and the skill required to operate a drill through a variety of surfaces. A spanner was placed in the foreground to denote that he used tools to connect and disconnect the hose. Loose rock and dust suggest hazards and open work surroundings.

2. Medical orderly. A male clinic orderly is shown in a dressing station bandaging the hand of an African worker. In the background is a tray with surgical instruments partly uncovered. The orderly wears a white coat. The job was intended to convey the impression of skill and know-how, as well as the specific responsibilities involved in the job, i.e. to be clean, to look after the welfare of others, etc....

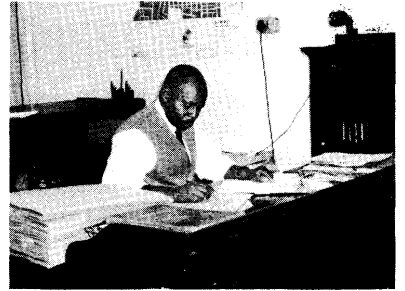
VALUE STUDY PICTURES



Pneumatic drill
operator



Medical orderly



Clerk/Scribe



Artisan's hand



Policeman



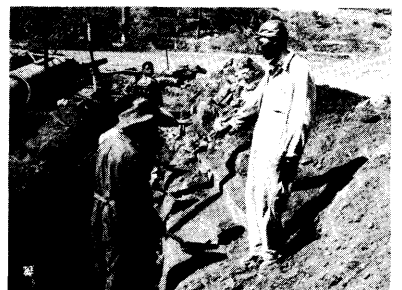
Pick-and-shovel
labourer



Refuse remover



Painter



Boss boy

3. Clerk - scribe. As there are a wide variety of clerks in the City Council, we chose to represent in the picture the essence of all clerical jobs, i.e. the ability to write. The clerk is shown sitting at a desk in an office, with a telephone exchange nearby. He writes on a file, checking some information from a book. Files and papers are placed on the desk. Mental effort is suggested by the concentration on the face of the clerk, and the fact that he holds his finger on an item of information lest he loses it.

4. Artisan's hand. The European artisan gives his back to the camera, and the focus is on his assistant who hands him a tool from a tray. Tool box, waste cotton are prominently displayed. The picture gives the impression that the artisan's hand has given a tool and now looks for the next one to be used by the artisan. It conveys the training the artisan's hand has received in the knowledge of various tools and the sequence in which they will be used.

5. Municipal policeman. He is shown separating two African quarrelling; a bicycle is in the foreground. One African shelters behind the policeman, to convey the impression that the policeman protects the public. The second African has thrown a punch. Though the policeman is exposed to danger of assault, he gives the impression of being well able to take care of himself. He holds the African firmly at arm's length and appears to have thrown him off balance. He is armed with a knurled stick which he has raised and which appears much more threatening than a badly thrown punch.

6. Pick and shovel labourer. A line of labourers are swinging picks on the side of a road. In the background is a view of the townships and a steamroller. The labourers are bending down, some to bring the pick down, others to disengage it. The picture conveys the physical effort involved in the job and the fact that it is carried out in the open.

7. Refuse remover. He is shown carrying a full bin on his shoulder and trotting to the back of a refuse vehicle. Effort is shown by the tenseness of the muscles of his forearm and the fact that he is leaning forward to balance the weight as he runs. The picture represents an everyday scene in the

townships and European districts. Though the picture was taken in a European residential district, it could easily have represented a scene in one of the more select residential areas of African townships.

8. Painter. He is shown standing on a short ladder, painting the eaves of a house. The picture intended to convey discreetly hazards of fall; the shortness of the ladder suggested that the fall would not be great. The picture is the only one in the group of an African artisan. He uses a brush and holds a pot of paint. We wanted this to suggest the apprenticeship the man had served, as well as the knowledge of paints he has acquired.

9. Bossboy. An African supervisor is shown directing a gang of labourers shovelling earth from a trench. The task supervised is not skilled, the bossboy appears in the well-known role of an overseer pressing labour.

Values about jobs could be elicited in three possible ways. We could present each picture in turn, ask what the person doing the job should be paid, and why. We could ask the subjects to rank the nine jobs in some order of merit and explain the basis on which the rank order had been derived. We could present the 9 jobs in pairs, ask which of the two men should be paid more, and the reason for this choice.

We rejected straightforward ranking because the approach would present our subjects with a great deal of material at once. They would not only be required to remember the nine jobs they were ranking, but also to elaborate the content of jobs from the nine pictures, and remember the elaboration made for each job. We rejected the presentation of each single job because the subject would develop a standard of judgment as he went along, and would possibly evaluate the last jobs presented differently than the first ones. We favoured the paired comparison approach because the subject had to judge only two jobs at a time, which he could span in turn. He would moreover formulate each judgment strictly in a relative manner, and would not have to formulate an a priori a scale of pay on which jobs would be placed.

As paired comparisons indicate quite clearly where ambiguities in ranking lie, the method is superior to straightforward ranking. Paired comparisons would in addition supply us with a measure of distances between rank orders. As these distances were computed from the preference matrix, we preferred them to distances on a scale which the subject would need to formulate consciously with indefinite or variable reference points.

The paired comparison technique presents, however, a major disadvantage in the relatively high number of judgments it generates. Nine pictures would require each subject to formulate 36 judgments. If, in addition, every subject were to explain the basis on which his judgment had been made, we would require substantially more time. We calculated that this would take on an average $2\frac{1}{2}$ hours per subject. African labourers and most of our subjects would lose interest after the first hour; they would fail to see the need to continue the experiment and would repeat the same reasons over and over again.

The incomplete block design reduces appreciably the number of judgments each subject has to make. We chose a design Bose (147) developed for nine variables. Each subject was asked to make only 9 judgments and could expand at will on the reason behind each judgment. This would take on average 45 minutes per subject, and enable us to interview 588 Africans and 196 European subjects.

The design which Bose developed required of us to present the comparisons according to a rigorous plan which ensured a balanced presentation of all possible pairs. We were required to work in groups of 28 judges or multiples of 28. The incomplete block design forces the assumption of judge homogeneity. As no judge is shown all possible comparisons, there is no way of measuring his consistency. Data were analysed by means of the Bradley-Terry technique (14, 15), on an electronic computer.

The following African occupational groups were represented in this study. Each group comprised initially 28 judges; but where the group was particularly well-represented in Council, we increased it by multiples of 28. Subjects included in this study were randomly selected from the central staff records.

Group AA (N = 28) - Female nurses from the City Health Department. Most of them are married, over 25 years old, and with a standard of education of J.C. or better. 60% of the sample are still undergoing their training. The remaining 40% have completed courses for general nursing and midwifery.

Group AB (N = 28) - Semi-professional staff of a senior level. These are social workers, sports organizers, cultural assistants, teachers, health visitors and health inspectors. They are all male and hold senior positions in the City Council, being generally responsible for the supervision of professional but more junior personnel. Subjects in this group are over 25 years of age, and have acquired additional qualifications to that of matriculation or school-leaving certificate, e.g. a teaching certificate, diploma in social work. This is the most occupationally advanced African group included in this study. It is the best educated group and has the fewest number of dependents.

Group B (N = 56) - Senior clerical and technical personnel. This includes senior clerks, and technical personnel who would have less advanced qualifications than subjects in group AB. There are in this group, clerk cashiers, building inspectors, beerhall supervisors. They have received for the most part, their training on the job. They have completed their J.C., but hardly any have gone further in their studies. Though a large number in the group are single, the average number of dependents they support is between 4 and 5. This would include parents as well as relatives and children.

Group C (N = 56) - Clerks. They are junior in status to clerks in group B. They are involved in routine clerical tasks and are employed in administrative departments, offices and out-patients clinics. The clinic clerk described in the previous chapter characterizes this group. Almost all of them are married, have to support from four to five dependents, are over 25 years old, and did not study further after leaving school, usually on completion of the junior certificate.

Group D (N = 56) - Artisans. These are men who have completed an apprenticeship, in one of the trades listed in the Native Building Workers' Act (Act No. 27 of 1951). Included in this sample are carpenters, plumbers, bricklayers and drainlayers. They are for the most part, over 25 years old, their education ranges from near illiteracy to standard IX. The majority in the group have not gone beyond primary education. They were trained by the Municipality and excepting for one subject, none have continued with studies after completing their apprenticeship. Over 70% are married and support on average five dependents.

Group EA (N = 28) - High-grade African supervisors. These are men who have acquired specialist training and supervise skilled workers. There are in this group, road makers, district overseers responsible for the removal of refuse and its disposal in a large area, trade chargehands, and workshop foremen. They are over 25 years of age, and range in education from near illiteracy to standard ten. The majority have not gone beyond primary education. They were trained by the Municipality, did not study further after they had acquired a competence in their trade. 90% are married, and support on average five dependents.

Group EB (N = 28) - Low-grade African supervisors. These are supervisors currently known as "bossboys". They supervise labourers and may often work alongside them. Promotion to the status of bossboy depended at the time of the study on the opinion of the European overseer. Some were promoted because of their leadership qualities, others as a reward for long service or simply because of favouritism. The manner in which they function varies according to the European overseer, who rigidly controls the degree of authority they will exercise. The majority of bossboys in this group were over 35 years old, and had been with the Council for more than 5 years, making this group the one with the longest service. The level of education is low; 75% are either illiterate or have gone half-way through primary school. They are all married and support on average five dependents.

Group F (N = 56) - Semi-skilled workers. This group includes semi-skilled workers who were for the most part trained in an ad hoc manner on the job. There are drivers, machine operators, and half the group consists of artisan's hands. They are all over 25 years old, few have completed primary school education, and just under 50% are illiterate. Most of them are married and support on an average 6 dependents.

Group G (N = 56) - Municipal policemen. These are policemen privately employed by the City Council to guard property in European districts and to enforce municipal by-laws in the townships. They are over 25 years old, few have completed secondary school, but most have gone half-way through primary school. They are all married and support on an average five dependents. They were trained by the Municipality, none have studied further.

Group H (N = 84) - Labourers - unpleasant conditions. These are labourers employed in jobs which are generally accepted as unpleasant and are paid slightly more than unskilled labourers. Included in this group are refuse removers, night soil removers, sewer cleaners, and labourers working in the basement of power houses. The majority are over 25 years old, and illiterate. They are for the most part married and support five dependents.

Group K (N = 112) - Labourers - lowest wage grade. This group was sampled from the largest labour group in the City Council, which included over 40% of the total labour force. They all earn the statutory minimum wage of R24.23 a month. They are employed in tasks which require no skill and involve brief periods of on-the-job training. They are for the most married and support five dependents. They all live well below the poverty datum line as indicated in a report from the National Institute for Personnel Research (31).

The European group comprised 196 municipal officials. This is in the nature of a total sample as all municipality officials above a certain level were included in this study. We incorporated in this sample all departmental heads and their deputies. The Municipality is functionally divided into a number of departments, each managed by a departmental head. Major departments are divided into branches each under the control of a branch head. The deputy is appointed

at the same time as the head of a department or a branch, and replaces his chief automatically when he is transferred, promoted or retired. As there are 23 departments in the municipality serving a variety of functions, the backgrounds of the various officials interviewed varied markedly. There were engineers, accountants, medical officers, librarians, work study consultants and various categories of professional administrators. As each sub-category would be too small to comprise a full group of 28, it was decided to group all European subjects together and consider them as having the managerial function in common.

4. Analysis of the data.

Preference matrices were drawn up for each of the eleven African occupational groups and for the group of European officials. Scale values were computed for the nine jobs by means of the Bradley-Terry method (14, 15). Jobs were plotted using scale values as distances.

The point of origin for each scale is not absolute, but relative to the pattern of the preference matrix. Any direct and detailed comparison between scales is not permissible. If the distance, for example, between two jobs on one scale is .4, and on another is .8, we cannot say that the distance between the jobs on one scale is twice that on the other. A broad comparison is permissible, however, if we base it on the manner in which jobs cluster near each other and are spread over the scale.

Product moment correlations were computed between the scale values each of the nine jobs obtained for the twelve occupational groups. The correlations were computed to give us some rough measure of agreements between scales. They are permissible if we do not seek to test their significance (we would be assuming otherwise that the scale values are distributed normally) and if we remember clearly what it is that we are correlating, i.e. a rank order and scalar distances determined by a preference matrix.

Test of significance were computed for each scale. Where the value of the test is significant, this means that the scale of jobs obtained from the preference matrix is significantly different from one which would be derived by chance. Tl test measures the significance of scales where

the group has 28 subjects. It assumes that subjects are consistent with themselves and with each other. As we used an incomplete block design, there is no way of testing this consistency. T⁴ tests measure the significance of scales for occupational groups comprising a number of sub-groups. The consistency of sub-groups forming a major occupational group was tested by T⁵ tests.

The assumptions of consistency we have made are permissible when we consider the limitations inherent in the experimental model. Judgments elicited by a paired comparison of job photographs are hard to control experimentally. The subject is shown a picture with a great number of cues. He could presumably use different cues at different presentations. He could weight the cues differently as different pairs are shown.

The incomplete block design we used precludes any measurement of judge consistency. A judge would see, for example, the picture of the clerk paired with that of the medical orderly, the medical orderly paired with the bossboy, but will not see the picture of the clerk paired with that of the bossboy. As we are unable to measure judge consistency, it is difficult for us to explain lack of consistency between subgroups, when this occurs.

The advantages of the approach we used were, however, many. We were able to use a technique which could be applied with equal facility to literate and illiterate judges. We were able to encompass in this experiment - the first of its kind - a great many occupational groups. Subjects were asked to make fewer comparisons but explained in each case the reasons for their preferences. The cost for all this, however, was an experimental design which lacked fine controls.

We feel therefore that the results of this experiment can only be considered on a broad basis, indicative of trends rather than providing fine measures of behaviour. Commenting on paired comparison experiments as the one we have carried out, Guilford (62) writes that "the amount of reduction an investigator will accept depends upon how much loss of accuracy he is willing to tolerate". We chose to tolerate a fair amount of error because of the advantages we have just enumerated.

Verbal comments were analyzed in two stages. We defined, in the first stage, categories into which the various comments made by Africans and Europeans could be grouped. In the second stage, we drew up frequency distributions of the comments occupational groups made on each job.

5. Results of the experiment.

The results of this experiment are based on the analysis of 7,056 judgments and 17,919 comments made by 784 judges, belonging to 12 occupational groups and with reference to 9 jobs. The extensive material which has been generated could be presented in a variety of manners. We could present, for example, at one time, all the material generated by one occupational group. We would examine the scale produced by judges in that particular group, and interpret it with reference to the comments they made. We could examine, on the other hand, each job separately and discuss how each occupational group perceives it.

We must remember, however, that we are primarily concerned with testing the hypothesis that various occupational groups evaluate jobs in the same manner. Because of the complexity of the material we have accumulated, we propose to examine the hypothesis in two separate stages. The examination in each stage will be determined primarily by the material analysed and the technique of analysis used.

We shall start by examining the preferences expressed by the various occupational groups. We shall examine the manner in which they have scaled the 9 jobs, and study how different scales are related to each other. This is the manner in which data would be examined after a straightforward paired comparison experiment. We propose to speculate, at this stage, simply on the preferences expressed and without any reference to the verbal comments.

In the second stage, we shall examine the hypothesis with reference to the verbal material. We shall also relate the preferences examined in the first stage, to the results of the content analysis of the verbal material. We shall ask three related questions: What concepts are used by African and European judges to justify their own evaluation of jobs? Are the jobs perceived in the same manner by the various occupational groups? And how do the frequency distribution of comments made explain the manner in which the jobs were scaled? The last two questions will be examined simultaneously.

5.1 Bradley-Terry scales for various occupational groups.

The scale values computed for the 9 jobs from the preference matrices of the 12 occupational groups appear in Table IXa. We also included in the table, the average current wage paid in the Johannesburg Municipal area, by other employers of African labour. The figures were obtained from a survey of current wages paid to Africans (31). We wanted to compare the rank order and scaling of jobs from various occupational groups with that dictated by economic or market considerations. We must point out, with reference to Table IXa, that the job which ranks first in any scale has the smallest value, and the one which ranks last has the highest value. This is due to the fact that all scale values are negative.

The results of the tests of significance - T1 and T4 - for the Bradley-Terry scales are shown in Table IXb. T1 tests are computed for groups of 28 judges and assume judge consistency within a group. T4 tests are computed for groups comprising two or more subgroups of 28 judges. Group D, for example, consists of two subgroups of 28 judges each, Group K of 4 subgroups, and the European group has seven such subgroups. The test assumes that all subgroups are consistent with one another, and that the judges within each group are consistent with themselves. T5 tests were computed to test the assumption of consistency made by T4 tests. We shall discuss the results of the T5 tests only after an examination of the scales generated by the preference matrix of an occupational group taken in toto.

When commenting on the manner in which jobs are scaled, we shall use our own assessment of the demands these jobs would make on an average job incumbent. The assessment is primarily a common sense one, guided by our own experience of these jobs, and by the job descriptions which were subsequently drawn up by job analysts.

5.1.1 The European officials (N = 196). The manner in which they have scaled the 9 jobs is shown in Table X. The rank order indicated by the scale is quite definite, except for two jobs clustering in the centre. Topmost job is that of the clerk, followed by the medical orderly. Two jobs with prevalent responsibilities adjoin each other. These

TABLE IXa. Bradley Terry scores for 9 jobs; external wages.

Occupational Groups Jobs	European Officials	AA	AB	B	C	D	EA	EB	F	G	H	K	External wage (monthly)
1. Pneumatic drill operator	4.132	1.796	3.270	2.733	3.675	1.710	2.245	1.620	1.347	2.430	1.470	1.310	R37.00
2. Medical orderly	1.474	1.524	1.403	1.395	1.571	2.104	2.096	2.048	1.858	2.096	2.080	2.080	R58.00
3. Clerks	.534	1.003	.741	.873	.469	1.228	.952	1.981	1.931	1.726	2.155	2.064	R78.00
4. Artisan's hand	5.048	3.612	4.200	3.730	4.605	3.650	4.017	3.612	3.612	4.510	3.730	3.324	R34.00
5. Policeman	2.766	3.057	2.847	2.617	2.996	2.617	2.172	2.733	2.217	.760	2.764	2.764	R38.50
6. Pick and shovel labourer	7.155	2.749	4.135	3.575	4.962	2.764	3.540	2.323	2.397	3.506	2.003	1.749	R30.00
7. Refuse remover	5.651	3.442	4.269	3.730	4.829	3.244	2.830	2.733	2.293	3.612	1.444	2.323	R32.00
8. Painter	3.339	2.900	2.313	2.386	2.996	1.749	2.538	2.112	2.501	2.996	3.101	2.674	R67.00
9. Bossboy	2.814	3.689	3.411	3.575	4.423	3.506	2.465	1.839	3.540	3.649	3.612	3.244	R38.50

TABLE IXb. Tests of significance (T1 and T4) for
Bradley Terry scales.

Groups	T1 N = 28	T4 N > 28
1. European officials		*1274.4
2. African nurses (Group AA)	* 80.7	
3. Senior semi-professional staff (Group AB)	*110.1	
4. Senior technical and clerical staff (Group B)		* 173.7
5. Clerks (Group C)		* 267.8
6. Artisans (Group D)		* 137.2
7. High grade supervisors (Group EA)	* 67.6	
8. Low grade supervisors (Group EB)	* 38.1	
9. Semi-skilled workers (Group F)		* 106.6
10. Policemen (Group G)		* 201.7
11. Labourers - unpleasant conditions (Group H)		* 429.8
12. Labourers - lowest wage grade (Group K)		* 184.8

* Significant at 1% level

$$\chi^2 (8 \text{ degrees of freedom}) = 20.90.$$

TABLE X. How the 9 jobs were scaled by
European Council Officials - N = 196.

0	
	Clerk (1)
10	
	Medical orderly (2)
20	
	Policeman (3)
30	Bossboy (4)
	Painter (5)
40	
	Pneumatic drill operator (6)
50	
	Artisan's hand (7)
	Refuse remover (8)
60	
70	
	Pick and shovel labourer (9)
80	
90	

are the policeman with his responsibility of maintaining peace and order, and the bossboy who must supervise the work of others. These two jobs are followed by the painter - a skilled job, the pneumatic drill operator - a semi-skilled job involving physical effort, the artisan's hand - a semi-skilled job involving less physical effort, the refuse remover - a labouring job with unpleasant features, and the pick and shovel labourers - a straightforward labouring job.

The scale suggests that the European group categorizes jobs in levels, and that though the distinction between levels is clear to see, the distinction within some levels is not so clear. The first level would include jobs ranked on the basis of education. Jobs requiring education are placed at the top of the scale. The next level involves jobs requiring patent responsibility, but the distinction between them is not at all clear. The remaining jobs appear to be ranked on a decreasing demand for skill. When two jobs appear to belong to the same broad category, then additional factors, e.g. physical efforts may be taken into consideration to place one job over another. The pneumatic drill operator and the artisan's hand may have been assessed as semi-skilled, but the pneumatic drill operator does the more fatiguing job and is placed higher.

5.1.2 African nurses (Group AA, N = 28). The scale for this group is shown in Table XI. Jobs fall into four levels. The clerk stands unequivocally on his own as the job which should receive most money. It is followed by the medical orderly and pneumatic drill operator, distinctly scaled, but relatively near each other. They are followed at quite some distance by the pick and shovel labourer, the painter and the policeman. At the bottom of the scale is the fourth cluster containing the job of the refuse remover, the artisan's hand and the bossboy. Though the two jobs which require most education appear first and second, we note that jobs with patent responsibilities, such as the policeman's and the bossboy, appear quite low in the scale. The bossboy ranks last, and the policeman ranks last in the third cluster. If physical effort were prized by this group, then the refuse remover should rank higher than the pick and shovel labourer. This group appears to group jobs into two categories - jobs requiring education, but with these is grouped the pneumatic drill operator, and the rest which includes labouring and skilled jobs lumped together with little distinction made

TABLE XI. How the 9 jobs were scaled by 28
Bantu Nurses (Group AA)

0	
5	
10	Clerk (1)
15	Medical orderly (2)
20	Pneumatic drill operator (3)
25	Pick and shovel labourer (4)
30	Painter (5)
35	Policeman (6)
	Refuse remover (7)
	Artisan's hand (8)
	Bossboy (9)
40	
45	
50	
55	

between them. Included in this last group are jobs with patent responsibilities. The artisan's hand and bossboy cluster together at the end of the scale. These are two jobs where the African comes into very close contact with the European but acts only as an additional pair of hands or as his voice.

5.1.3 Senior semi-professional staff (Group AB, N = 28). The jobs were scales as shown in Table XII. The jobs are spread much more clearly, excepting for the last three jobs which cluster together. The clerk is unequivocally placed first, followed by the medical orderly and the painter. These are all jobs which require extensive preparation before the person can do the work. They are followed by the policeman, a job with patent responsibility, and the pneumatic drill operator, which is preferred to the bossboy. At the bottom of the scale are placed the two labouring jobs and sandwiched between them that of the artisan's hand. This group appears to favour first of all, jobs which require extensive preparation, then jobs with patent responsibility, but in between a semi-skilled job which require extensive effort, and at the bottom of the scale, unskilled jobs lumped with a semi-skilled job, little distinction made between them.

5.1.4 Senior clerical and technical personnel (Group B, N = 56). Their scale appears in Table XIII. The first two jobs, i.e. clerk and medical orderly, stand out clearly from the rest, three jobs cluster in the centre of the scale, i.e. painter, policeman and pneumatic drill operator. The remaining four jobs cluster at the end of the scale. This group favours first of all, status jobs: in the City Council, both clerks and medical orderlies are on the graded staff which is a privileged white-collar group. In the centre are grouped together jobs with some outstanding characteristics, the painter is the only job requiring an apprenticeship, the policeman has a responsible and hazardous job, the pneumatic drill operator a semi-skilled but physically strenuous job. It is surprising to note that little distinction is made between labouring jobs and jobs which involve patent responsibilities or require a modicum of skill. This group rates these two jobs as low as the nurses do. It is interesting to see that whereas the European group made little distinction between the patent responsibilities of the policeman and the bossboy, this group clearly distinguishes between them.

TABLE XII. How the 9 jobs were scaled by top
semi-professional Bantu employees
(Group AB - N = 28)

0	
5	
	Clerk (1)
10	
	Medical orderly (2)
15	
20	
	Painter (3)
25	
	Policeman (4)
30	
	Pneumatic drill operator (5)
35	Bossboy (6)
40	Pick and shovel labourer (7)
	Artisan's hand (8)
	Refuse remover (9)
45	
50	
55	

TABLE XIII. How the 9 jobs were scaled by senior
technical and clerical Bantu personnel
(Group B - N = 56)

0	
5	
10	Clerk (1)
15	Medical orderly (2)
20	
25	Painter (3) Policeman (4) Pneumatic drill operator (5)
30	
35	Pick and shovel labourer and Bossboy (6) Refuse remover and artisan's hand (8)
40	
45	
50	
55	

5.1.5 Clerks (Group C, N = 56). Their scale appears in Table XIV. As has been the case so far with the other groups, the top two jobs are those of the clerk and the medical orderly. The policeman and painter share third place; they are followed by the pneumatic drill operator. The remaining four jobs cluster at the bottom of the scale but some distinction appears to be made between the two labourer's jobs and those the bossboy and artisan's hand. This group clearly favours its own job and places it unequivocally first. The responsibility of the policeman is seen as equivalent to the skill of the painter. As was the case with group B, we find that the patent responsibility of the policeman is clearly distinguished from that of the bossboy.

5.1.6 Artisans (Group D, N = 56). Their scale appears in Table XV. The jobs are not as clearly distinguished from each other as they were in the previous scales. They seem to fall into four clusters. The clerk still retains first place, but the pneumatic drill operator which has been hovering around the lower end of preceding scales now comes to the second place and is placed very near the painter. It seems as if a skilled job to this group is seen as equivalent to a semi-skilled job demanding great physical effort. The medical orderly falls between this cluster and the next which contains the policeman and the pick and shovel labourer. Physical effort is seen again as important, just as important as the responsibility of the policeman. It is interesting to note that the refuse remover appears at the top of the last cluster possibly because the job involves only pure physical effort and not the use of any tools. The jobs of bossboy and artisan's hand are placed last.

5.1.7 High-grade African supervisors (Group EA, N = 28). The scale for this group is shown in Table XVI. We find once again, that the jobs are not clearly scaled. The clerk is placed clearly at the top; it is followed by a cluster at the centre of the scale containing six jobs, followed by the pick and shovel labourer. Lastly comes the artisan's hand. Some gradation may be seen in the central cluster, the medical orderly, policeman and pneumatic drill operator are placed together. They are followed by bossboy and painter, and lastly by the refuse remover. Though some distinction between jobs is made, the basis on which this distinction is made is not clear. A job which requires

TABLE XIV. How the 9 jobs were scaled by Bantu
Clerks (Group C - N = 56)

0	
5	Clerk (1)
10	
15	
	Medical orderly (2)
20	
25	
30	Policeman and Painter (3)
35	
	Pneumatic drill operator (5)
40	
	Bossboy (6)
45	
	Artisan's hand (7)
	Refuse remover (8)
50	Pick and shovel labourer (9)
55	

TABLE XV. How the 9 jobs were scaled by Bantu
Artisans (Group D - N = 56)

0	
5	
10	
	Clerk (1)
15	
	Pneumatic drill operator (2)
	Painter (3)
20	
	Medical orderly (4)
25	
	Policeman (5)
	Pick and shovel labourer (6)
30	
	Refuse remover (7)
35	
	Bossboy (8)
	Artisan's hand (9)
40	
45	
50	
55	

TABLE XVI. How the 9 jobs were scaled by High grade
Bantu supervisors (Group EA, N = 28)

0	
5	
10	Clerk (1)
15	
20	Medical orderly (2)
	Policeman (3)
25	Pneumatic drill operator (4)
	Bossboy (5)
	Painter (6)
	Refuse remover (7)
30	
35	Pick and shovel labourer (8)
40	Artisan's hand (9)
45	
50	
55	

education comes top, a job which gives the man little discretion but to act as an assistant to a European comes last. Between these two jobs, unequivocally placed, the other jobs are gradated on not too distinct a basis. Labouring jobs are at the bottom, they are followed upward by a skilled and a supervisory job, above that is a mixed bag including a semi-skilled but strenuous job, a responsible job, and a job requiring training.

5.1.8 Low grade African supervisors (Group EB, N = 28). The jobs were scaled as shown in Table XVII. What is clear about this scale is the fact that the artisan's hand is placed last. The remaining eight jobs appear in a diffuse cluster which shows some traces of gradation. The pneumatic drill operator is shown for the first time at the top of the scale, a place held so far by the clerk. Their own job - that of the bossboy is placed second, the clerk and medical orderly are contiguous and are followed by the painter. We have here a group of jobs which "matter" for one reason or another. Their own job, educated jobs, and a skilled job. The pick and shovel labourer follows near these other jobs; its importance is possibly due to the fact that it is a job which they personally supervise. The refuse remover and the policeman share 7th place and are seen as equivalent for pay purposes.

5.1.9 Semi-skilled workers (Group F, N = 28). Their scale appears in Table XVIII. It is important to note that though half of this group consisted of artisan's hands, this job is placed last just below the job of the bossboy. These two jobs are in a cluster, clearly set at the bottom of the scale. The pneumatic drill operator appears clearly at the top of the scale and stands on its own. It is followed by two clusters distinct from each other, but both filling the centre of the scale. The medical orderly and clerk form the first cluster, the two labouring jobs, the policeman and the painter, form the second cluster. Though some distinction is made between staff jobs and the others, little distinction is made between labouring jobs and jobs either requiring skill or involving the worker in patent responsibilities.

TABLE XVII. How the 9 jobs were scaled by
Bossboys (Group EB - N=28)

0	
5	
10	
15	Pneumatic drill operator (1)
	Bossboy (2)
	Clerk (3)
20	Medical orderly (4)
	Painter (5)
	Pick and shovel labourer (6)
25	
	Policeman and refuse remover (7)
30	
35	
	Artisan's hand (9)
40	
45	
50	
55	

TABLE XVIII. How the 9 jobs were scaled by semi-skilled Bantu Workers (Group F, N = 56)

0	
5	
10	
15	Pneumatic drill operator (1)
	Medical orderly (2)
	Clerk (3)
20	
	Policeman (4)
	Refuse remover (5)
25	Pick and shovel labourer (6)
	Painter (7)
30	
35	Bossboy (8)
	Artisan's hand (9)
40	
45	
50	
55	

Their scale appears in Table XIX. This group has placed its own job unequivocally at the top of the scale. The remaining eight jobs are fairly clearly spaced. With the exception of a small cluster of three jobs appearing before the last job, the remaining jobs are placed at a distance from each other. The clerk, the medical orderly, the pneumatic drill operator and the painter are ranked in decreasing importance. They are followed by a cluster containing the two labourings jobs and the bossboy. The artisan's hand is placed at the bottom of the scale. If we ignore the preference for their own jobs, we find that the remaining jobs are rated on a pattern similar to that of the high-grade supervisors, of the senior technical and clerical personnel, or that of the senior semi-professional employees. Jobs requiring education are placed first, then a skilled job and lastly labouring jobs judged slightly more important than jobs which give the African little initiative for action.

5.1.11 Labourers - unpleasant conditions (Group H, N = 84). The jobs were scaled as shown in Table XX. Their own job or a job similar to the one they perform is clustered at the top of the scale with that of the pneumatic drill operator. The second labouring job appears in the second cluster with that of the medical orderly and the clerk. These are followed by the policeman, and at some distance, the painter. The bossboy and the artisan's hand are clustered at the end of the scale. Though this group concedes the importance of jobs requiring education, it does not rate highly a job requiring skill. It appears to be heavily influenced by the importance of physical effort in jobs. The jobs of refuse remover and pneumatic drill operator have this factor in common, and are placed at the top of the scale. The pick and shovel labourer also requiring physical effort, appears in the next cluster and is made equivalent to jobs requiring education.

5.1.12 Labourers - lowest wage grade (Group K, N = 112). Their scale is shown in Table XXI. The pneumatic drill operator is placed at the top of the scale. It is followed by either their own job, i.e. the pick and shovel labourer, or a job similar to the one they are doing. Next come the two status jobs closely clustered together, followed by the second labouring job. The painter and the policeman

TABLE XIX. How the 9 jobs were scaled by Bantu
Policemen (Group G - N = 56)

0	
5	
	Policeman (1)
10	
15	
	Clerk (2)
20	
	Medical orderly (3)
	Pneumatic drill operator (4)
25	
30	Painter (5)
35	Pick and shovel labourer (6)
	Refuse remover (7)
	Bossboy (8)
40	
45	Artisan's hand (9)
50	
55	

TABLE XX. How the 9 jobs were scaled by Bantu
Labourers working under unpleasant
conditions (Group H, N = 84)

0	
5	
10	
15	Refuse remover (1) Pneumatic drill operator (2)
20	Pick and shovel labourer (3) Medical orderly (4) Clerk (5)
25	
	Policeman (6)
30	
	Painter (7)
35	
	Bossboy (8) Artisan's hand (9)
40	
45	
50	
55	

TABLE XXI. How the 9 jobs were scaled by Bantu
Labourers in the lowest wage group
(Group K - N = 112)

0	
5	
10	
15	Pneumatic drill operator (1)
20	Pick and shovel labourer (2)
25	Clerk (3) Medical orderly (4) Refuse remover (5)
30	Painter (6) Policeman (7)
35	Bossboy (8) Artisan's hand (9)
40	
45	
50	
55	

are clustered together. The bossboy and the artisan's hand cluster at the end of the scale. Though this group is set on favouring its own type of job, it places the drill operator at the top of the scale, and attaches some importance to status jobs. It does not attach much importance however, to the two jobs which are viewed with disfavour by the other occupational groups.

5.1.13 Limitations in the interpretation of scales. T5 tests measure the degree of consistency between subgroups in the larger occupational groups. The tests assume, however, judge consistency within each subgroup. Each test produces a X^2 value whose degrees of freedom equal $(g-1)(t-1)$ where g = the number of subgroups of 28 judges in the occupational group, and t = the number of pictures compared. The number of cards compared remained nine for all occupational groups. The number of subgroups ranged from seven, for the European group, to two, for a number of African groups.

The results of the T5 tests are shown in Table LIX. They are significant in four of the larger groups, and not significant for the remaining four groups. It is interesting to note that the tests are significant with four white-collar groups (if policemen could be considered as white-collar), and not significant with the four blue-collar groups. If we were to exclude for the moment the policemen and artisans, we would notice that the tests are significant for the European and African high status groups, and not significant with all the low status groups.

In an effort to interpret these results, we computed T1 tests for all subgroups. These tests are all significant whether the T5 test is significant or not (Tables LX and LXI). This means that each subgroup of 28 judges generated a scale which was significantly different from one which would be produced by chance.

We computed next the scale values of the 9 jobs from the preference matrices of each subgroup where T5 scores were significant. The results appear in Table LXII. Where a scale value is not given, this means that judges in the subgroup were unanimous in their preference or rejection of a card. For example, all judges in group CA preferred the clerk over other jobs. All European judges in group E rejected the pick and shovel labourer and placed him last in their scales.

TABLE LIX. T5 test results for group (N > 28)
BRADLEY TERRY SCALES.

Groups	T5
1. European subgroups - excepting Group E ∅	*64.132
2. Senior technical and clerical staff - Groups BA and BB	*30.421
3. Clerks - Groups CA and CB	*26.990
4. Policemen - Groups GA and GB	*33.376
5. Artisans - Groups DA and DB	13.566
6. Semi-skilled workers - Groups FA and FB	12.280
7. Labourers - unpleasant conditions - Groups HA, HB, HC	23.412
8. Labourers - lowest wage grade - Groups KA, KB, KC, KD	22.148

* Significant at 1% level $\chi^2 = (g-1) (t-1)df$

g = number of groups

t = number of items (or cards) compared.

∅ Group E excluded from T5 calculations as all judges in the group placed the card of the pick and shovel labourer last.

TABLE LX. T1 results for subscales where
T5 test is significant.

Results for sub-scales		T1
1.	European - subgroups A	*177.7
2.	" " B	*201.9
3.	" " C	*152.0
4.	" " D	*198.3
5.	" " E (pick and shovel labourer card omitted)	*215.2
6.	" " F	*189.5
7.	" " G	*213.0
8.	Senior technical and clerical staff - Group BA	*135.2
9.	" " " " - Group BB	* 68.9
10.	Clerks - Group CA (clerk-scribe card omitted)	*149.4
11.	" Group CB	*145.4
12.	Policemen - Group GA	*133.4
13.	" Group GB	*101.7

* Significant at 1% level

$$\chi^2 (8 \text{ degrees of freedom}) = 20.90.$$

TABLE LXI. T1 results for subscales where T5 test is not significant.

Results for sub-scales	T1
1. African artisans sub-group DA	*96.1
2. " " sub-group DB	*54.7
3. African semi-skilled workers - sub-group FA	*56.9
4. " " " " - sub-group FB	*62.0
5. Labourers working under markedly unpleasant conditions - sub-group HA	*71.4
6. Labourers working under markedly unpleasant conditions - sub-group HB	*75.3
7. Labourers working under markedly unpleasant conditions - sub-group HC	*80.5
8. Labourers - lowest wage category - sub-group KA	*38.4
9. " " " " sub-group KB	*64.5
10. " " " " sub-group KC	*57.3
11. " " " " sub-group KD	*46.7

* Significant at 1% level of significance

$$\chi^2 (8 \text{ degrees of freedom}) = 20.90.$$

TABLE LXII. Scores of the 9 Value Jobs on Bradley Terry Preference Scales where T5 is significant.

Occupational groups Jobs	European Subgroups							Senior Staff		Clerks		Policemen	
	A	B	C	D	E	F	G	BA	BB	CA	CB	GA	GB
1. Pneumatic drill operator	3.381	5.118	3.701	3.279	4.702	4.616	6.410	4.595	1.911	2.594	3.474	3.387	1.796
2. Medical orderly	1.396	2.216	1.319	1.058	1.682	1.156	2.616	1.938	1.415	.963	.710	2.450	1.974
3. Clerk	.649	.275	.758	.914	.410	.582	.142	.279	1.325	*	1.059	1.808	1.796
4. Artisan's hand	4.508	5.867	4.876	5.489	5.379	5.566	6.270	4.860	3.616	3.219	4.897	5.015	4.605
5. Policeman	2.444	3.293	2.429	2.385	3.005	3.265	4.155	3.897	2.293	2.137	2.665	.510	.997
6. Pick and shovel labourer	6.999	8.191	4.421	8.094	*	7.345	8.490	5.321	2.885	3.585	5.210	4.692	2.797
7. Refuse remover	5.990	6.136	5.858	6.663	6.377	5.696	7.758	5.130	3.358	3.785	4.897	4.390	3.297
8. Painter	3.485	4.518	3.214	3.163	3.841	3.027	3.771	3.219	2.365	1.211	3.583	2.646	3.649
9. Bossboy	2.759	2.640	2.429	2.695	2.760	3.835	4.155	4.685	3.445	3.308	4.414	4.110	3.649

The results in Table LXII show that all European subgroups scaled the clerk and medical orderly respectively first and second. The scale distance between these two jobs is sometimes large, e.g. group G and sometimes narrow, as with group D, but the jobs always stand in the same relation to each other. Most subgroups agree in the manner the refuse remover and pick and shovel labourer are placed eighth and ninth in the scale. Once again, distances between the two jobs may be very large, e.g. group E or quite narrow, as with group A. An exception occurs, however, with group C where the artisan's hand is placed after the refuse remover, but before the pick and shovel labourer.

Differences between European subgroups occur, however, in the manner in which the bossboy, policeman and painter are scaled in the top half of the scale; the painter usually comes after the first two jobs, though once he is put before them. The policeman and bossboy are either contiguous with each other, or else are given randomly preference over each other. The same interchange of positions occurs with the artisan's hand and the pneumatic drill operator. The latter is usually scaled above the former, excepting with group G. The distance between the two is sometimes so great that the pneumatic drill operator is almost contiguous to the painter (a skilled job). At other times, the pneumatic drill operator is placed quite near the labouring jobs.

The scale which was computed for all European subgroups (Table X), averages all these differences. We should do well to remember that the scale is based on a fair amount of uncertainty over the middle jobs. European judges confine these differences within two distinct levels. There is no question of placing the bossboy with the labourers, or the pneumatic drill operator over the painter. The distinction is clearly made between responsible and skilled jobs on the one hand, and semi-skilled jobs on the other. Groups disagree, however, on whether the responsibility and hazards of the policeman should be preferred to the organizational responsibility of the bossboy, or whether the skill of the painter is more important than these two types of responsibility. Similarly, they are not quite certain as to whether the skill and effort of the pneumatic drill operator bring him nearer the painter or the labourer. There is therefore no doubt among European judges that education and job responsibility holds pre-eminence

over any other combination of job attributes. They are also quite certain that sheer physical effort should receive the lowest wage and a combination of physical effort and unpleasant conditions should be paid more. Uncertainty shows itself where finer discriminations need to be made, e.g. is job responsibility more important than skill?

The differences between African subgroups are more difficult to interpret because in each case there are only two scales. We can compare them with each other. Groups BA and BB agree in placing the clerk and medical orderly first and second respectively at the top of the scale. The painter and policeman appear next, but alternate in precedence: group BA prefers the painter, group BB the policeman. The pneumatic drill operator fluctuates most in position. Group BA puts it at the top of their last cluster, group BB places it third in the scale. The remaining jobs are not distinctly scaled. It is significant, however, that group BA places the two labouring jobs at the bottom of the scale, whereas group BB places the artisan's hand and bossboy at the end.

We find that once again, these differences are averaged in the scale which was computed for both subgroups (Table XIII). The painter, policeman and pneumatic drill operator appear in one cluster at the centre of the scale, the clerk and medical orderly are placed clearly at the top of the scale. The remaining jobs are clustered together at the bottom of the scale, little distinction being made between labouring jobs and the artisan's hand or the bossboy. The group as a whole discriminates at three levels. There are, first of all, jobs requiring education and training. These are placed at the top. Then there are jobs which are different from the rest in that they either have an important factor, e.g. the skill of the painter, or else some combination of factors which make them stand out from the rest, e.g. the hazards and responsibilities of the policeman, or the effort and hazards of the pneumatic drill operator. And finally, there are the remaining jobs with almost random discriminations between them. The results of the two subscales do not therefore contradict the interpretation of the major scale (Table XIII), but show the limitations of the discriminative ability of the judges in group B.

The two subgroups of clerks also appear to discriminate at three levels: medical orderly and clerk at the top, policeman, painter and pneumatic drill operator in the centre, and the remaining jobs at the bottom of the scale. This in turn reflects itself in the manner in which the nine jobs are scaled for the two subgroups combined (Table XIV). Differences between the subgroups are confined to these three levels. Group CA places clerk over orderly, group CB reverses the order. Group CA places the painter at the top of the central cluster; group CB places it at the bottom. The pick and shovel labourer and refuse remover alternate as penultimate and last jobs in the scale.

The two policemen subgroups agree in the manner in which the top and the last jobs are scaled. Both groups place the policeman at the top of the scale, and both groups place the artisan's hand at the bottom. The remaining jobs are placed in a variable manner. The clerk and medical orderly are nearer the top of the scale, but the painter and pneumatic drill operator shift widely. The bossboy is placed by one subgroup above the labouring jobs, and below them by the other subgroup. The joint scale (Table XIX) spaces the jobs much more clearly than either of the two subgroups. Though this scale averages two widely different scales, we find it much easier to interpret than either of the two scales.

The results of the T5 tests have revealed an important limitation of this paired comparison experiment. They have shown that four of the twelve scales are based on divergent evaluating orders. We suspect that if it were possible to measure judge consistency, we would find divergent evaluating orders within the smaller groups and many of the subgroups. We must note, however, that excepting for the policemen, most of these differences are confined to particular areas of the evaluating order. It seems as if the broad evaluating pattern is firmly established, but that within it differences occur at separate levels. The more advanced the occupational group, the clearer the broad evaluating pattern becomes, and the finer the basis in which one group will differ from another. We consider therefore that we are justified in our decision of examining Bradley-Terry scales based on preference matrices for occupational groups taken in toto. The alternative approach of examining subgroups must be rejected on the further grounds that we have no information about individual judges and their consistency.

5.2 General comments on Bradley-Terry scales.

The observations and comments we made are based purely on the scales derived for the various groups. We have perforce used our own assessment of the demands made by the nine jobs, based essentially on our current experience of these jobs. A number of points emerge, however, from this preliminary examination of the scales:

5.2.1 There is no evidence that all groups evaluate jobs in the same manner. There are marked differences as one moves along the occupational hierarchy. The hypothesis that the evaluation of jobs is carried out on similar lines by different groups is not supported by a simple examination of the scales.

5.2.2 There is some evidence that some groups favour their own job, though this by no means occurs in all cases. The contention made by Shen (157), that raters do not always overestimate themselves in desirable ratings, has a counterpart in this study. When judges are called upon to assess the relative value of jobs, they do not always overestimate the importance of their own jobs, or of jobs related to their own. The clerks and the municipal policemen placed their own jobs unequivocally at the top of the scale. The other groups either failed to place their job at the top, or else as was the case with group H, made their own type of job (refuse remover) share top place with another job.

5.2.3 Two jobs, i.e. the clerk and the pneumatic drill operator, appear to focus the prevailing set shared by occupational groups. These groups could be divided roughly into two schools of thought: the one placing the job of clerk at the top, and the other preferring the job of pneumatic drill operator. Into the first school would go the European officials, the nurses, the senior semi-professional staff, the senior clerical and technical personnel, the clerks, the artisans, the high-grade African supervisors, and the policemen. Into the second group would go the bossboys, the semi-skilled workers, and all groups of labourers. These two groupings are divided essentially on the extent of on-the-job training or experience the judge requires to do his own job. Semi-skilled workers, labourers and bossboys require brief periods of on-the-job training, or prior experience, to learn their job.

The other judges require for the most part, either to be educated, or to undergo extensive training for their jobs. This is supported further by the demographic material discussed above which shows that the greatest incidence of illiteracy occurs in the bossboys, the semi-skilled workers and the labourers.

5.2.4 All African groups place the job of artisan's hand at the bottom or near the bottom of the scale. This is done even by the artisan's hands themselves. The job is important to Europeans. It is common knowledge that it is viewed by them as a significant advance from mere labouring jobs. Some view it in the same category as a theatre's nurse. The picture representing this job was framed to suggest this thought. Africans hold it, however, at a low level of worth, possibly because the job is in the nature of a "straw job", the worker achieving nothing on his own, but helping someone else to work.

5.2.5 Another job which is not highly valued by Africans is that of the bossboy. Though the European group rates this job quite high, African groups, with two exceptions, rate it at the bottom of the scale, generally with the artisan's hand. The two exceptions are made by two African supervisory groups. The bossboys place it second, the high-grade supervisors rank it fifth, below the job of the pneumatic drill operator. The reason for this persistent low rating may well be due to the fact that it too is considered as a straw job. The bossboy generally acts a mouth-piece for the European overseer and carries little authority. It is possible that though the European group stresses the importance of the bossboy, and sees in him a front-line supervisor, thus a vital link in organizational hierarchies, Africans think differently. Because of his restricted functions, he may well fail in acting as a channel for upward communications and his job not considered as important by Africans who come into much closer contact with him. The more sophisticated African groups, e.g. nurses, senior technical and clerical groups may undervalue this job because it is generally held by illiterate or ill-trained workers.

5.2.6 There are indications that various occupational groups are more influenced by one factor than they would be by others. Labourers may be influenced in their evaluation of jobs primarily by the physical effort demands. The group of artisans is primarily guided by the skill content of jobs. Clerks and senior technical personnel are guided by the educational requirements of jobs. This particular bias would be caused by the specific experience the judge has gained of work through the occupation he holds.

5.2.7 The European group is guided in its evaluation of African jobs by more than one factor. The scale shown in Table X indicates a grouping of jobs according to predominant factors which change as we go down the scale. There are to begin with, jobs which require primarily education, then jobs which involve patent responsibilities; these are followed by jobs requiring a decreasing degree of skill, and lastly come the labouring jobs. Where jobs belong broadly to the same category, then an additional factor is introduced to place one job over the other, e.g. the refuse remover and the pick and shovel labourer are both labouring jobs, but the refuse remover ranks higher, possibly because of the unpleasant features associated with their job. Evidence of similarly involved reasoning becomes less apparent as we move down the African occupational hierarchy. This may be due to two reasons. (1) Their low evaluation of, and possibly strong antagonism against, straw jobs. We would expect, for example, the group of high-grade supervisors to have a better appreciation of the job of the artisan's hand and place it nearer the middle of the scale, but find nothing of the sort. (ii) The second reason may be the increasing dependence of judges on one factor as we move down the occupational hierarchy. This results in odd groupings as shown in Table XX or XXI, e.g. the pick and shovel labourer grouped with the medical orderly and the clerk.

5.3 Product moment correlations between scales.

Product moment correlations computed between scales are shown in Table XXIII. We must remember that these correlations were computed simply to establish a means of comparison between scales, i.e. the rank order of jobs and the scale values computed from the preference matrices. The

TABLE XXIII. Product moment correlations between scales.

AA	AB	B	C	D	EA	EB	F	G	H	K	External Wage	
.5654	.8997	.8358	.8860	.5420	.8409	.4011	.2245	.6336	-.1397	-.0931	-.7810	European officials
X	.7999	.8752	.8257	.8713	.7124	.5593	.7751	.5902	.5430	.7079	-.6553	AA Nurses
	X	.9822	.9832	.7975	.8512	.4978	.4658	.6763	.0975	.2155	-.9.68	AB Top semi-professional
		X	.9904	.8447	.8298	.4539	.5827	.7119	.2300	.3415	-.8795	B Senior technical/clerical
			X	.7914	.8448	.3902	.5063	.7150	.1483	.2363	-.8834	C Clerks
				X	.7395	.6214	.7799	.6452	.4422	.6345	-.7626	D Artisans
					X	.6483	.5773	.7672	.3089	.3150	-.7209	EA Top supervisors
						X	.5288	.3659	.3720	.5545	-.3914	EB Bossboys
							X	.6669	.8518	.8824	-.2913	F Semi-skilled workers
								X	.3093	.3328	-.4328	G Policemen
									X	.8918	+.0290	H Labourers - unpleasant jobs
										X	-.0827	K Labourers - lowest wage grade

values on which the correlations were computed are shown in Table IX. As $N = 9$, the standard error is in every case so large that the correlation matrix can serve no other purpose than indicate broad trends and groupings. The correlations with the external wage are negative because all scale values are negative, i.e. the job with the highest rank has the smallest scale value. We shall limit our examination of Table XXIII to three facets:

1. the manner in which African scales compare with the European scale.
2. African groups with similar scales.
3. the manner in which African scales compare with the external wage structure.

5.3.1 Comparisons between European and African scales. African groups fall, with reference to the European scale, into three categories:

Category 1 includes groups which agree with it very markedly. These are:

- a - semi-professional staff (Group AB) $r = .90$
- b - clerks (group C) $r = .89$
- c - high-grade African supervisors (group EA)
 $r = .84$
- d - senior clerical and technical personnel
(group B) $r = .84$.

Examination of the respective scales reveals that the only differences are due to the fact that African groups gave a low evaluation to the jobs of bossboy and artisan's hand, but relatively scaled higher the job of pneumatic drill operator.

Category 2 includes groups which show some agreement with the European group, though not as marked as groups in category 1. These groups are:

- a - municipal policemen (group G) $r = .63$
- b - female nurses (group AA) $r = .57$
- c - artisans (group D) $r = .54$.

Examination of the respective scales indicates that the African and European groups disagree on the placement of six out of the nine jobs. The bossboy and artisan's hand are heavily down-rated. The pneumatic drill operator and the pick and shovel labourer are placed higher. The ranking of the policeman varies; the policemen place it first, the Europeans third, the nurses and artisans lower in the scale.

Category 3 includes groups which show little, if any, agreement with the European group. These are:

- a - bossboys (group EB) $r = .40$
- b - semi-skilled workers (group F) $r = .22$
- c - labourers - lowest wage grade $r = -.09$
- d - labourers on unpleasant jobs $r = -.14$.

We notice that these are all groups which require little, if any, literacy for the performance of their jobs. Examination of the scales reveals that the group of bossboys belongs in this category more than it does in the previous one. The four groups do not agree with the European group on the placement of any of the nine jobs and prefer a rank order which shows marked differences between them and the one preferred by the European group. The scales of the African groups are much more compact; jobs cluster much more frequently than they do on the European scale.

The African groups place the pneumatic drill operator, the refuse remover and the pick and shovel labourer much higher than the European group. The artisan's hand, ranked seventh by the Europeans, is ranked last by all the African groups. The clerk, medical orderly, painter and policeman are down-rated by some African groups though not in the same manner by all of them. The job of bossboy rates high with bossboys, average with Europeans, and low with all the other African groups.

5.3.2 African groups with similar scales.

Table XXIII indicates that there are two clusters of African groups with correlations of .85 or better. These are shown in Tables XXIV and XXV.

Groups	AB	B	C
AB	X	.98	.98
B		X	.99
C			X

Table XXIV. High status groups (correlations)

Groups	K	H	F
K	X	.89	.88
H		X	.85
F			X

Table XXV. Low status groups (correlations)

The scales of groups in these two clusters are very similar, both in the manner in which jobs are ranked, and the appearance of clusters along the scale. The high status groups, i.e. the semi-professionals, the senior clerical and technical workers, and the clerks, disagree only in the manner in which they place jobs at the bottom of the scales. Groups B and C distinguish less clearly the last jobs than group AB. They agree on the main in placing the clerk, medical orderly and painter as the first three jobs in the scale. These are followed, with minor changes, by the policeman, the pneumatic drill operator and the bossboy. There are some differences in the manner in which the labouring jobs and the artisan's hand are scaled, but they always cluster at the bottom of the scale.

It could be said that these three groups have placed the same relative values on jobs. They are primarily concerned with the background of training and education the person brings to his job. This is shown in the consistent manner in which the clerk, orderly and painter are placed at the top of the scale. They consider then jobs with patent responsibilities, but are awake to the presence of other factors. The policeman is distinguished from the bossboy possibly because of the hazards in the job. The pneumatic drill operator ranks higher than the bossboy, possibly because a semi-skill and physical effort are worth more than patent responsibility. It is significant moreover that the bossboy ranks higher than labouring jobs in two out of these three groups.

The scales of groups in the second cluster (Table XXV) are also similar in the manner in which the jobs are ranked and cluster on the scale. Differences between groups occur in the centre of the scale rather than at the lower end. All three groups place the pneumatic drill operator either at the top or very near the top of the scale.

The bossboy and artisan's hand cluster at the bottom of the scale. The labouring jobs are pushed to the top of the scale, the clerk and medical orderly appear in the top half of the centre, the policeman and painter in the lower half. Variations are mainly due to the relative importance attached to the labouring jobs. Group F ranks the pick and shovel labourer sixth, group H ranks it third, group K second. It is evident that job bias has affected the relative evaluation of jobs. Their agreement at both ends of the scales suggests, however, that these groups have common features in the manner in which they judge jobs. They place, on the one hand, great stress on physical effort, and possibly the performance of tasks in which the results are very tangible and less conceptual. They take cognizance, however, of the importance of jobs of a more conceptual nature and which require prior education. The clerk and medical orderly are always placed in the top half of the scale. The bossboy and artisan's hand are relegated to the bottom of the scale in an almost identical manner.

A link exists, however, between these two clusters of jobs. The semi-skilled workers give less emphasis to labouring jobs than the two groups of labourers. In consequence, the medical orderly and clerk are placed nearer the top of the scale. We placed the correlations between groups in the two clusters in Table XXVI.

	AB	B	C	K	H	F
AB	X	98	98	.22	.10	.47
B		X	99	.34	.23	.58
C			X	.24	.15	.51
K				X	.89	.88
H					X	.85

Table XXVI. High status and low status groups (correlations)

This link becomes quite apparent as the largest correlations in the table are between the semi-skilled group and the high status groups. In an effort to determine further links between the two clusters, we expanded the matrices shown in Tables XXIV and XXV to include additional correlations. These are shown in Tables XXVII and XXVIII.

	AB	B	C	AA	D
AB	X	.98	.98	.80	.80
B		X	.99	.88	.85
C			X	<u>.83</u>	<u>.79</u>
AA				X	.87

Table XXVII. Extended high status matrix.

	K	H	F	AA	D
K	X	.89	.88	.71	.63
H		X	.85	.54	.44
F			X	<u>.72</u>	<u>.78</u>
AA				X	<u>.87</u>

Table XXVIII. Extended low status matrix.

The significant point to note is that groups in both clusters have additional correlations with the same two occupational groups, i.e. the female nurses and the artisans. The correlation between these two new groups and the semi-skilled workers are underlined in Table XXVIII, and appear to be quite high.

We seem to have discovered a third cluster of groups which acts as a link between the clusters of high status and low status groups. This middle cluster stresses in their evaluation of jobs the importance of education with that of physical effort. The scales of these three groups show that they agree in placing the bossboy and artisan's hand at the bottom of the scale. The pneumatic drill operator, the clerk and the medical orderly are placed at the top end of the scale with some slight variation. Labouring jobs are placed nearer the centre of the scale, a place which they share with the policeman.

Whenever we think of the African, we see him in a process of transition. This process may well be reflected in the manner in which the scales are intercorrelated. There are at the one end, those who have arrived, at the other end are the labourers still selling their manual labour but having no skill to offer. In between are those occupational groups with intermediate status and in the process of acquiring some skill. At the lower end of this group are semi-skilled workers better than labourers, but like them, still largely illiterate. At the other end are the nurses near the high status group in education but retaining sympathy for the labour of the common man. In the centre are the artisans, less educated than the nurses, but better skilled than the semi-skilled workers. All three groups in the central cluster reflect therefore aspects of the evaluative patterns of high and low status clusters.

5.3.3 Relation between African scales and the current wage scale.

The manner in which the 9 jobs would be scaled according to their current market wage is shown in Table XXII. It is important for us to examine the relation of the scales determined by preference matrices with current wages. Such an analysis acts in a way as a measure of the sense of reality possessed by the various occupational groups. It is a common sense experience that wages or salaries actually paid are a measure of the relative importance of jobs.

It is interesting to note from Table XXVII that current market practice discriminates between jobs no better than many of the African groups appear to have done. Six of the nine jobs cluster at the bottom of the scale; though some discrimination between them is evident, we gain the impression that we are dealing with two distinct wage groups.

The clerk, the painter and the medical orderly are broadly spaced in the top portion of the scale. The distinction is made primarily on the basis of education, then of skill, thirdly of a job requiring skill, but learnt essentially on the job. There appears a sort of reasoning compounded of the principles of exchange and of status prevalent in European communities. The clerk is educated and holds a position of status. The medical orderly is also educated but holds a position of lower status, almost in the nature of a servant looking after bodily needs, which he does. The painter is a relative newcomer. The determination of his wage was a compromise between wages currently paid to European artisans and those prevailing among African workers. The determination of the wage of the painter appears to have taken no account of wages paid to an elite of educated Africans.

At the bottom of the scale are the six jobs which are more characteristic of current African employment. These jobs are distinguished on the basis that responsibility is more important than skill. The simple process of additive reasoning also functions. If two jobs belong to the same broad category of work, then the job with some additional demand is paid more than the other. The drill operator is paid more than the artisan's hand, the refuse remover more than the pick and shovel labourer.

TABLE XXII. How the 9 jobs are scaled by the current monthly wage paid outside Council.

R80	
	Clerk (1)
R75	
R70	
	Painter (2)
R65	
R60	
	Medical orderly (3)
R55	
R50	
R45	
R40	
	Bossboy and policeman (4)
	Pneumatic drill operator (6)
R35	
	Artisan's hand (7)
	Refuse remover (8)
R30	
	Pick and shovel labourer (9)

Reverting to Table XXIII, we notice that the closest relation between African scales and current wages is found with the three groups which formed the high status cluster. The scale of group AB correlates $-.92$ with the wage scale; that of group B correlates $-.88$; and that of group C correlates $-.88$. The smallest correlation is found between the three groups which formed the low status group and current wages. Group H correlates $+.03$, group K $-.08$ and group F $-.29$. It appears therefore that the factors which guided the high status group in their evaluation of jobs are in some concordance with those predominating in the market place. The factors used by the low status cluster are however at variance with common economic usage.

Supporting evidence comes from the correlations computed at the end of our job evaluation study between factor scores and current wages paid to Africans. The twelve factors used were those listed in the previous chapter and fully described in the J.D. 3 M. schedule. The results appear in Table XXIX. Two sets of correlations were computed, one for jobs which were monthly paid and of which 130 were identified in the City Council, and another for weekly paid jobs of which 1,090 were identified.

It is obviously not possible to relate with any accuracy the 12 factors used in our job evaluation to the concepts which guided various African occupational groups. We note, however, that the determination of wages, whether among weekly paid or monthly paid workers, is determined primarily by the education and the experience the job demands. Some recognition is given to responsibility for supervision and for personal contact. Little note is given on the other hand, to physical effort or to conditions of work, i.e. work surroundings or work hazards. There are, in actual fact, negative correlations between some of these factors and the wage. This supports therefore the explanation we gave of the relation between African scales and wage structure.

TABLE XXIX. Correlations between Factor Scores
and Wages paid in the Johannesburg
City Council.

FACTORS	Monthly paid jobs	Weekly paid jobs
	N = 130	N = 1,090
. Education	.566	.439
. Work Background	.365	.577
. Job Training	.258	.135
. Mental Skill	.461	.485
. Mental Effort	.236	.286
. Physical Skill	.012	.172
. Physical Effort	- .171	- .273
. Responsibility for Equipment and materials	- .010	.139
. Responsibility for Personal Contact	.359	.206
. Responsibility for Supervision	.426	.430
. Work Surroundings	.066	- .068
. Work Hazards	.032	- .017
Multiple r	.658	.656

5.4 General comments on product moment correlations between scales.

The evidence we have presented supports the observations we made initially from the Bradley-Terry scales. They reinforce the impression we had formed that different occupational groups evaluate jobs differently. We noticed it when we compared African scales to the European scale, when we examined the similarity between African scales, and when we compared them to the current wage structure. Differences are most marked between the cluster of groups we called high status, and the cluster of low status groups. These two groups are linked by a middle cluster which may have a pattern of evaluating common to the other two clusters.

We also noticed that the high status cluster scales jobs in a similar manner to the scale determined by current wages. This raises the question as to whether occupational groups were guided in their evaluation by current wages. The material we have presented so far does not allow us to speculate on this point with any certainty. There is no doubt that a strong correlation exists between the wage scale and the scales of the high status occupational groups. These groups are themselves at the favoured end of any wage or salary continuum. Whether this fact induces them to accept differentials determined by economic forces, or whether their social sophistication makes them aware of such differentials we cannot tell for certain.

5.5 Verbal comments made by European and African groups.

We enter now our second stage of the analysis of results. We shall seek an interpretation of the manner in which jobs were scaled by occupational groups in terms of the verbal comments judges made to substantiate their preferences. Judges were shown each pair of jobs and asked which of the two should be paid more. When they had indicated the job they preferred, they were uniformly asked the question "Why should this job be paid more money?" The comments we discuss in this section are the answers judges gave to this question.

We shall start our examination of the data by considering the sort of comments working people generally make when they are asked to explain why one job should be paid more than another. We shall consider these comments with reference to the European managerial group, and then with reference to the African group taken as a whole.

5.5.1 Verbal comments made by European groups.

Comments made by European judges can be classified into the following eight categories:

- A. Knowledge, i.e. all that a person needs to know in order to perform satisfactorily his functions at work. Included in this category are all comments dealing with experience, training and education.
- B. Skill, i.e. the ability to achieve tangible and concrete results. Whenever a judge mentions specifically the work skill, and connotes this ability to achieve at work, tangible and concrete results, the comment is categorized here. Included in this category are comments referring to clerical skills, e.g. the ability to work accurately and reliably with figures; the skill of the medical orderly in bandaging and in handling surgical instruments; the skill of the policeman in defending himself when attacked; the skill of the bossboy to determine correct levels of excavation; the skill of the painter to apply paint evenly, and of the pneumatic drill operators in drilling to limits. Mental skills are not included under this heading.
- C. Responsibilities, i.e. these refer, generally speaking, to particular features of the job for which the worker is held accountable, and which the judge has considered important enough to mention. We have included in this category, broad unqualified comments stating simply "He needs to have a sense of responsibility"; "This is a more responsible job", as

well as specific responsibilities mentioned by judges, e.g. he is responsible to see that proper contacts are established and maintained with the public; the consequence of errors; the fact that the worker is not actively supervised, that he handles expensive equipment, the responsibility of maintaining law and order. In most cases, responsibilities are directly related to the specific job being considered.

D. Physical effort, i.e. the amount and nature of muscular exertion assessed to be used in the performance of a job and the sensation of physical fatigue experienced afterwards. The two jobs in this experiment where physical effort could be judged to play a predominant role are that of the refuse remover and of the pick and shovel labourer. The former carries intermittently a heavy load on his shoulder and has to trot behind a moving vehicle with it. The pick and shovel labourer uses his implements to excavate soil of varying hardness the whole day through.

E. Mental effort, i.e. the need to apply oneself to certain forms of mental activity, involving some measure of concentration and vigilance. The clerk, for example, must complete his work under pressure. He has to submit certain returns by a given date and must contend with a number of interruptions, e.g. the public, the switchboard. The medical orderly must be alert for symptoms in a patient which would escape the notice of a less observant person. The policeman must watch carefully the behaviour of large groups of people. The bossboy ensures that his workers do not run short of work, and that conditions of work are quite safe. Implied in all these examples is a combination of anticipation and vigilance. The person in

the job must direct his attention to vague aspects of his environment and learn to infer from small cues the probability that something of importance will take place.

F. Work conditions, i.e. these refer to environmental and extraneous factors in which the work must be carried out, and over which the worker has no control, e.g. working in the open, working near sewer fumes. Included in this category are all forms of hazards to which the worker is exposed, hazards which may be tangible or intangible. The medical orderly would have to deal with vomit and faeces (unpleasant work conditions), and is exposed to infections (intangible hazard). The policeman works irregular hours and is exposed to physical assault. The painter could fall from his ladder or be poisoned by paint.

G. Personal attributes, i.e. these are personal characteristics which judges consider important for the correct execution of the job. Comments included in this category vary from broad generalities, e.g. we need a man with the right personality for this job, to more specific attributes.

The most important of these are:

- (i) initiative - he must judge issues, use his own discretion;
- (ii) reliability - he must be reliable, trustworthy or show integrity.
- (iii) intelligence - he must reason things out, and be adaptable to a variety of situations.

Additional attributes are mentioned with reference to specific jobs. The clerk must have a good memory and be able to speak clearly. The medical orderly is often faced with the problem of whether or not to call the doctor.

The policeman must show maturity and courage and be able to control himself in provoking situations. The bossboy must show leadership qualities to be able to control his workers.

H. Extraneous factors. This category includes comments which cannot fit into any of the other categories. The comments would largely be determined by the nature of the job and the position it holds in the scale. The status of the clerk and of the medical orderly are examples of comments which would be placed into this category. Comments would stress the fact that the clerk or the medical orderly held a senior position in the municipality and had to be paid to maintain appearances. Other comments referred to the fact that orderly had to maintain a high standard of personal cleanliness as he dealt with human injuries; that the policeman needed to appear neat and smart as he represented authority; that the job was more important to the municipality; that people were not readily attracted to the type of work.

The fact that we were able to classify all the comments made by European judges into these eight categories is an important indication. It shows that when European officials are asked to explain why one job should be paid more than another, they use principally concepts incorporated in current job evaluation systems. They mention the education the person requires to do a job, the responsibilities inherent in it, and the conditions under which the job is carried out. They do this not because of any knowledge of job evaluation systems, but rather because they use common sense dimensions which have been used by a wide variety of persons for quite some time. It seems rather that the opposite could be seen to hold, i.e. that job evaluation systems were based on these common sense dimensions.

We must again point out that the five factors, common to most job evaluation systems and which we discussed extensively under the rationale of the experiment, were not forced a priori on judges explaining their preferences. Judges were shown pairs of photographs, asked to indicate which job should be paid more, and then asked merely to state in their own words, why?. Their own words we found afterwards could be related to the five common factors of job evaluation. Additional factors were brought in and a distinction made between mental effort and physical effort. We decided to separate these two aspects of effort into separate categories because each aspect was found to be related to a particular group of jobs. Mental effort predominated in jobs with marked conceptual tasks, e.g. the clerk. Physical effort, on the other hand, was associated to labouring jobs.

The comments made were in every case related to the particular pair of jobs the judge had examined, and more specifically to the job they had preferred. We noticed this particularly with reference to comments which fell into two categories, i.e. knowledge and responsibility.

As we have indicated, we included under knowledge, comments made about all things a person needs to know to do his job. These included comments referring to training, formal schooling and the extent of experience the job demanded. In most cases, these comments were adapted to the job which had been preferred. It was said of the clerk, for example, "he must be educated to understand figure work"; "he knows office routines... he knows many languages because he can interpret". The medical orderly received extensive training to understand principles which were new to him so that "he could dress a wound cleanly" or administer first aid. The policeman cannot function effectively without having learned a number of "by-laws". The bossboy had learned procedures of work and could convey instructions accurately as he knew the vernaculars spoken by his labourers. The painter had served a long apprenticeship and knew a great deal about paints. Comments about knowledge, understandably became scantier with the remaining jobs, but were made nevertheless where the judge perceived knowledge as a relevant factor to the job he had preferred. The drill operator was seen to need a modicum of technical know-how to assemble and operate his drill. The artisan's hand was said to be familiar with the tools of the artisan and the work he did. The refuse remover knew where

all the houses were and the particular location in each of the dustbins.

Comments about responsibility, particularly, were made with reference to the job discussed. Stress was placed, however, much more frequently on the negative aspects of responsibility, i.e. what the worker had to avoid doing. We were told, for example, that the clerk, the medical orderly and the policeman, did important work because they worked on their own. The consequence of error was felt to be particularly serious. The orderly could kill someone through his carelessness; the clerk could create serious administrative problems; the policeman could, through tactlessness, generate a riot. The responsibilities of the bossboy were extensively described, but here again, negative features were mentioned quite frequently. The bossboy is responsible for the safety of his men: he must make sure that working conditions are safe. He is moreover responsible for any mistakes made by his labourers. Similar comments with negative connotations were made about the remaining jobs. The painter must avoid wasting materials, and is responsible for the finish of the work. The drill operator must look after an expensive piece of equipment. The artisan's hand is responsible for the safeguarding of tools. Similarly, when personal attributes were discussed, these also referred to the negative aspect of responsibility. When the integrity, reliability, of a worker was stressed, this was yet another way of stressing "that which a man must not do".

Emphasis on the negative aspects of responsibility and the use of common sense dimensions suggest that the evaluation of jobs is influenced by the particular experience the judge has gained of the work situation. It is clear that this experience is gained principally through the work the judge does himself. The factor of knowledge reflects a form of reasoning based on current knowledge of the occupational development of the individual. It is common knowledge that the average employee prepares himself for his job by going to school, and then by undergoing additional training, both formal and informal. This common sense experience was gained by European judges not merely through their observations, but through intense personal experiences. Most of the European judges in this group attained positions of authority by undergoing a similar process of development. They knew they could

not have undertaken their present tasks unless they had prepared themselves by intensive periods of study and training. If then the worth of their work was due to this preparation, it could well be that the worth of the work of others was judged in terms of the prior training and education they required.

A similar relation could be seen between the work of managers and the remaining common sense factors they used. Effort is the cornerstone of the concept of productivity. One of the frequent problems managers experience is to determine how best workers can be motivated to give more effort. The frequent reference European judges made to personal attributes reflects yet another facet of their functions as managers. They concern themselves with personal attributes when they must decide on the selection of staff or the delegation of responsibilities. Their concern with work conditions and status may reflect their own perception of the values workers attach to jobs.

The emphasis European judges place on the negative aspect of responsibility could be due to unfortunate experiences they have had by delegating responsibilities to Africans. European officials were quite keen to discuss at other occasions, instances where Africans had failed to assume the responsibilities they were given, or else had abused the discretion which was placed in them. Whether these instances are frequent enough to warrant generalizations, or whether strong social prejudices and fears are in actual fact operative, we cannot tell for certain. The fact remains, however, that notwithstanding stated policies of separate development, European officials generally view Africans with suspicion and are not altogether convinced that responsibilities should be delegated to them. Jaques (83) pointed out that managers feel very dependent on the work of their subordinates. We can assume, in consequence, that European officials are quite uneasy when they realise that they will become dependent on persons whom they have not learned to trust.

5.5.2 Verbal comments made by the African group.

African judges explain their preferences in essentially the same manner as European judges. They mention education, effort, responsibilities, personal attributes and most of the factors used by the European group. Their comments can, for the most part, be fitted into the categories we described in the previous section and which we found were applicable to the comments of the European group. This is fortunate as it enables us to make a direct quantitative comparison between African groups and the European group taken as a whole.

Any such comparison must, however, be made with an important qualification in mind. Whereas European officials were guided in their evaluation by the functions of jobs as they affected the organization, we find a more personal note in the African comments. True, the African concerns himself with such abstract issues as the education required in the job, and the responsibilities involved in it. But this concern expresses itself most frequently at a personal level. More important than having acquired education, is to have struggled for it. The clerk must not be paid more because the job requires literacy, but because "he spent his time and money training for his job and receiving education". Another typical comment stresses family relationships: "His father spend a lot of money educating him with the aim of making him able to earn money ... He must repay his father the money which was spent on him".

Comments may also refer to the relationship between the judge and the person depicted in the picture. "The clerk has education ... he can help illiterates like myself". "If you show him a piece of paper, he can tell you where a place is to be found". Responsibilities of jobs may specifically be defined in terms of this personal relationship: "The scribe writes a note recommending the painter for a job ... If there was no scribe then the painter would not get a job". "I cannot get a dustbin if it has not been ordered by the scribe". Such comments relate personal experiences which African judges have had and on which they base their evaluation of jobs.

Comments of a more personal nature are also given when the African compares his own job with another. Cold abstract comments made by the European group are replaced by vivid personal experiences. The refuse remover tells us that the "bin eats into his shoulder" and that it is quite easy to stumble and fall when one is running with a heavy object on the shoulders. Old shoes affect the feet badly. The drill operator tells that the vibrations of the machine are hard to bear, and that strength is needed "to keep the jerking machine steady".

This tendency to use more personal comments is to be expected from men who are intimately connected with the jobs of the value study. African jobs must remain to European subjects essentially abstract concepts. They are something which they see, but cannot directly experience. This is shown in the less personal words European judges use when they explain their preferences, e.g. the job is strenuous, it requires more skill, education and so on. The comments and examples of African judges are, on the other hand, much more concrete. This is due to the fact that they have a more direct experience of the jobs represented in the pictures and can identify themselves with them more easily.

This leads to a further distinction between Europeans and Africans. When a European does not adequately explain a judgment, he resorts to a well-worn stereotype, "We need persons with the right personality for this job" or more simply: "This is skilled work". Africans appear to use stereotypes just as readily, but commit, in addition, a number of errors which are characteristic to them, and which we did not find among any of the European judges.

There are, to begin with, comments which do not explain at all reasons for the judgments, but which suggest some antagonism Africans have for Europeans. "The pick and shovel labourer has to dig deep down into the soil till the Europeans get what they are after". The bossboy stands to be hurt by the men "who identify him with the tyranny of the Boss and who is arrogant and proud".

Other comments indicate an inadequate perception of the job. A judge, for example, was guided entirely by the images presented to him, and said that the clerk should be paid more than the bossboy because "the clerk writes, he is doing work ... The bossboy merely indicates". The policeman is said to do no work, but merely to walk around. The main criterion used by these subjects appears to be the production of some concrete result which the worker has achieved through his own personal efforts.

In some cases, a train of association is presented as a process of logical reasoning. The clerk and drill operator are both seen to do a strenuous job because they both have to maintain a bending position. In another case, the judge was more explicit, but again saw just as readily the equivalence between the strenuous effort of the clerk and that of the refuse remover. "The scribe does a strenuous job. He uses his mind. He must record correctly all that he is told. The refuse remover also does a strenuous job. The two should be ranked equally. But the scribe is educated and this is an advantage in his favour". The opposite argument is also found based on the same hastily drawn equivalence when a labourer is favoured to the clerk. "Both the clerk and the pick and shovel labourer are doing a very strenuous job. The labourers are, however, exposed to the elements, and should be paid more".

The presentation of a train of association as reason for a judgment appears as well in the description of some of the causal relationships. The refuse remover should be paid more because "if he were not there, the bossboy will have no work to do". Similarly, the drill operator precedes other workers and should be paid more. "He is doing a job which comes first. He works even before a city is built. A policeman can only get a job after he has worked. A city can only be built after he has worked". In one case, the argument presented staggers with its finality. "The pick and shovel labourer does a more important job ... Why, if you die, he might dig your grave".

In some cases, the causal relationship which is perceived, indicates acceptance of some hierarchical structure. Some argue that "it is because the scribe has done some writing that the drill operator is employed". Some see the medical orderly as more important because "the diggers go to the medical orderly with their injuries so that they can go back to work and earn money for the support of their families". In other instances, the explanation is given purely with reference to self. "The medical orderly looks after our health, whereas we can still live even if the house is not painted".

Finally, there are instances where the judge presents his argument forcibly and quite vividly, but lacks the vocabulary to present it more pithily. This was the case with the judge who did not know the name or cause of tuberculosis, but who said of the drill operator: "The machine so affects his health that even after his stopping to use it, he continues to shiver. It causes him to develop an illness that makes him shiver, as though he is feeling cold all the time".

All these examples reinforce the contention we made initially that Africans evaluate jobs on a more personal basis. The majority of their comments can be classified into the same categories we defined for the European group, though such categories would have more personal connotations with African judges.

We asked ourselves whether instances of faulty reasoning were characteristic of the African as a member of a racial group undergoing adaptation to an industrial society, or whether they were to be found among working groups in general. We could find no comparable experiment carried out among working groups in other countries. A report by John Gale (53) in the Observer suggests, however, that the second alternative is quite plausible, i.e. that instances of faulty reasoning reflect in actual fact the hurried and less critical reasoning one finds among certain social groups. John Gale reported on the strike of underground workers which had paralysed intermittently the London Transport system. He interviewed a number of workers and reported some of their comments in full. One of them in particular is quite similar to the comments we have just discussed. A motorman

was discussing the demands the job made on him and said: "If a man's unfortunate enough to have a suicide, he's got to get down and help, and pick the pieces up. There's no compensation for it, and if you're off sick because of it, you may get nothing. You're stood spare three days in the room, ready in case there's an inquiry ... Old Ted Slaughter, who just died, had seven suicides within six months, and it broke down his health. He was reduced to a motorman-shunter at Neasden. His health still deteriorated. They made him a collector, with a loss of 10s. off his rate. Put him on the barrier at Preston Road. His health still deteriorated, till a month ago he died. All due to those blooming suicides".

We must not lose sight, however, of the first possibility, i.e. that the comments made by Africans are characteristic of a group in transition and in the process of adapting itself to an industrial society. There is a fair amount of evidence which suggests that values are social products which the individual has internalized. Biesheuvel (11) after examining the results of various studies conducted among Africans, concluded "that the more deeply Africans are drawn into that essentially Western culture, the more thoroughly do they acquire the personalities functional for that culture". Hutt and Miller (78, 128) in a different context, concluded that the fairly stable value systems of adult life were gradually internalized by children in a manner which, however, could not yet be fully explained.

A similar process of internalization presumably takes place with the values of work. We maintain that this process will depend on the experience the African has gained by working in an industrial community. We shall examine this point further in a detailed analysis of the comments made by the various occupational groups when they considered the job of the clerk.

5.5.3 Verbal comments made with reference to the clerk.

Our analysis of the verbal comments made with reference to the clerk will be somewhat detailed. We wish to indicate how African judges differ both among themselves and from Europeans in their evaluation of the clerk. This is of interest because by indicating the principal differences and explaining their origin, we shall gain some insight into the way various groups think. We shall show moreover, how a probing analysis of verbal comments brings out differences which may not be apparent from straightforward tabulations.

There are a number of reasons why we are particularly interested in the comments made about the clerk. In the first instance, the scaling of this particular job helped us to distinguish between various clusters of occupational groups. The semi-professional, senior technical and clerical groups placed the clerk at the top of their scales. Semi-skilled workers and labourers did not. The middle cluster of groups placed it at the top of the scale, but favoured also jobs requiring much physical effort.

It is quite possible that the manner in which various groups view this job characterizes the values they have internalized. This is moreover the only job, in the group of nine we included in the value study, which has a marked conceptual content. The transactions in the other eight jobs are all more tangible. Though in some cases they are preceded by conceptual elaboration, this is nowhere as great as in the case of the clerk. He writes, and therefore deals with symbols. His job is perhaps the most representative of a well-developed community. Record-keeping is after all the paradigm of advanced social organization.

The comments made by the European group are tabulated in Table XXX. Most of the comments fall into the first four categories. The need for the clerk to work reliably is stressed in three categories of comments: responsibility under the sub-category of consequence of errors; personal attributes under the sub-categories of reliability and integrity; and skill under the sub-category that the job is skilled because it requires precision and accuracy in figure work. European judges accept that the clerk holds a status job, that he works with concepts and is therefore required to be educated.

TABLE XXX. Comments about Clerk by European group
(N = 196)

CATEGORY (Mean Number of Comments = 9.6)	Number of comments	% of Total
1. <u>What he knows</u> - (mainly that he needs more education - his knowledge of Bantu dialects and of office procedures are also stressed)	644	34.3
2. <u>Responsibilities</u> . Equal emphasis placed on the consequence of errors, to the fact that he works on his own - as well as to the responsibility for personal contacts	382	20.4
3. <u>Personal attributes</u> . Primarily that the job requires an intelligent, adaptable person having to cope with various situations. Great stress placed on reliability and integrity.	311	16.6
4. <u>Status of the job</u> . He is a senior staff member and must maintain appearances, and dress accordingly	267	14.2
5. <u>Skill</u> . Essentially the clerical skills accurate and reliable work with figures and files. Wide variety of tasks which clerk must master.	224	12.0
6. <u>Mental effort</u> . His work is more exacting - he must meet dead lines, works under pressure with interruptions from switchboard.	27	1.4
7. The work he does is more <u>valuable</u> to the Council.	21	1.1
TOTAL	1,876	

The categorization of comments made by the eleven African groups is shown as percentage of totals in Table XXXI. The first impression we gain, is that there are hardly any differences in the distribution of comments as we move from one African group to another. Ten groups out of eleven feel that the clerk should be paid more because of what he knows, with his responsibilities coming a close second. This order is reversed by the high-grade supervisors. Personal attributes - meaning essentially that the clerk must be more intelligent and adaptable than others - fill as a rule the third most important category of comments. Sundry comments relate generally to aspects of the job which the African judge considers unpleasant. Labourers on the lowest wage grade (group K), for example, feel that the clerk does an unpleasant job because he must sit behind a desk the whole day. He cannot move around freely.

Looking at European and African groups, we find that the mean number of comments, made by any group, is directly related to the place it gave the job on its scale. More comments are made by groups when they place it at the top of their scales than when it is placed at the centre. There are, however, some cultural differences. The largest mean number of comments is made by the European group, 9.6 comments per person or 4.8 comments per comparison. This is followed by the African group with highest educational qualifications - the semi-professional group - with a mean number of 5.5 comments per person or 2.8 comments per comparison.

Beyond these facts there is little else which helps us distinguish between various occupational groups or between European and African judges. The reason for it is that we have in no way qualified the broad classification of comments. Is education, for example, viewed in the same manner by labourers and clerks? What particular connotations are attached to the concept of responsibility by European and African judges? Why is it that the category: mental effort, features in the comments of African judges and hardly at all among European comments?

In order to find an answer to these questions, we examined how each occupational group viewed the clerk. The picture which emerged can be summarized as follows:

TABLE XXXI. Percentage of comments made by African groups about Clerk.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. What he knows	30.5	32.0	31.0	33.8	39.7	33.1	45.6	29.2	25.2	32.8	31.3
2. Responsibilities	20.1	26.6	27.1	25.2	21.8	25.9	18.4	29.7	29.6	25.0	29.8
3. Personal attributes	21.4	21.8	17.3	16.6	17.9	14.4	15.8	20.5	26.1	20.3	19.7
4. Status of job	4.6	5.1	7.0	2.6	2.2	2.3	3.5	0.6	1.7	-	-
5. Skill	7.2	2.9	1.0	7.3	-	3.8	0.9	1.1	3.5	-	1.0
6. Mental effort	11.0	8.7	11.3	5.9	12.8	6.8	12.3	12.4	7.8	9.4	11.6
7. Sundry comments	5.2	2.9	5.3	8.6	5.6	13.7	3.5	6.5	6.1	12.5	6.6
Total Number of Comments	154	275	284	151	179	263	114	185	115	64	198
Mean Number of Comments	5.5	4.9	5.1	2.7	2.1	2.3	4.1	3.3	4.1	2.3	3.5
Rank of Job in Scale	1	1	1	3	5	3	1	1	1	3	2

A. Semi-professional group - group AB.

They stress the struggle and cost to acquire an education. Responsibilities are not clearly specified. Some judges state simply that the clerk is a responsible man. Others specify that he is placed in a position of authority and can influence materially the lives of others. The most explicit comments refer to personal attributes. The job requires someone who can think for himself. This need for independent thinking and initiative means that the clerk is less easily replaced than say the drill operator. Many judges stress mental effort: "He strains his brain thinking, whereas the artisan's hand is told what to do".

B. Senior technical and clerical personnel - group B.

They stress cost and effort of education. Some suggest that the mere fact that the clerk is educated entitles him to preferential treatment. Explicit comments are made about the central position the clerk holds in the hierarchy. "He is the hub of the works coordinating all business relating even to our friend the drill operator". The most colourful comments relate to the conceptual nature of the job and to the fact that the clerk uses his brain, and that this is stressful: "He carries his problems home in his mind ... The labourer has much loafing in between ... Some clerks have become mentally deranged from doing mental work continuously".

C. Clerical personnel - group C.

The most competent group to discuss this job. They stress the cost and effort of education, and the need to compensate the clerk for this. The superiority of mental work over physical work is mentioned repeatedly. There is a great deal of concern over mental effort and the fear that much thinking leads to madness. Consequence of errors are seldom mentioned, but when they are, judges become quite explicit: "If he makes a mistake, people are paid the wrong amount and will suffer".

D. Labourers working under markedly unpleasant conditions - group H.

Comments reflect primarily the image uneducated people have of literate persons. "He has a lot of knowledge in his head." Comments are made about the cost parents have to undergo in order to educate their children. When the responsibilities of the job are discussed, they refer to the function of the clerk as a channel of communication. This reflects distrust in European supervisors, a finding reported by Glass in "The Black Industrial Worker " (55). The controlling position the clerk has in the organization and his ability to do mental work are repeatedly mentioned. Comments about mental effort connote the fear that people go mad from hard thinking".

E. Labourers in the lowest wage grade - group K.

Comments in the sundry category are relatively frequent. They refer to features of the job the judge dislikes most, e.g. the clerk is expected to produce a great deal of work, he cannot walk around when he feels like it, but must remain seated at his chair; the job is unpleasant because it offers limited opportunity for physical activity. Comments on education portray an almost childlike admiration for literacy. "If he is sent, he can read a number and so find a place". The importance of repaying parents for the cost they incurred educating their children is mentioned repeatedly. Responsibility connotes the fact that the clerk is in a central position of authority. He controls central records, pinpoints the work of individuals, and is consulted by workers. The mental effort in the job is mentioned frequently.

F. Nurses - group AA.

They stress the effort and cost of education. A superficial relationship is perceived in some cases between the clerk and other labouring jobs, e.g. "Before one gets education, one works hard for it, so the clerk, like the refuse remover, has had some experience in hard and strenuous work". Nurses, however, attach great importance to effort per se. Abstract work done by the clerk is felt to be more important than physical work, e.g. "The clerk is more important because he knows things by studying them, whereas the artisan's hand knows things only by seeing them".

G. Artisans - group D.

Equal emphasis placed on knowledge and responsibilities. Cost of education is mentioned frequently. The central position of the clerk and the manner in which he directs the work of others form the bulk of comments dealing with responsibility. The superiority of mental over physical work is accepted by many.

H. High-grade supervisors - group EA.

The clerk is educated and therefore quite near to the European official. Comments on responsibility form the most numerous category. They relate generally to the importance of the records kept by the clerk. "The machine that the driller uses goes through the records of the clerk". This importance attached to records reflects the experience high-grade supervisors have had of administrative controls. African supervisors are in fact subject to much greater administrative controls than would be placed on their European counterparts. Comments made reflect also the healthy respect persons who have acquired technical competence, have for administrative matters.

I. Bossboys - group EB.

The job is strenuous, giving the clerk little opportunity to move around. His education cost a great deal of money and effort, and should in turn receive suitable compensation. Education has placed the clerk moreover in a position of control.

K. Policemen - group G.

The position the clerk holds in the organization and his education are frequently mentioned. "The policeman stops fights, that is all. The scribe writes a report on all that has happened". Effort and cost of education must receive their proper compensation. Mental effort is mentioned frequently together with suggestions that brain work is more exacting. A policeman wistfully noted that "the clerk cannot booze at any old time as the cleaner might and still work efficiently".

5.5.3.1 Similarity between African groups.

All African groups stress the fact that the clerk should be compensated because of the effort and costs involved in his education. Biesheuvel (11) suggests that Africans value education mainly for these reasons. They have limited resources at their disposal and must in actual fact struggle hard to reach Western standards of competence.

The controlling position the clerk holds in the organization forms another point of agreement between African groups. They all agree that the functions of the clerk affect the work of others and influence materially their lives.

All groups agree in one way or another that conceptual work is superior to physical work. This occurs even with partisan groups like the policemen who placed their own job to the fore.

5.5.3.2 Differences between African groups.

The main differences between African groups reflect an important finding: African judges value the job of the clerk according to the experience they have had of the job. High-grade supervisors mention administrative controls. Labourers and semi-skilled workers see the clerk controlling them. The top cluster of occupational groups sees the clerk controlling others.

The most patent difference appears in the manner in which different groups explained the importance of conceptual work. The top cluster of groups stated simply that brain work was more important than physical work. Some judges drew the sophisticated simile between mental work and the controlling function of the central nervous system. But quite often the importance of mental work was expressed as a self-evident truth.

Labourers, on the other hand, tended to give more tangible examples. They saw the clerk working with symbols they did not quite understand. He was in a position to control their lives because of the records he kept. A clerk could find his way around the townships or around rules and regulations with equal ease and competence. He was endowed with a special knowledge they did not possess.

5.5.3.3 Differences between European and African groups.

The differences we elicited between African groups became apparent only after a probing analysis of the comments. They reflected differences in background and experience and could be viewed within the context of this experiment as being not important. Whether the clerk said he controlled others and the labourer said the clerk controlled him, both said in essence the same thing: that the clerk was an important person who should be paid more because he was placed in a position of control.

The differences between European and African groups are, however, much more fundamental. They were located in three major areas which we examined with some detail.

5.5.3.3.1 European groups give less emphasis to mental effort.

African judges in all occupational groups mentioned explicitly the mental effort involved in the job of the clerk. These comments described the discomfort of the clerk glued to his chair unable to move freely and attend to his personal needs. Some of the comments were rather far-fetched and expressed the belief that the clerk would go mad, so hard and intense was his thinking. The bulk of the comments were, however, quite sober and dealt with the fact that the clerk had to think for long periods of time and attend to a number of things at once.

European judges made few specific comments on this subject. When they were made, they dealt specifically with the effort the clerk had to make in concentrating in spite of the distracting influence of the switchboard.

We tabulated the comments made by European and African judges on the subject of mental effort. The proportions are shown in Table XXXII.

	Europeans	Africans	χ^2
Comments refer to mental effort	27	198	$\chi^2 = 12,692$ $p > .0001$
Other comments made by groups	1849	1784	

TABLE XXXII. Proportion of comments referring to mental effort.

We note that the proportion of African judges who mention specifically mental effort is significantly larger than the proportion of European judges.

5.5.3.3.2 European groups give less emphasis to the effort and cost of education.

African judges from all occupational groups stressed the importance of compensating the clerk for the effort and cost of his education. There was a slight shift of emphasis as we moved from high to low status occupational groups, the lower status groups saying that the father battled to educate his children. In essence, however, all African groups referred to the same idea. European judges, on the other hand, hardly ever mentioned this issue. The difference in proportions between both racial groups is again highly significant, viz. Table XXXIII.

	Europeans	Africans	X
Comments refer specifically to cost of education	7	166	$\chi^2 = 164$ $p > .0001$
Other comments dealing with knowledge	637	484	

TABLE XXXIII. Proportion of comments mentioning cost of education.

5.5.3.3.3 African groups place less emphasis on the consequence of errors.

European judges were greatly concerned over the reliability of clerks. When they discussed the responsibility of clerks they mentioned repeatedly the consequence of errors. When they commented on personal attributes, they referred to the importance of having reliable and trustworthy persons. When clerical skills were mentioned, they were equated to accuracy in figure work.

The emphasis which European judges place on the negative aspects of responsibility is possibly due to the fact that they still view the African with some reservations when the latter are placed in positions of responsibility. Europeans are not altogether happy about delegating responsibilities to Africans.

These facts emerged from the tabulation of comments made by Europeans about consequence of errors and trustworthiness (Tables XXXIV and XXXV). In both cases, the X^2 values were significant at the .0001 level.

	Europeans	Africans	X^2
Comments mention specifically consequence of errors	196	62	$X^2 = 82.6$
Other comments dealing with responsibility	186	449	$p > .0001$

TABLE XXXIV. Proportion of comments mentioning consequence of errors.

	Europeans	Africans	X^2
Comments mention specifically trustworthiness	44	12	$X^2 = 28.7$
Other comments dealing with personal attributes	267	363	$p > .0001$

TABLE XXXV. Proportion of comments dealing with trustworthiness.

5.5.3.4 Absence of differences between African groups.

Having established the presence of certain differences between European and African groups, we examined whether they existed as well between African groups. We restricted our comparison to high and low status clusters. We assumed that if no differences occurred between these clusters, they were unlikely to be found among other African groups.

The proportion of comments made by high and low status clusters in all four instances show no significant differences (Table XXXVI). The X^2 values are quite small.

Comments	High Status groups	Low Status groups	χ^2
Comments mention specifically mental effort	73	50	$\chi^2 = 1.46$
Other comments made by groups about clerk	640	543	Not significant
Comments mention cost of education	57	46	$\chi^2 = .967$
Other comments dealing with knowledge	166	163	Not significant
Comments mention consequence of errors	16	20	$\chi^2 = 1.54$
Other comments dealing with responsibility	165	125	Not significant
Comments mention trustworthiness	5	1	$\chi^2 = 2.6$
Other comments dealing with personal attributes	137	94	Not significant

TABLE XXXVI. Proportion of comments made by high and low status groups.

5.5.3.5 Provisional conclusions.

We have examined, in some detail, the comments made about the clerk. This is only one of the nine jobs included in this study. The observations we have made are, however, quite important and lead us to formulate these preliminary conclusions.

We note in the first place, that there are differences in the manner in which different groups justify their preference of the clerk. These differences are not quite apparent at the broad conceptual level of the eight categories used in our initial tabulations. They become, however, quite apparent when comments are examined in some detail.

The most marked differences are between European and African groups. We see among Europeans deep concern over performance in the job and a suggestion that African clerks are not to be trusted fully. These comments may possibly be the results of two biases: the bias of managers and that of a privileged minority. Managers are dependent on workers to maintain the smooth functioning of departments. They are forced to delegate. At the same time, they are quite convinced that no one will work as effectively as they would ... had they only the time to do all the work themselves. Europeans are moreover members of a large privileged minority. The African advent into a technical society is quite recent and largely untried. It is quite possible therefore, that the strong prejudices Europeans possess are reinforced by the mistakes and lack of tradition of African clerks. There is in this, yet another reason for the fear of delegating responsibility and the emphasis Europeans place on consequence of errors and trustworthiness. This behaviour may not be typical alone of South African conditions, but possibly occurs wherever strong prejudices exist. Xenophobia, anti-semitism would give rise to a similar set of circumstances.

The Africans value the work of the clerk primarily on the basis of the experience that they have had of it. High-grade supervisors stressed the administrative nature of the job, because they themselves came under stringent administrative controls. The high status cluster of groups mentioned how the clerk controlled the lives of others. Low status subjects stressed how the clerk controlled their own lives, and admired his literacy.

We cannot, however, conclude with any finality that these differences are only due to the experience the judge has had of the job. We shall have to combine our observations on the clerk to those we shall make on other jobs. The assumptions we have made must remain for the moment untested. We do not know, for example, to what extent the European prejudice is that of a manager, or that of a member of a privileged minority. No comparable studies have been carried out in a purely Western organization which does not employ a mixed labour force. We cannot tell for certain that the distrust Europeans have of Africans causes them in actual fact to perform in a less reliable manner. Some

further light will be shed by an examination of the comments judges made on the other eight jobs.

To bring a study of this nature within manageable proportions, we shall not continue our examination of comments in the detail we have adopted for the clerk. We shall examine the remaining eight jobs primarily on the basis of the eight categories we adopted for our tabulations. Where, however, differences become apparent, either from the tables of comments, or from the manner in which a job has been scaled, we shall examine these categories in greater detail. Our examinations will be restricted to selected occupational groups which our analyses have shown so far to be clearly different from each other.

5.5.4 Verbal comments made with reference to the medical orderly.

The comments made by the European group appear on Table XXXVII; those made by African groups are tabulated according to percentages of totals (a convention used for all tables showing the distribution of verbal comments by African groups) and appear in Table XXXVIII.

The European group has scaled the orderly second. The bulk of their comments fall into the first three categories, i.e. knowledge, responsibilities and personal attributes. Reference is made to the fact that the orderly has received extensive medical training, that he is clearly responsible for human life, and must develop confidence in his patients who are suspicious of Western medicine. The job requires an intelligent person who can use his initiative as he may have to face a serious situation on his own. The skill he shows in handling surgical instruments and the status of his job, which demands of him a standard of dress, receive the same emphasis. Hardly any mention is made of the fact that he is exposed to infections and therefore liable to catch diseases.

African groups look at the medical orderly differently. Groups AB, B, and C tend to look at him in the same manner as the European group. Less emphasis is placed on personal attributes, more emphasis is placed on skill and work hazards. The bulk of comments is evenly divided between knowledge and responsibilities. Knowledge involves the cost and effort of studying for the job. Responsibilities refer to a variety of features, but more specifically to the consequence of errors and the need to work accurately. "He is responsible for life ... Slightest mistake he makes may cause the patient to suffer pain and injury, probably for the rest of his life".

We find with the remaining groups - and more especially with the low status groups - much greater emphasis placed on responsibility. The comments made by these groups, and which fall into this category are similar to those made by the first three groups. They deal frequently with generalities, he attends to the sick, he helps sick people, he relieves pain and suffering. Personal experiences

TABLE XXXVII. Comments about medical orderly by
European group (N = 196).

CATEGORY (Mean number of comments = 7.9)	Number of comments	% of Total
1. <u>What he knows.</u> Requires higher education, has acquired medical knowledge and was trained more extensively in such matters as first aid, medical work, etc.	510	33.0
2. <u>Responsibilities</u> primarily that the consequence of errors is serious because he deals with human lives - he must inspire confidence in the public; works on his own.	420	27.0
3. <u>Personal attributes.</u> An intelligent, reliable person who must show initiative and must be clean as he deals c human injuries.	274	17.8
4. <u>Skill.</u> Handles instruments, knows how to bandage, and undertakes sundry medical tasks, e.g. gives injections, stitches wounds.	144	9.3
5. <u>Status.</u> He must be respected in the community and must dress suitably - it will not do to have a man with tattered clothes doing this job.	141	9.1
6. <u>Work conditions.</u> Mainly the fact that he is exposed to hazards of infection.	31	2.0
7. <u>Mental effort.</u> He must be alert for symptoms.	7	0.5
8. <u>Sundry comments.</u> The job he does is much more valuable to the community.	18	1.3
TOTAL	1,545	

TABLE XXXVIII. Comments made by African groups about Medical Orderly.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. What he knows	34.5	33.6	39.8	18.8	18.3	24.6	33.3	26.5	27.4	22.7	29.8
2. Responsibilities	32.8	32.8	32.0	66.2	57.8	55.2	34.2	48.5	47.0	61.4	45.7
3. Personal attributes	5.2	6.9	8.7	4.3	3.3	2.5	3.4	6.1	10.6	1.8	9.3
4. Status of job	5.2	6.1	5.0	1.4	1.7	1.5	3.4	3.8	1.5	-	2.6
5. Skill	9.7	8.1	5.8	4.3	3.3	6.4	6.8	5.3	7.5	3.6	2.6
6. Mental effort	3.7	4.4	3.3	3.6	0.6	0.9	2.6	2.3	1.5	1.8	3.3
7. Work conditions	5.2	2.8	1.7	-	2.2	1.5	6.0	0.7	1.5	1.8	0.7
8. Sundry comments	3.7	5.3	3.7	1.4	12.8	7.4	10.3	6.8	3.0	6.9	6.0
Total Number of Comments	134	247	241	139	180	203	117	132	66	57	151
Mean Number of Comments	4.8	4.4	4.3	2.5	2.1	1.8	4.2	2.4	2.4	2.1	2.7
Rank of Job in Scale	2	2	2	2	4	4	2	4	2	4	3

are suggested in a few instances "He has to be extra careful when treating injured people as they feel pain more". The bulk of comments refer, however, to the fact that the responsibility for human life is much greater than that for machines or inanimate objects. "He helps us by attending to our injuries ... he is more responsible". "He is the doctor's "spanner boy". He saves life".

We found no differences in the connotations of the concept of responsibility between the various African groups or between African and European judges. The orderly serves a function of healing which is well-known in all forms of society. As such, he is readily identifiable, often with little more than the simple label: he saves lives.

African groups place, however, little emphasis on personal attributes. The need for cleanliness and the dangers of infection are mentioned most frequently by the nurses who are well acquainted with them and by the semi-professional group, who is the best educated group. We must point out that these dangers of infection are least tangible and less likely to be conveyed by a picture than would have been the case with some of the features of the painter or policeman. For judges to discuss the importance of cleanliness by merely looking at the picture of the orderly, requires either first-hand experience as the nurses possess, or else sufficient worldly knowledge which is the by-product of a good education.

The bulk of sundry comments for all groups deal with the unpleasant features of the job. There appears to be a widely-held belief among Africans, especially in the lower occupational groups that the sight of blood or having to touch it will affect the personality of the orderly. In addition to that, he has to deal with "dying, dead and mangled people" and this calls for great courage. It is interesting to note that group H (labourers working under markedly unpleasant conditions) stresses this factor more than any other group.

The orderly is generally ranked in the top half of the scale. It is usually placed second, excepting for the policemen who place it third, and for the bossboys, the artisans and labourers who place it fourth. Most comments are given about this job by the high status groups and the nurses.

The main difference which can be observed between groups is in the number of categories used to describe its most important attributes. The European judges use the first three categories with similar frequency. Most of the African groups use two or one category. If the mean number of comments is small, then most of them tend to fall into the category of responsibility. This may well be due to the fact that of all the categories used to evaluate the importance of the orderly, this is the one which includes the most egocentric comments, e.g. he can hurt me if he is not careful.

5.5.5 Verbal comments made about the policeman.

The European group scales the policeman fourth, close to the bossboy. To them, the most important reason for ranking this job as high as that lies in the personal attributes demanded in the job (Table XXXIX). The policeman must be primarily a man of integrity who will not abuse his position of authority. There are a number of things he must be in addition. He must use his initiative to avoid a riot, when a nasty situation begins to develop. He must be impartial and show courage. Next in importance are mentioned his knowledge and his responsibility of ensuring that proper contact is maintained with the public. Fourth in importance are the hazards of the job which European judges generally associate with the fact that African policemen are inadequately armed. The status of the job, namely that the policeman represents authority and must dress in a manner which will command respect, is mentioned one tenth of the time.

Africans usually rank the policeman at the centre of the scale. The bossboys and labourers rank it lower than the rest. The clerks and artisans place it in the same rank as the European group. Excepting for the high status group, little mention is made of the personal attributes. The bulk of comments fit into the category of responsibilities and work conditions, meaning primarily the hazards of the job. This category is the most important with the policemen who rank their own job first, with the low status groups and with the nurses.

TABLE XXXIX. Comments about policeman made by
European group (N = 196).

CATEGORY (Mean number of comments = 6.9)	Number of comments	% of Total
1. <u>Personal attributes.</u> Primarily a person of integrity, who can use his initiative, is intelligent, and has a good physique. He must be impartial and show courage.	379	28.2
2. <u>What he knows.</u> He was trained in the legal aspects of his work, knows municipal by-laws, and must be literate.	278	20.7
3. <u>Responsibility</u> primarily for personal contact in that he must be courteous and tactful. He maintains law and order and works on his own.	278	20.7
4. <u>Work conditions.</u> Hazards of the job more especially the danger of assault - works irregular hours, called out at night.	222	16.5
5. <u>Status.</u> Holds a position which must be respected by others. He represents authority and must appear neat and smart.	137	10.2
6. <u>Skill.</u> To interpret the law and defend himself from physical assault.	16	1.2
7. <u>Mental effort.</u> He must be careful when on patrol, alert and vigilant.	10	.7
8. <u>Sundry comments.</u> The job is much more valuable to the community, he deals with situations beyond his authority.	22	1.8
TOTAL	1,342	

TABLE XL. Comments made by African groups about Policeman.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. Personal attributes	13.3	9.7	13.0	4.0	0.9	1.4	5.1	4.4	6.3	3.7	5.0
2. What he knows	3.6	7.3	9.5	-	0.9	1.4	-	2.2	4.8	-	1.7
3. Responsibilities	45.8	37.9	35.4	29.4	28.2	34.6	46.1	43.4	34.9	51.9	25.4
4. Work conditions	30.1	35.5	28.6	52.6	54.5	46.8	43.6	38.9	38.0	33.3	50.8
5. Status	1.2	1.6	2.7	-	1.8	2.8	-	-	3.2	-	-
6. Skill	-	4.8	2.7	7.0	5.5	7.2	2.6	3.3	4.8	7.4	3.9
7. Mental effort	3.6	1.6	2.0	3.0	-	3.6	-	2.2	3.2	3.7	1.1
8. Sundry comments	2.4	1.6	6.1	4.0	8.2	2.2	2.6	5.6	4.8	-	12.1
Total Number of Comments	83	124	147	99	110	139	39	90	63	27	181
Mean Number of Comments	3.0	2.2	2.6	1.8	1.3	1.2	1.4	1.6	2.3	1.0	3.2
Rank of Job in Scale	4	4	3	4	6	7	6	5	3	7	1

Hazards are particularized by all groups. The policeman is inadequately armed, yet he must deal with hooligans carrying firearms. When he separates people who are fighting, they may both turn against him. He must intervene even when he is in danger. As would be expected, the most explicit and numerous comments are made by the policemen; the labourers, who make the smallest number of comments, tend to comment on the hazards of the job rather than about the responsibilities.

The responsibilities of the job are commented upon by all groups, but more particularly by the semi-professional group and by the bossboys. Comments deal generally with the broad functions of the policeman. He maintains law and order. He protects people; he keeps peace among men; he has to reconcile persons from different tribal groups with each other; he safeguards the community. There is no difference in the manner in which all occupational groups view responsibility.

Personal attributes refer in almost the same proportion to the need for intelligence and to those characteristics one generally wishes to see in a policeman. The job requires someone who is intelligent because he must give a coherent account of occurrences, and explain why he has arrested someone. He must, in addition, be honest and faithful, and show a fair amount of courage. "He has taken it upon himself to face death". Comments about personal attributes are rarely made by the labourers. They show some resignation to the fact that policemen must be taken as they come, and rarely, if at all, mention personal attributes which are desirable in this job.

Sundry comments for all groups refer to the fact that due to the particular controlling function of his job, people tend to dislike and hate the policeman. The unpopular nature of the job is stressed by the policemen themselves, and by the labourers on unpleasant jobs. Comments generally state that the policeman is unpopular, that his duties are misunderstood, that people hate him "and yet he must still protect them".

5.5.6 Verbal comments about bossboy.

The bossboy ranks fourth in the European scale, quite near the job of the policeman. The bulk of the comments Europeans make refer to the responsibilities of the job (Table XLI). He must organize the work and control staff. He must look after the safety of his men, issue instructions, and ensure that they are carried out. He must inspect the work done from time to time, to see that it is carried out within specifications. The second most important comment refers to the personal attributes a bossboy should have, namely enough intelligence to understand instructions and put them across, and to show those qualities of leadership which will get people to do the things he wants them to do.

Africans - as we have already noticed - view the job quite differently. The bossboys place it second in their scale, the high-grade supervisors place it fifth, but the other groups place it near the end of the scale; the nurses place him at the bottom of the scale; the high status groups place him sixth, well after the pneumatic drill operator and in the bottom cluster of labouring jobs; the remaining five groups place him in the penultimate position slightly above the artisan's hand.

The number of comments made by Africans is low (Table XLII). Most comments are made by the supervisory groups and by group AB. The remaining groups make few comments as the bossboy was obviously preferred much less frequently. The bulk of the comments made refer to the responsibilities of the job. Knowledge and unpleasant features of the job are mentioned more frequently than personal attributes.

The responsibilities of the bossboy are clearly detailed and comprehensively described by the two supervisory groups. Group EA mentions that the bossboy does the thinking for the labourers in the gang, that he is held accountable for their mistakes and that "he has to put up with a lot of difficult characters who are incorrigible". The bossboys stress above everything the fact that they are accountable to the White man for everything their men do. "He is responsible for the job ... Anything that goes wrong he should answer for. The white man simply gives him orders

TABLE XLI. Comments about Bossboy by European group (N = 196).

CATEGORY (Mean number of comments = 5.9)	Number of comments	% of Total
1. <u>Responsibility</u> for the safety of his men, to organize work and control staff, to issue instructions, to ensure that work is carried out according to specifications.	641	55.0
2. <u>Personal attributes.</u> An intelligent person who can understand instructions and put them across.- must show qualities of leadership, and use his initiative at work.	213	18.2
3. <u>What he knows.</u> Has gained considerable knowledge of work activities; speaks various vernaculars.	168	14.4
4. <u>Status.</u> He holds a senior job and is nearer to management.	60	5.2
5. <u>Skill</u> in a number of operations where he is required to assist the European overseer, e.g. determining levels.	29	2.5
6. <u>Mental effort.</u> He must anticipate trouble and take remedial action, especially in matters dealing with the safety of his men.	21	2.3
7. <u>Work conditions.</u> He works in the open and is exposed to some hazards.	13	1.0
8. <u>Sundry comments.</u> The job he does is more important to council; it is of greater importance to the community.	19	1.4
TOTAL	1,164	

TABLE XLII. Comments made by African groups about Bossboy.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. Responsibilities	69.0	63.1	54.9	70.9	66.4	60.8	56.7	73.4	64.0	53.2	58.8
2. Personal attributes	8.6	7.5	17.1	8.3	7.2	4.8	10.0	7.8	13.8	9.1	10.6
3. What he knows	13.8	17.4	17.1	10.4	8.4	17.6	23.3	9.4	6.9	15.6	18.8
4. Status	-	1.2	1.2	-	-	0.8	-	-	-	-	1.2
5. Skill	5.2	-	3.6	-	1.2	3.2	-	-	-	-	2.4
6. Mental effort	-	2.4	4.9	2.1	-	2.4	-	-	6.9	2.6	1.2
7. Work conditions	1.7	3.6	-	-	6.0	4.8	-	3.1	2.8	6.5	-
8. Sundry comments	1.7	4.8	1.2	8.3	10.8	5.6	10.0	6.3	5.6	13.0	7.0
Total Number of Comments	58	81	82	48	83	125	30	64	72	77	85
Mean Number of Comments	2.1	1.5	1.5	0.9	1.0	1.1	1.1	1.1	2.6	3.0	1.5
Rank of Job in Scale	6	6	6	8	8	8	9	8	5	2	8

and leaves every work with him". They are also concerned with the problem of motivating men to work: "The bossboy must know the way people think ... It is a difficult thing to have a man work". Other comments refer to the fact that the bossboy is in a controlling position. "No work can be done without his direction", and that he must look after the welfare of the men.

We compared the comments made by the two supervisory groups on the responsibilities of the bossboy to those made about the responsibilities in other jobs. We found that on the whole, these two groups were at their best when they discussed the responsibilities of the bossboy. These were comprehensively described. The stock responsibilities in the other jobs were mentioned with less frequency. Though some of the comments made were quite specific, e.g. "The orderly saves lives because he prevents the loss of blood", they tended as a rule to the stereotype, e.g. the policeman is responsible for the safety of the public, the orderly saves lives. It may be concluded therefore that supervisors are more competent than others to discuss the responsibilities of their own job, but that this does not make them more sensitive to the concept of responsibility in general.

Other African groups mention the responsibility for supervision, but concern themselves more specifically with problems of human relations. The bossboy must deal with grievances, he has to maintain peace, and what is more difficult, he must stand as a link between an aggressive white supervisor and dissatisfied African workers. Other functions of the supervisor, e.g. that he is responsible for the progress of work, that he directs labourers, that he instructs them in the use of equipment, are mentioned as well.

Comments dealing with knowledge refer to the fact that as the bossboy was promoted from the ranks, he knows more about the work than the labourers. Personal attributes refer to the fact that he was promoted because of his ability, that he must plan his work. Sundry comments are mentioned most frequently by the bossboys themselves, and refer to the fact that the job is unpleasant and unpopular. "The men may rebel against him ... He is unpopular". Dangers of assault, and even murder feature in the comments made by the bossboys and the labourers in group H.

If then, the characteristic features in the job of bossboy are noted by Africans in all occupational groups, how do we explain the low rank given to this job by a large number of African judges. We must note to begin with, the fact that the comments about the bossboy were made generally when his job was judged to deserve more money. If then, his job scales low, this means that jobs placed higher in the scale are favoured in one of two ways: either the factors in their jobs are considered more important than those in the bossboy, e.g. the education of the clerk is more important than the responsibility of the bossboy, or else they have much more of a given quality than the bossboy, i.e. the clerk is more educated than the bossboy. With these two possibilities in mind, we examined the comments made by judges when some other job was preferred to the bossboy.

The most telling reasons why the bossboy should not be preferred are made by group AB, who have ranked the bossboy sixth. Though a number of judges in this group state that the bossboy should be paid, the majority of the judges feel that some other job should be paid more. Three reasons are advanced: (1) The other job makes greater demands, e.g. the clerk must be educated, whereas the bossboy can supervise even if he is not well trained. (2) The other job achieves something concrete, whereas the bossboy merely stands and watches, i.e. he is an overseer in the passive sense of the word. "The spanner boy is actually working while the bossboy only stands and watches". (3) The third type of comment is openly critical of the function of the bossboy and sees in him no more than a stooge of the White man. "The clerk is skilled... the bossboy can be dispensed with. He is merely there to enslave others". "The orderly is appointed through merit and not through favouritism as may be the case with the bossboy".

The nurses (group AA) scaled the bossboy last. They were primarily concerned with the fact that labourers exert themselves much more than the bossboy. "The pick and shovel labourer actually exerts himself, whereas the bossboy does little work, if any at all". His job is less strenuous because he just stands around doing nothing. Other comments stress the fact that the bossboy is uneducated and untrained, and does therefore less important work.

The low status groups (semi-skilled workers, labourers) and the artisans, place the bossboy in the penultimate position at the bottom of the scale, just above the artisan's hand. Their comments similarly indicate the low value with which the bossboy is held. He is given no initiative, he is told what to do. He is lazy, lounges around while others do the real work. "The labourers go to sleep with aching bodies ... They sweat a lot ... The bossboy does sweet nothing". As a labourer pithily put it "I don't see what the bossboy is supposed to be doing. He just stands". Other comments refer to the fact that the bossboy is not trained, and that a person like the painter, who is trained for a skilled job, is worth much more than a person who is told "take this and put it there".

Our own observations in the City Council, and the experience we have generally had with African supervisors, indicate that there is a great deal of truth in the disparaging comments which were made about the bossboy. Persons were frequently promoted to the job on the recommendation of the white supervisor, and this was often tantamount to blatant favouritism. The jobs they supervised were essentially simple and required little experience. The bulk of the bossboys who were selected for this study were illiterate. In most cases, the bossboy served no other function than to make tea for the European supervisor and act as his interpreter. This state of affairs did not, of course, prevail in all departments. In a number of instances, bossboys were granted sufficient authority to function effectively and supervised over less simple tasks. In most cases, however, these jobs were done by labourers who were illiterate and had received good training on the job.

The evidence presented, supports our explanation that the reason why the bossboy ranks low is because Africans see it as a straw job. He does little in their eyes which is concrete; he is ill-trained and often uneducated, he supervises simple jobs and has little scope to exercise initiative. The relegation of this job to the bottom of the scale is therefore the result of a number of factors influencing each other. Africans, as we indicated earlier on, have a more pragmatic view of jobs than Europeans. Africans use in their evaluation of jobs the personal experiences they acquired of many of the jobs used in this study. The bossboy

they visualize, is someone they know in real life, often their own bossboy. To European judges, on the other hand, the bossboy is a symbol of delegated authority. He stands for that important concept of front-line supervision, the man who will get results, who is most intimately connected with the workers. It is for this reason that personal attributes play an important part in the comments they make. They may, in their conceptual speculation of the desirable characteristics of a front-line supervisor, have forgotten what, in reality, a bossboy is: an illiterate ganger who acts as the mouthpiece of a European supervisor.

Other factors appear, however, to have influenced Africans in their low evaluation of the bossboy. There is the view that concrete results are more important than supervisory inspection. It is something we find mentioned in comments of all occupational groups, even among bossboys, when they value the job of the pneumatic drill operator over their own. This is perhaps akin to the reason why the Russian emblem bears a hammer and sickle rather than the alpha and omega. Jointly with this view that physical effort and concrete achievements are important, is the importance attached to proper training and education. Many of the judges reject the bossboy, purely on the grounds that he is untrained and his appointment is due to favouritism rather than technical competence. Underlying all this, we note a fair amount of antagonism against white supremacy, and the fact that the bossboy is used to further the control of the dominant white group.

5.5.7 Verbal comments about painter.

The painter is scaled fifth by the European groups. They stress first of all, the responsibility of the job. This means in essence that the painter should produce work of acceptable quality and finish (Table XLIII). He must, moreover, avoid wasting material and show a sense of responsibility because he works on his own. The apprenticeship he has served and the skill he has acquired receive the same emphasis. Hazards at work are mentioned with less frequency, but receive over one tenth of all comments made, almost the same frequency as comments dealing with personal attributes, i.e. the painter must be sufficiently intelligent to learn his trade.

TABLE XLIII. Comments about painter by European group (N = 196).

CATEGORY (Mean number of comments = 4.0)	Number of comments	% of Total
1. <u>Responsibility</u> for the quality and finish of the work; to avoid waste of materials, and because he works on his own.	238	30.4
2. <u>What he knows</u> . He has served a long apprenticeship and is quite familiar with the materials he uses.	164	21.0
3. <u>Skill</u> . This is undoubtedly the more skilled job, it demands a certain touch and a fair amount of artistic quality	150	19.2
4. <u>Work conditions</u> . Essentially the hazard of fall, poisoning from paints, and having to work with pungent smells.	97	12.3
5. <u>Personal attributes</u> . An intelligent person who can learn his trade and who shows some initiative, e.g. selecting his own material, deciding on method of work.	75	9.6
6. <u>Status</u> . He must be treated differently because he is a skilled tradesman.	59	7.5
TOTAL	783	

African groups place less emphasis on the responsibilities of the painter (Table XLIV). When these are mentioned, they refer to the fact that the painter works on his own, and that he must produce work which will be of good quality. But these comments appear fourth or fifth in importance with most groups, excepting the nurses and the artisans, where they appear in the third most frequent category.

The bulk of the comments made by Africans fall into the category of work conditions, skill and knowledge. As the proportions of comments made vary from group to group, we shall discuss each category in turn.

Work conditions refer primarily to work hazards. These are not only due to the fact that the painter works on heights, but also relate to the many dangers caused by paints. The fumes affect the chest; the paints burn the skin; he may catch cold from working on heights; he may be poisoned by some of the paints. Hazards feature most prominently with the policemen whom one can say are attuned to danger and project their own fears in this evaluation. Hazards are also prominently mentioned by labourers in group H, whose work gets them into many dangerous situations, e.g. working in sewers, and by artisans who consider hazards forever present in their jobs and of greater importance than the apprenticeship they have undergone and which is of the past. Groups B and C vary from the rest in that they place greater emphasis on knowledge, i.e. the apprenticeship, than they do on work hazards. The comments of the remaining groups, however, fall predominantly in this category.

Sundry comments refer generally to two things: the unpleasant nature of the work because the artisan is expected to produce results quickly, but also the fact that he produces something tangible, i.e. "he actually works ... at least we see the work he is doing". This form of evaluation is used most frequently by labourers in group H.

A category which features prominently with group AB, but which is also used by the remaining groups, refers to the status of the job. Africans are understandingly proud of the fact that they can acquire a trade and say that the painter is quite capable of painting a white man's house. He is a fully fledged artisan, he can beautify surroundings, and his work to many has an artistic connotation.

TABLE XLIV. Comments made by African groups about Painter.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. Responsibility	7.0	13.4	15.4	8.4	6.7	7.9	15.8	10.4	7.8	10.8	9.0
2. What he knows	20.9	23.8	27.4	23.1	12.4	18.9	17.1	15.3	23.5	15.4	7.9
3. Skill	19.8	23.8	16.0	22.1	10.1	16.5	14.3	11.8	15.7	16.9	19.1
4. Work conditions	23.2	21.9	17.1	22.1	37.1	28.0	24.3	33.7	25.5	29.2	44.9
5. Personal attributes	8.1	5.5	9.1	2.1	3.4	3.7	7.1	9.2	9.8	3.1	7.9
6. Status	16.3	4.3	8.0	7.4	1.1	4.9	7.1	6.1	5.9	4.6	2.2
7. Mental effort	4.7	4.3	4.0	7.4	3.4	1.8	10.0	4.9	-	3.1	4.5
8. Sundry comments	-	3.0	3.0	7.4	25.8	18.3	4.3	8.6	11.8	16.9	4.5
Total Number of Comments	86	164	175	95	89	164	70	163	51	65	89
Mean Number of Comments	3.1	2.9	3.1	1.7	1.1	1.5	2.5	2.9	1.8	2.3	1.6
Rank of Job in Scale	3	3	3	7	7	6	5	3	6	5	5

Comments dealing with skill and knowledge are essentially the same as those made by the European group, and refer primarily to the apprenticeship the man has served.

It is interesting to note that notwithstanding this appreciating of the skill and hazards of the job, the painter ranks seventh in the scale of semi-skilled workers. A priori reasoning would suggest that they should have ranked this job much higher. It is a job higher in the skill hierarchy to their own, and one to which one would expect them to move or to aspire. Movements into the trades are, however, restricted at present because of the small demand which exists for African tradesmen. The restrictions are just as real as those thrown across occupational lines in America and which Packard has so vividly described in "The Status Seekers" (136). Workers do not therefore aspire to that which is beyond their reach. Secondly, a perusal of the comments made by judges in group F when rejecting the painter, reveals that negative comments are rarely made. Only two out of 56 judges mention the fact that the painter does a light job which is really not physically demanding. We find, however, that emphasis is given to those characteristics of jobs which are scaled higher, together with an acceptance of the skill of the painter. The policeman does a more dangerous job, the pneumatic drill operator does a job which is both dangerous and strenuous, the refuse remover and labourer work much harder. The impression one gains is that the skill and hazards of the painter are perceived, and often mentioned, but that they are held in less account than the particular characteristics which qualify jobs placed higher in the scale.

5.5.8 Verbal comments about pneumatic drill operator.

The drill operator is scaled sixth by the European group in between a skilled job, and a semi-skilled job which is judged to be less demanding as far as physical effort goes, and which possesses fewer unpleasant features. The comments made about this job represent only 8% of all comments made by European judges, but indicate quite clearly the relative importance of the first four categories (Table XLV).

TABLE XLV. Comments about Pneumatic Drill
Operator by European Groups (N = 196)

CATEGORY (Mean Number of Comments = 3.3)	Number of Comments	% of Total
1. <u>Work conditions</u> . Primarily hazards to health from vibrations and potential accidents - the work is done in the open and is very noisy.	231	35.4
2. <u>Skill</u> in having to drill to limits or simply in operating the machine.	147	22.5
3. <u>Physical effort</u> . This is hard, strenuous work offering little opportunity to rest.	97	14.9
4. <u>Responsibility</u> . He works on his own and operates expensive equipment.	67	10.3
5. <u>What he knows</u> . Essentially the technical know-how required to assemble the drill to fittings and operate it.	59	9.0
6. <u>Personal attributes</u> . He must have aptitude for mechanical work.	37	5.7
7. <u>Mental effort</u> . He is distracted by the public - needs to concentrate on his work.	5	.7
8. <u>Sundry comments</u> . This is a more important job.	10	1.5
TOTAL	653	

Comments about work conditions are most frequently made. These refer to hazards caused by the excessive vibrations of the machine and the potential dangers the operator is exposed to, e.g. flying rock, the machine falling on him. Emphasis is placed, however, on the noisy conditions of work, something which would strike forcibly any observer of the job. The skill of drilling to limits and in operating the machine receives the second largest number of comments. Physical effort, and the fact that the operator is responsible for an expensive piece of equipment appear in third and fourth place.

African groups are divided in the manner in which this job is ranked. The low status groups place it at the top of their scales, the high status groups are uniform in giving it the fifth place in their scales. The comments they make also differ in emphasis (Table XLVI). The high status groups give slightly more stress to work conditions, the low status groups emphasise more the physical effort of the job. Excepting for groups AA, AB, and B, little mention is made of the skill inherent in the job.

The comments referring to physical effort are usually quite simple and to the point. They refer to the fact that great strength is needed to keep the jerking machine steady, and that it will not cut through rock on its own, but that one must apply muscular pressure. It is "a sweating job"; it strains the muscles; the machine is very heavy. One gets the impression that judges at some stage or other operated the machine either in a full-time capacity or on a brief period of trial. The job of drill operator is considered open to any African who shows an aptitude for it. The most frequent comments about physical effort are made by groups F, H, and K, all of which placed this job at the top of their scales.

The bossboys and nurses placed this job also near the top of their scales, but gave slightly more emphasis to work conditions. We find in this category, comments referring to work hazards and to health dangers. The machine may explode, he may drill into dynamite, stones may fly into his eyes and blind him, ground may cave in, the work is generally very dangerous. Factors which are deleterious to

TABLE XLVI. Comments made by African groups about Pneumatic Drill Operator.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. Work conditions	41.3	25.4	34.2	39.2	33.5	39.8	33.0	35.9	40.6	45.1	42.0
2. Skill	11.1	9.8	7.5	2.0	-	2.5	7.2	2.8	1.6	1.4	5.3
3. Physical effort	22.2	28.7	25.0	46.6	48.8	44.0	27.8	40.9	39.0	39.7	33.6
4. Responsibility	3.2	5.7	1.7	-	-	1.0	1.0	-	1.6	-	0.8
5. What he knows	12.7	8.2	9.2	1.4	1.6	1.6	13.5	2.8	1.6	1.4	3.0
6. Personal attributes	1.6	7.4	8.3	-	0.4	1.3	6.2	3.5	6.2	1.4	0.8
7. Mental effort	1.6	2.5	3.3	2.7	-	0.3	7.2	2.1	3.2	-	-
8. Sundry comments, i.e. unpleasant job	6.3	12.3	10.8	8.1	15.7	9.5	4.1	12.0	6.2	11.0	14.5
Total Number of Comments	63	122	120	148	248	316	97	142	64	73	131
Mean Number of Comments	2.3	2.2	2.1	2.6	3.0	2.8	3.5	2.5	2.3	2.6	2.3
Rank of Job in Scale	5	5	5	1	2	1	3	2	4	1	4

health are also described in some detail. Frequent reference is made to the dangers of tuberculosis because of the dust the operator inhales. In addition, a wide variety of ailments are noted. His nerves are affected, his hearing is impaired, the machine ruins his mental health, it affects his blood circulation, it weakens his kidneys, it gives him rheumatism. It is the type of job one cannot do for long periods at a time; "one cannot live long after operating the drill".

The vivid and detailed description of these hazards, especially as they are made by widely different occupational groups, makes us wonder whether we have struck with this job a powerful African stereotype. The association of the African with the pneumatic drill can be traced back almost to its introduction in the gold mining industry and the development of deep level mining. Many of the comments made by our judges refer more to the mining industry than to any elaboration which could be drawn from the picture. The operator works on surface. The dangers of inhaling dust or of caving ground are quite negligible. But there may have developed over the years strongly-held stereotypes about mining activities in general which find themselves associated with the use of the pneumatic drill.

Until we come across more specific information, this must remain as no more than an interesting speculation. We may conclude, however, that to our African judges, the operation of the drill is essentially an unpleasant, dangerous and strenuous job. Skill does not feature prominently in their evaluation of this job. When they place it at the top of their scale, this means that they attach greater importance to the combination of unpleasant characteristics in this particular job.

5.5.9 Verbal comments about artisan's hand.

The comments made about this job by the European group are classified in Table XLVII. The two major reasons why this job is of value is because of the knowledge the worker has gained, and the fact that one needs to be intelligent to learn this job quickly. Mention is also made of the fact that the worker must be able to get on with European artisans, that he has acquired some skill, and his assistance reduces appreciably labour costs. This is due to

TABLE XLVII. Comments about Artisan's Hand
made by European group (N = 196)

CATEGORY (Mean Number of comments = 1.9)	Number of Comments	% of Total
1. <u>What he knows</u> - essentially his knowledge of tools and his familiarity with aspects of the work of the artisan.	124	33.4
2. <u>Personal attributes</u> . An intelligent person who can learn his job quickly and who can get on with European artisans.	112	30.1
3. <u>Skill</u> - in a number of tasks the artisan delegates to him, e.g. removing tyres, parts of engines, and in assisting the artisan.	42	11.3
4. <u>Work conditions</u> - does dirty work, is exposed to injury and dermatitis from machine oil.	25	6.7
5. <u>Responsibility</u> - looks after tools and maintains them.	24	6.6
6. <u>Physical effort</u> . The work is much harder than that depicted in the other picture.	3	0.8
7. <u>Sundry comments</u> - his assistance cuts down the time a skilled man would spend on a job.	41	11.1
TOTAL	371	

the wide discrepancy in earnings between European artisans and their African assistants, the European earning four to five times as much as an African semi-skilled worker.

The European group scaled this job seventh, above the two labouring jobs. African judges ranked it well below the labouring jobs, last in the scale, or else clustered it with them. Because very few comments are made about this job, their categorization shown in Table XLVIII is not altogether reliable. Where few comments are made, the addition or subtraction of one comment from any category materially affects the percentage. We note, however, that the most important category refers to the particular knowledge of tools the artisan's hand has acquired. He knows all the tools by name, he is sent for things he knows, he knows which tools to take out for a particular purpose.

A new category "connection with artisan" refers to the fact that the artisan's hand has learnt many aspects of the job of the artisan, that he has learnt to do them himself, and may in actual fact be asked by the artisan to do them. Sundry comments refer to unpleasant features of the job, and relate to the fact that the artisan generally abuses his assistant. Among personal attributes are mentioned the ability to learn quickly and of being able to get on with European artisans.

A detailed examination of the negative comments made about the job, i.e. in those particular instances where some other job was preferred, revealed essentially the same picture held about the bossboy. The artisan's hand did little work, his job is a light one. It does not require much intelligence, he is not skilled, no one expects much from him. Other comments are more specific. The artisan's hand does not have to strain his brain thinking because he is told everything he has to do. "He is just a fetch and carry man ... he is a helper ... he does not do the job himself, but helps someone else to do his job". We find here the same image of the straw job which Africans appear to dislike particularly. The artisan's hand achieves precious little on his own: he is there to assist someone else achieve the concrete results they could very likely achieve themselves.

TABLE XLVIII. Comments made by African groups about Artisan's Hand.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. What he knows	38.3	41.3	41.8	27.9	33.9	29.0	63.4	28.6	27.8	33.3	44.5
2. Personal attributes	14.7	17.5	6.3	4.6	10.2	7.5	-	10.2	33.3	5.6	11.1
3. Skill	14.7	7.9	3.8	9.3	3.4	3.2	10.0	12.2	5.6	-	-
4. Work conditions	3.0	1.6	1.3	2.3	6.8	10.8	-	2.1	-	11.0	-
5. Responsibility	8.8	9.5	11.3	7.0	3.4	2.2	6.7	16.3	11.0	5.6	3.7
6. Physical effort	2.9	4.8	3.8	16.3	22.0	25.8	3.3	10.2	5.6	22.2	3.7
7. Connection with artisan	8.8	7.9	15.2	16.3	-	6.5	13.3	6.1	-	5.6	7.4
8. Sundry comments	8.8	9.5	16.5	16.3	20.3	15.0	3.3	14.3	16.7	16.7	29.6
Total Number of Comments	34	63	79	43	59	93	30	49	18	18	27
Mean Number of Comments	1.2	1.1	1.4	0.8	0.7	0.8	1.1	0.9	0.6	0.6	0.5
Rank of Job in Scale	8	8	7	9	9	9	8	9	9	9	9

5.5.10 Verbal comments about refuse remover.

The European group have scaled this job seventh, well above the pick and shovel labourer. Their comments (Table XLIX) stress above everything else the work conditions surrounding this job. He works with dirt and filth, can catch any number of diseases and is exposed to a number of hazards, e.g. vicious dogs, traffic. Half as many comments as were made about work conditions are made about physical effort. The work is strenuous and tiring as he carries a heavy load and has to run with it. Comments are also made about the need to have honest people do this job as they have access to private property. The scarcity value of the job (i.e. the particular combination of effort and poor working conditions attracts few people to this job) is mentioned 5% of the time.

African groups generally scale this job at the bottom of the scale with the exception of the three low status groups. Labourers in group H scale it first, very close to the pneumatic drill operator. Groups F and K rank it fifth.

The major portion of the comments made by the low status groups refer to the physical effort involved in the job (Table L). Group H is particularly voluble on this score as one third of the judges are in actual fact referring to their own job. The refuse remover has to go up and down all the time, the load should be carried by two men, he must keep up with the motor truck.

Work conditions are described with slightly greater emphasis by the high status groups, but are also mentioned by all other groups. Comments refer to the hazards of the job, i.e. he must run balancing a heavy bin, he could stumble and fall in the street, and to dangers of infection. Comments range from the specific mention of well-known diseases, e.g. he can get T.B., to general references, i.e. the body is ruined by running with heavy load; he grows old sooner.

Few comments are made about personal attributes; these usually refer to the strong physique required in the job. The responsibility of the job is mentioned more frequently by the high status groups. They acknowledge its importance to

TABLE XLIX. Comments about Refuse Remover made
by European group (N = 196)

CATEGORY (Mean Number of Comments = 1.5)	Number of Comments	% of Total
1. <u>Work conditions</u> - he is exposed to health hazards, dangers of injury and works with dirt and filth.	136	45.1
2. <u>Physical effort</u> - his work is strenuous and tiring - he carries a heavy load and has to run with it.	65	21.6
3. <u>Personal attributes</u> - a man of integrity as he enters private premises and could easily steal.	34	11.3
4. <u>Responsibility</u> - he comes into contact with the European public and must learn to be tactful.	32	10.7
5. <u>What he knows</u> - where the various houses are situated; how to get to the refuse bin quickly.	4	1.3
6. <u>Skill</u> - in tilting a bin on his shoulder and running without spilling its contents.	3	1.0
7. <u>Scarcity value</u> . The particular combination of effort and poor working conditions attracts few people to this job.	17	5.7
8. <u>Sundry comments</u> - he renders a valuable and essential service by keeping areas clean.	10	3.3
TOTAL	301	

TABLE L. Comments made by African groups about Refuse Remover.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. Work conditions	32.3	26.5	37.2	15.5	26.4	15.7	28.2	20.6	18.7	22.7	26.7
2. Physical effort	22.6	36.8	35.3	69.1	55.0	67.4	41.0	60.3	45.8	56.8	53.3
3. Personal attributes	-	-	2.0	1.0	0.4	0.6	-	-	-	-	-
4. Responsibility	12.8	19.1	11.8	2.0	0.9	3.5	7.7	9.5	2.1	6.8	6.7
5. Mental effort	-	2.9	-	-	-	-	-	-	2.1	-	1.6
6. Skill	-	-	-	-	-	-	-	-	2.1	-	-
7. Sundry comments	32.3	14.7	13.7	12.4	17.3	12.8	23.1	9.5	29.2	13.6	11.7
Total Number of Comments	31	68	51	97	220	172	39	63	48	44	60
Mean Number of Comments	1.1	1.2	0.9	1.7	2.6	1.5	1.4	1.1	1.7	1.6	1.1
Rank of Job in Scale	7	8	8	5	1	5	7	7	7	7	7

the community life, as the worker prevents diseases by ensuring cleanliness and thus renders an important service to the public. "Without him all places will be dirty and disease will spread ... No one likes to live in dirty places".

Sundry comments refer to the unpleasant nature of the job. "It is a filthy job ... the dirt smells ... the bin may leak and the slime runs on me". These are comments which are made by all groups, more particularly by refuse removers. These comments should dispel the notion commonly held that the African is relatively insensitive to unpleasant jobs and does not mind doing them, or even that he prides himself in the ~~fact~~ that he can do them.

5.5.11 Verbal comments about pick and shovel labourer.

European judges have scaled this job last, and consequently, have made the smallest number of comments (Table LI). These usually refer to work conditions, e.g. that the labourer must work in the open and exert much physical effort.

African judges scale this job at the lower end of the scale with the exception of group K (who ranks it second), group H (who ranks it third), and group AA (who ranks it fourth). The comments most frequently made by these groups and all other African groups refer to physical effort (Table LII). Labourers in group K and H make the more specific comment "You dig into hard ground ... you use the spade to throw rubble over a high wall ... this is very strenuous ... It is a heavy job digging where there are stones". Other judges refer to physical effort in more general terms: "It is very strenuous ... it taxes the energy ... this is strenuous muscular work".

The second most frequent category refers to conditions of work. These include the unpleasant work surroundings ("It is dusty ... working in the sun makes you sweat"), and hazards inherent in the job ("Pick axe may land on somebody's foot"). A number of judges, especially among the labouring groups, show concern about the effect that strenuous work has on the labourer's health. "It gives you backache ... it renders you sterile". The life span is shortened as men age quickly on this job.

TABLE LI. Comments about Pick and Shovel Labourer
made by European group (N = 196)

CATEGORY (Mean Number of Comments = .3)	Number of Comments	% of Total
1. <u>Work conditions</u> - works in the open, is exposed to the weather, to traffic.	21	41.1
2. <u>Physical effort</u> - at the end of the day he would feel much more tired than the person shown in the other card.	18	35.3
3. <u>Skill</u> - some skill involved in digging to proportions.	9	17.6
4. <u>Sundry comments</u> - the work he does is much more important to the Council.	3	6.0
TOTAL	51	

TABLE LII. Comments made by African groups about Pick and Shovel Labourer.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. Work conditions	35.3	38.0	27.4	35.0	30.5	28.0	39.4	29.0	42.0	23.5	37.3
2. Physical effort	50.0	55.0	58.8	61.7	68.3	69.6	54.1	65.1	51.6	66.7	53.7
3. Skill	-	-	-	-	-	-	-	1.2	-	-	-
4. Responsibility	14.7	4.2	9.8	1.1	0.6	1.9	4.9	2.4	3.2	5.9	6.0
5. Personal attributes	-	1.4	4.0	1.1	0.6	0.5	-	-	-	3.9	1.5
6. Sundry comments	-	1.4	-	1.1	-	-	1.6	2.4	3.2	-	1.5
Total Number of Comments	34	71	51	94	164	214	61	86	31	51	67
Mean Number of Comments	1.2	1.3	0.9	1.7	1.9	1.9	2.2	1.5	1.1	1.8	1.2
Rank of Job in Scale	7	6	9	6	3	2	4	6	8	6	6

Comments referring to responsibility mention the important part the digger plays in the development of urban life. "Road mending is important for the community ... they lay water pipes so we can get water". These comments are made mostly by judges in the high status groups. Personal attributes refer to the physique required of a digger, and sundry comments are vague expressions of the general unpleasantness of the job.

It is significant that the emphasis placed by the labouring groups on these two jobs, which characterize their occupation, is on physical effort, rather than the work surroundings. It is also significant that the value of these jobs to community life is expressed much more frequently by the high status groups.

6. Discussion and conclusions.

The hypothesis we set out to test in this experiment was formulated as follows:

"That the concepts used in the evaluation of jobs and the relative importance attached to them are the same for a sample of European management officials as they would be for Africans, at various occupational levels".

The hypothesis sets two separate questions. Were the concepts used in the evaluation of jobs, the same for all our jobs? Did they attach the same relative importance to them?

When we speak of concepts, we think of categories into which events or phenomena can be classified. A concept in our experiment meant categories which would help us establish some equivalence between the multiplicity of comments given by various judges.

A concept in this sense was shown to be dependent on the degree of analysis we proposed to carry out. We were able to classify comments from all our subjects into the same eight categories. As each category was based on an extensive definition of a concept, it could be said that in this sense, all occupational groups used the same concepts when evaluating jobs. Yet as the analysis of the comments became more discriminative, the same concept was shown to be interpreted differently by various occupational groups. In the case of the clerk, for example, significant differences were found in the manner in which judges interpreted responsibility.

When we formulate concepts, equivalence is dependent on the level of discrimination we wish to adopt. This in turn is dependent on the purpose for which concepts are formulated, and the nature of the data we are categorizing.

"To categorize" wrote Bruner (18) "is to render discriminably different things equivalent, to group the objects and events and people around us into classes - and to respond to them in terms of their class membership rather than their uniqueness". Equivalence, therefore, is said to exist, when things which could be discriminated as different are considered to be the same kind of thing, or amounting to the same thing".

Categorization is clearly forced upon us. If we did not categorize, the business of living, and for that matter, of conducting psychological experiments would be impossible. We would have to examine in the same highly discriminative manner, all occurrences which we encounter. As it is, we categorize and reserve our refined discriminative activity only for "those segments of the environment with which we are specially concerned".

In an experiment as the one we have carried out, it would not have been possible to categorize comments in a more refined manner. We indicated at times, that a more probing analysis would reveal discriminable differences between African occupational groups, but that these differences did not add materially to our interpretation of the data. The experimental design and the data which were generated, lacked precise controls throughout, and did not really warrant a more detailed analysis.

Bruner (18) points out further that the categories in terms of which we group the events of the world around us, are constructions and inventions. "There exists a near infinitude of ways of grouping events in terms of discriminable properties", and we can only avail ourselves of a few of these. The invention of categories is successful when it enables us to "predict correctly certain consequent events". If we were, for instance, to invent a category of job attributes which no one would recognize or use, then we would have failed in our task of categorization. If, on the other hand, we were to categorize attributes into a category which most of us would readily understand, and use, then we would have succeeded in developing a pragmatic classificatory category.

The categories we invented were based essentially on comments freely made by judges in an evaluative situation. They have the merit of reflecting with some brevity what is common usage when workers and managers are asked to evaluate jobs. Taken, therefore, in this broad sense, the concepts used are the same for a sample of European managers as they would be for Africans at various occupational levels. However different in the details, comments all referred to the same broad concepts. There are numerous examples.

Labourers were just as competent as their European managers to perceive the conceptual nature of the job of the clerk. Judges in all occupational groups discussed the educational requirements of jobs, referred to responsibilities and to conditions of work. Admittedly there were shifts in emphasis, and possibly different connotations as we moved from one occupational group to the other, but the comments could be all seen to refer to the same broad concepts.

The relative importance which various occupational groups attached to these concepts varied, however, markedly. The analysis of the data generated in this experiment, repeatedly pointed to this conclusion, and forced us, on this score, to reject the hypothesis. In this respect, the analysis of the verbal comments corroborated the major impressions we had formed from the initial examination of the Bradley Terry scales.

6.1 Reasons for rejecting aspects of the hypothesis.

We reject the hypothesis that European management officials and Africans at various occupational levels attach the same relative importance to concepts they use in the evaluation of jobs. We do it for the following reasons:

6.1.1 The nine jobs we included in this experiment were scaled differently by the various occupational groups. This was particularly seen in the manner in which the first job was scaled. Occupational groups differed markedly on this issue. One cluster of groups scaled the clerk first; another cluster of groups placed the pneumatic drill operator at the top of their scales.

6.1.2 These differences are not primarily due to the preferences some occupational groups have for their own jobs. The contention made by Shen (157) that raters do not always overestimate themselves in desirable ratings has a counter in this study. Only one occupational group, that of the policemen, could be said to have been biased towards their own jobs. The clerks, who placed their own job first, acted no differently than the semi-professional judges or the senior clerks. The labourers on unpleasant work placed the refuse remover, a job related to theirs, at the top of the scale; they made it share, however, first place with the pneumatic drill operator, a job which occupational groups related to theirs, placed at the top.

6.1.3 The product-moment correlations between scales indicate that the African occupational groups are divided into three clusters. Differences in the manner in which the nine jobs were scaled are most marked between the cluster of groups we called high status, and the labouring and semi-skilled groups, referred to as the low status cluster. These two clusters are linked by a middle cluster which borrows features from the other two. The manner in which jobs are scaled by these clusters and by the European group suggests that they placed different emphasis on job attributes. Labourers, for instance, placed jobs demanding physical effort at the top of their scales. Clerks and senior technical personnel were guided by educational requirements.

6.1.4 African and European judges differ most markedly in the manner in which the jobs of bossboy and artisan's hand are scaled. The European group places the bossboy fourth in their scales. African groups place it near the bottom of their scales. The artisan's hand is seen by the European group to belong to the semi-skilled group of jobs, and is placed above the labouring jobs. All African groups, including artisan's hands, place it at the bottom of their scales.

6.1.5 Analysis of the comments reveals that the major point of reference used by different occupational groups vary markedly. European officials are concerned primarily with the consequence of delegating work and responsibility to African workers. African groups are on the whole concerned with pragmatic and personal issues. Though they concern themselves with abstract issues, such as the education required in a job, this concern is expressed at the more personal level of the struggle involved in acquiring such education.

6.1.6 The impressions gained from a first examination of the scales and reported under points 6.1.3 and 6.1.4 are corroborated by the analysis of comments. The emphasis of the high status cluster falls on education and training. The low status cluster stresses, on the other hand, physical effort and concrete, tangible achievements. The middle cluster of groups stresses education and physical effort evenly. These differences are characterized by the distribution and nature of comments on four specific jobs:

6.1.6.1 The bossboy - The European group tends to consider the bossboy in the abstract, as a symbol of the front-line supervisor. Africans are guided by a more pragmatic image of the bossboy. Whereas Europeans are concerned with personal attributes and supervisory functions, Africans refer to the general illiteracy of bossboys, and the unpleasant position bossboys find themselves when they assume authority on behalf of Europeans.

6.1.6.2 The painter - European judges stress his responsibilities: he must produce work of good quality. Africans consider primarily the dangers and hazards of the job. Only two African groups, both of which are high status, stress the importance of the apprenticeship the painter has undergone.

6.1.6.3 The policeman - European judges stress the personal attributes demanded of the job and the consequence of errors. African groups, particularly policemen, stress the physical hazards. Labouring groups hardly mention personal attributes.

6.1.6.4 The pneumatic drill operator - Excepting for the European group, and three African groups (the nurses; semi-professional, senior technical and clerical workers) little mention is made of the skill inherent in the job of the pneumatic drill operator. Labouring and semi-skilled workers who place this job at the top of their scales, do so primarily because of the combination of two unpleasant attributes, i.e. great physical effort and poor work conditions.

6.1.7 In the detailed analysis of the comments made about the clerk significant differences between European and African groups revealed the following features:

6.1.7.1 European judges give less emphasis to mental effort.

6.1.7.2 European judges, within the category of responsibility, give more emphasis to the consequence of errors.

6.1.7.3 Within the category of knowledge, European judges give less emphasis to the effort and costs Africans expend when they educate themselves.

6.2 Additional supporting evidence.

The paired comparison experiment which we have just described, was carried out in the context of an attitudinal study (30). Though the paired comparison experiment was aimed to serve particularly our job evaluation assignment, the attitudinal study was aimed at finding reasons for absenteeism and turnover among African workers. All subjects who had participated in the paired comparison experiment were interviewed further on certain aspects of their work. African subjects were asked about their attitudes to work. Questions were put to them on the wages they were paid, the manner in which they were supervised, their attitude to Council as an employer, and so forth. European officials were asked to give their opinions about African labour. They were asked whether Council paid a competitive wage, and the basis on which African wages should be determined.

The attitudinal study was carried out immediately after the paired comparison experiment. The broad findings of the study were reported separately (30), but the detailed analysis of the answers to some of the questions gives supporting evidence to the major findings of the paired comparison experiment.

European judges were asked three questions which are relevant to this study. At the start of the interview, they were asked to rank in order of importance seven factors which were currently used to determine a wage for Natives. A card was shown to them with the seven factors which were: education, responsibility of the job, experience, physical effort, skill, unpleasant working conditions, and long service. The second question was asked in the middle of the interview. After the officials had been asked to discuss who were the Council's greatest competitors for African labour, they were asked "What do they offer to Africans that the Council does not offer?" The question was intended to show the relative importance attached to wages by Council officials. The third question was asked at the very end of the interview and was intended to act as a further check on the comments made during the paired comparison experiment, and the rank order of factors produced in answer to the first question.

Judges were asked to distribute a wage of ten pounds between five factors. The factors were knowledge (comprising education and experience), skills, physical effort, responsibilities (comprising responsibilities for supervision, equipment, and for personal contacts), and job features (comprising hazards and unpleasant surroundings).

The manner in which the seven factors were placed in rank order of importance is shown in Table LIII. The column of sums of weighted frequencies shows the frequencies with which jobs were placed in various ranks, multiplied by a weight equal to the rank and summed together. Table LIII shows that the first two factors cluster together and that responsibility of the job and education are considered as having almost equal importance. In the centre are clustered skill and experience, and at the bottom of the scale, suggested by the Ewf*, appear the remaining three factors - long service is considered least important, and unpleasant working conditions are considered slightly more important than physical effort.

Factors	Rank order	Ewf
1. Responsibility of the job	1	395
2. Education	2	399
3. Skill	3	614
4. Experience	4	642
5. Unpleasant working conditions	6	1096
6. Physical effort	6	1158
7. Long service	7	1182

TABLE LIII. Rank order of seven factors currently used in wage determinations - European group
(N = 196)

The manner in which the wage of ten pounds was distributed between the five factors is shown in Table LIV. W was computed according to the following formula:

$$W = \frac{\sum \frac{E f_a}{p}}{N}$$

* Ewf = sum of weighted frequencies

where f = the frequency of subjects who selected amount a_i
for factor i .

a = the actual amount in money of the frequency cell.

p = the preference in a rank order for subject i
suggested by the amount allocated.

N = the number of subjects in the experiment.

E = sum of.

Factors	Rank order	W
1. Knowledge (education, experience)	1	£3.776
2. Responsibilities (for supervision, equipment and personal contacts)	2	£3.416
3. Skills	3	£1.655
4. Job features (hazards, unpleasant surroundings)	4	£0.662
5. Physical effort	5	£0.491

TABLE LIV. Distribution of wage of £10 between five
factors - European group ($N = 196$)

As will appear, W was so computed as to take account not only of the mean amount of money allocated to a factor, but also to take account of the rank order of preferences suggested by the distribution of money. The amounts of Table LIV show a distribution which is very similar to that suggested by the Ewf in Table LIII. Knowledge and responsibility receive almost similar amounts, and are placed at the top of the scale, skill is placed in the centre, job features and physical effort are placed at the bottom of the scale, with physical effort once again last.

We adjoined in Table LV three scales, each showing an order of preferences expressed by the European group; these were the scale of Ewf from Table LIII; the Bradley Terry scale computed from the preference matrix of the nine jobs in the paired comparison experiment; and the scale of W from Table LIV. We notice a consistent pattern in the manner in which preferences are expressed. Physical effort is placed at the bottom of both factor preference scales.

TABLE LV. Combined scales of preferences
European Group N = 196.

wf (Table LIII)		Bradley Terry scale (Table X)	W (Table LIV)
20			
30			
40	Responsibility Education	0	4.00
		Clerk	Knowledge
50		10	3.50
		Medical orderly	Responsibilities
60		20	3.00
	Skill		
	Experience	Policeman Bossboy	
70		30	2.50
		Painter	
80		40	2.00
		Pneumatic drill operator	
			Skills
90		50	1.50
		Artisan's hand	
		Refuse remover	
100		60	1.00
	Unpleasant working conditions		
			Job features
110		70	.50
		Pick and shovel labourer	
	Physical effort		Physical effort
	Long service		
120		80	0

At the bottom of the Bradley Terry scale, the pick and shovel labourer is placed. This is a job which has primarily a physical effort content. At the top of the two factor preference scales are education and responsibility. Similarly, at the top of the Bradley Terry scale are two jobs making predominant demands on education and responsibility. At the centre of both factor preference scales appears the factor skill. At the centre of the Bradley Terry scale is the job of the painter. Unpleasant working conditions is preferred to physical effort, the refuse remover is preferred to the pick and shovel labourer.

These similarities not only support the conclusions of our paired comparison experiments, but suggest strongly that European judges used the same evaluating order in three different situations. It is true that these situations are closely related to each other, not only in time, but also in the content of the separate evaluating tasks. The presentation of each task was, however, separated from the other. The experimental design in each case was tangibly different, i.e. a paired comparison, a rank order of a priori determined factors, and the distribution of a sum of money between five factors. The similarity of the results obtained from a large sample suggests therefore that European judges are consistent in the manner in which they evaluate the relative worth of job attributes.

The answers given to the middle question "What do competitors offer to African labour that the Council does not offer?" are tabulated in Table LVI. They reveal the views European managers have about competing for African labour. The greatest advantage competitors are seen to have over Council is in their ability to pay higher wages and because they have developed less rigid wage policies; nearly half the comments made, fall in this category. Wages are seen by managers as the most important factor in the competition for African labour. This is further stressed in the importance given to fringe benefits, particularly those which help extend the wage, e.g. free food, transport allowance. We can assume with a fair amount of certainty that the subject of African wages was of great concern to our sample of European managers.

Categories of comments	% of Total	Number of comments
1. Higher wages, better systems of pay with rapid increments, rewards for initiative, etc...	48	196
2. Better working conditions for African labour, e.g. fewer hazards, more personal attention, systematic training.	21	88
3. Fringe benefits which help extend the wage, e.g. free food; medical benefit; transport allowance.	12	50
4. Fringe benefits, i.e. pension scheme.	2	9
5. Sundry comments	10	40
6. Does not know	7	30

TABLE LVI. Advantages which competitors are seen to have over the Council.

African judges were interviewed extensively on the wages they were paid. Questions dealt with their overall satisfaction, with the manner in which wages should be determined, with fringe benefits, and with their knowledge of wages paid to African workers by competitors of the Council.

A detailed analysis of the answers to these questions revealed that wages formed the major source of dissatisfaction among African subjects. They were mentioned as the main reason for wishing to change jobs within Council, or else for wanting to leave Council altogether. This observation was supported by an analysis of separation rates for a second random sample of African Council employees (N = 2,697) over a period of six months (30). Table LVII shows that the separations increased quite markedly with the lower wage grades in the weekly and monthly paid establishments. The highest proportion of those who left, among weekly paid workers in the sample, were in the lowest wage groups, but equally interesting is the fact that this pattern repeated itself among monthly paid workers. Here again, the highest proportion of those who left were in the two lowest wage categories.

		Wage category Rand per month	Left	Stayed	Proportion Separating
Weekly paid groups	1	R16.00 - R20	0	5	0
	2	R20.01 - R24	5	12	29.4
	3	R24.01 - R26	294	1035	22.1
	4	R26.01 - R28	108	592	15.4
	5	R28.01 - R30	13	105	11.0
	6	R30.01 - R32	29	267	9.8
	7	R32.01 - R34	0	41	0
	8	R34.01 - R36	0	17	0
Monthly paid groups	1	R36.01 - R42	3	24	11.1
	2	R42.01 - R48	6	44	12.0
	3	R48.01 - R54	3	37	7.6
	4	R54.01 - R60	1	16	6.3
	5	R60.01 - R66	1	14	7.1
	6	R66.01 - R72	0	2	0
	7	R72.01 - R78	0	19	0
	8	R78.01 - R88	0	12	0
	9	R88.01 - R98	0	3	0
	10	R98.01 - R108	0	3	0
$\chi^2 = 69.0$					
Sign. .005					

TABLE LVII. Separation rates among different wage grades
for second J.C.C. African sample (N = 2,697) (30)

We found that 92% of the 588 African subjects who took part in the paired comparison experiment were not satisfied with the wages they were paid. This dissatisfaction was common to all occupational groups. The bulk of the criticism made against wages currently paid fell into two groups:

- a - the wage was too low to meet the requirements of the subject (61% of all comments made).
- b - in his opinion, the wage was not related to various job demands (36% of all comments made).

The remaining three per cent of the comments referred to factors in managerial policy, such as slow increments or not being told the range of the wage scale.

It is important to note that subjects in all occupational groups considered the wage as inadequate to meet their personal requirements. The middle and lower occupational groups stated more specifically that the wage they received was not related to the number of dependents they had to support.

It did not take account of high taxes and rentals which had to be paid, nor of the high transport costs. The top occupational groups said that their wages were too low to maintain the standard of living they were expected to keep.

It is clear that African subjects were even more concerned about the wages they were paid than their European managers. To the latter group, wages were indispensable to compete effectively for good quality labour. They were seen in the abstract as a managerial problem. To the African group, however, the concern with wages was at a more personal level. Inadequate wages meant that rentals or taxes could not be paid, or that the subject could not maintain a higher standard of living. It is important to note moreover that most of the African subjects we interviewed were well aware of wages paid by other employers of African labour for the type of work they did. The large majority of workers in the lower occupational groups felt that their wages were worse than those paid elsewhere. The greatest number of those in the higher occupational groups felt that their wages were the same or better than those paid elsewhere. Both these points of view were proved to be correct by a survey of external wages (31).

Because of this keen interest in wages, we were particularly anxious to learn how the determination of wages was viewed by Africans. The paired comparison experiment answered partially this question. We wanted to verify the impressions we had formed from the data of this experiment by asking our subjects in addition, this omnibus question "According to what should workers be paid?" We preferred an open-ended question to a rank ordering of factors because a fair proportion of our African subjects would be illiterate. The question was put to them at an early stage in the interview after they had discussed extensively the manner in which they viewed their current wages.

The answers given by various occupational groups were categorized and appear in Table LVIII. The figures given for each category are percentages of total number of comments made by various occupational groups. The categories we used were essentially the same as those used in the paired comparison experiment. "What he knows" refers to the education, qualifications, experience the worker is required

TABLE LVIII. Percentage distribution of comments by African group to question:
"According to what should workers be paid?"

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)	Total Comments
1. What he knows	33.3	28.1	32.4	20.1	8.8	13.5	28.4	16.8	22.2	24.5	20.3	22.6
2. What he does	16.7	28.1	23.5	31.2	25.0	24.2	9.5	46.7	35.2	30.2	29.7	27.3
3. Physical effort	11.1	8.9	6.2	24.8	39.7	36.5	17.6	13.2	18.5	22.6	13.6	19.3
4. Work conditions	9.7	3.0	0.7	8.3	16.2	5.1	10.8	5.6	3.7	3.8	13.6	7.3
5. Personal attributes	11.1	9.6	11.7	7.3	-	6.7	6.8	8.4	3.7	3.8	4.2	6.7
6. Responsibility	9.7	8.2	8.3	3.7	2.2	1.7	4.0	0.9	5.6	11.3	4.2	5.4
7. Economic needs	5.6	7.4	13.1	3.7	5.1	5.6	18.9	1.9	7.4	1.9	9.3	7.3
8. Length of service	2.8	6.7	4.1	0.9	3.0	3.9	4.0	6.5	3.7	1.9	5.1	3.9
9. All should get the same wage	-	-	-	-	-	2.8	-	-	-	-	-	0.2
Total Number of Comments	72	135	145	109	136	178	74	107	54	53	118	1181
Mean Number of Comments	2.6	2.4	2.6	1.9	1.6	1.6	2.6	1.9	1.9	1.9	2.1	2.0

to have to do his job. "Work conditions" means hazards and unpleasant work surroundings. "Personal attributes" refer primarily to the merit of the worker and the interest he shows in his work, but also to the fact that the job may require someone who is intelligent. Effort and responsibility were rarely qualified, but were given as self-evident comments.

Four new concepts had to be introduced to take care of the remainder of the comments. "What he does" had variable connotations with different groups. It meant usually the work a man did, and so was a strong plea for differentiation on the basis of job demands. Comments were not always qualified, but when they were, they carried connotations particular to the occupational group. Labourers implied primarily physical work; artisans referred to skill; policemen referred to the importance of jobs for the community. Economic needs referred either to the size of the family the worker needed to support, or else to the high cost of living. Length of service referred to long service increments. Five labourers in group K felt that all workers should get the same wage.

There is a close similarity between the manner in which various occupational groups answered this question, and the manner in which they scaled the nine jobs in the paired comparison experiment. Groups AB, B and C stress education over physical effort. They also place the clerk at the top of their scales. Groups F, H and K stress physical effort over education. The pneumatic drill operator and labouring jobs are pushed to the top of their scales. Work conditions are emphasized by labourers in group H, nurses and policemen each giving their own particular connotation. Labourers in group H mean by it unpleasant work surroundings, nurses refer to hours of work, and policemen refer to dangers. Economic needs are stressed particularly by nurses and clerks. These are two occupational groups whose earnings place them at the lower end of the African middle class. They experience particular difficulties in maintaining the middle class standard of living.

The category "what he does" features prominently in all occupational groups with the exception of the nurses. As we have indicated, this category makes an indirect plea for job evaluation. When a subject says that a worker should be paid according to what he does, this implies that differentials should be introduced in earnings because workers do different jobs. This point is made particularly strongly by the artisans and the high-grade supervisors. Both these two groups have only recently acquired a competence in one of the trades.

The data from the attitudinal study which we have just presented support the major findings of our paired comparisons. The differences we observed between occupational groups are confirmed. We could speculate that the same evaluating order was used by subjects when they compared jobs and when they took part in the attitudinal study. There are strong indications, however, that this evaluating order is influenced by the experience the subject has had of work, more particularly by the work he is currently doing. We turn to examine this point next.

6.3 Value and cognition.

In his discussion of the value judgment, Lamont (98) noted that the attribution of goodness implied the prior and continuing cognition of an objective order. Approval arises only as a response to the perception or awareness of an objective order. The objective order acts in the nature of an ultimate criterion.

When European officials and African subjects evaluated jobs, this objective order was quite apparent. It showed itself in the first place, in the manner in which subjects elaborated the rather restricted stimuli presented to them by the photograph. The policeman was shown in a fight. But the picture clearly conveyed the impression that the policeman could take care of himself. He was armed with a stick, his assailant was shorter than him, and had thrown a punch which had missed badly. Similarly, the painter was placed on a ladder, but this was a short ladder, and the painter appeared to stand quite firmly on it. Yet in both cases, subjects from all occupational groups waxed quite eloquent on the dangers of the job. The fumes and

corrosive property of paints were frequently mentioned. Similarly, with the policeman. Subjects drew heavily from their experience of township life: the streets are inadequately patrolled; the policeman is insufficiently armed when he faces a thug with a firearm. Finally, when we discussed the comments about the pneumatic drill operator, we noticed that Africans from all occupational groups described vividly and in a detailed manner the hazards of the job. Their description went beyond the information supplied by the picture and made us wonder whether we had not struck with this job a powerful African stereotype.

The examples we have given so far illustrate the influence on the evaluative order of broad patterns, cognition of which are largely cultural. There are, however, many numerous instances of a more specific nature. These can all be related to the particular experience the subject had from working with the City Council. The best example is seen in the manner in which the bossboy is consistently scaled low by most African judges. The abstract demands of the job and its hypothetical responsibilities are completely eclipsed by the current experience African judges have of this job. Other jobs are seen as physically more demanding; the bossboy does little which is physically strenuous and so on. Labourers in group H, working under markedly unpleasant conditions, stressed more than any other group, the unpleasant features in the job of the orderly, e.g. he has to deal with dying, dead and mangled people. The unpopular nature of the job of the policeman, the fact that he is resented by the public was stressed by policemen themselves. The labourers in group H often having to work in dangerous situations, were very sensitive of dangers in other jobs, e.g. the painter, the policeman and the bossboy. The manner in which groups B and K evaluated the job of the clerk reflected their divergent experience of the job. Group K stressed the position of power the clerk had, and how he could influence the life of the labourer. Group B spoke of the mental effort required in the job and the need to produce accurate work and contend with frequent interruptions, often under pressure to meet a deadline. Judges in the other high status groups spoke of the greater value of work, which relies on abstractions, to labouring work, which relies on perception.

Similarly, supervisors in groups EA and EB were more competent than other African judges to discuss the responsibilities of the bossboy, though this did not make them more sensitive to the concept of responsibility in general.

We mentioned that the tendency to use more personal comments when substantiating an evaluative judgment, was to be expected from men who were themselves intimately connected with jobs. Egocentric judgments were made, particularly with reference to the medical orderly. His personal attributes were not frequently mentioned, but emphasis was given to the paradigm "he will certainly hurt me if he is not careful".

As for the European group, their whole evaluating order was guided by their experience as managers and administrators. The significant stress on the consequence of errors, their ability to view the bossboy in the abstract, their concern about competing effectively for labour were all signs of managerial bias. The process of self-development which managers underwent to attain positions of responsibility was reflected in the importance they attached consistently to factors such as education and training.

There is sufficient evidence to suggest that judges drew heavily from their experience of the work situation to evaluate the nine jobs they were presented. As this experience was largely determined by the functions the judge served, we can safely assume that it varied just as the functions of the judge varied. This in turn influences the development of the evaluating order the judge would ultimately adopt to determine the relative worth of jobs. It is possibly this fact which explains the major differences we observed in the evaluating orders of judges from various occupational groups.

6.4 Consequence of rejecting aspects of the hypothesis.

The evidence we have presented clearly forces us to reject the hypothesis that European officials and Africans in various occupational groups attach the same importance to broad concepts used in the evaluation of jobs. The main consequence of rejecting this aspect of the hypothesis is to accept the views put forward by Otis and Leukart (155) and Sayles (155) that both management and workers have their own different ways of evaluating jobs. We must go further and say that as workers evaluate jobs according to their own personal experience of work, they differ among themselves on the manner in which jobs are to be evaluated.

This conclusion is consistent with findings of other research workers in related situations. We reported Biesheuvel (11) as saying "the more deeply Africans are drawn into that essentially Western culture, the more thoroughly do they acquire the personalities functional for that culture". Biesheuvel was considering the African in his broad social setting. The more experience the African gains of Western culture, the more he tends to develop the personality which will function in that culture. This in turn implies that he will acquire the necessary system of values which will guide and control his behaviour in that culture. A similar development can be shown to occur in the narrower field of work values. He enters an industrial society which actively practices wage differentiation. He accepts such differentiation and as the paired comparison experiment indicated, he is quite competent to differentiate himself, i.e. to say which of two jobs should be paid more. But the basis on which he differentiates, and the results of such differentiations, vary according to the experience that he has himself had of work. The more developed his work and the greater his integration into Western culture, the more his pattern of evaluation resembles that of fully-fledged members of the Western community (only in so far as European officials are said to represent a Western community). The less developed the work he does, the less likely his pattern of evaluation will resemble that of European officials.

The theory which Jaques (85) has propounded, appears to be refuted in part. The concept of the time span of discretion was apparent in the concern expressed by managers about the consequence of errors. But it is negated by the extensive documentation we presented to prove that workers in different occupational groups have different evaluating orders. Our criticism that discretion would not be considered as crucial by workers who do not experience it is moreover substantiated by the evidence we have presented. Managers have experienced the exercise of discretion and value it. So much is evident from the importance they attach to responsibilities and the personal attributes. Labourers on the other hand, rarely experience it and so largely ignore it.

And yet the evidence is not so convincing that we should reject the theory of Jaques out of hand. The concern shown by African judges over mental effort in conceptual jobs suggests they consider discretion under another name. The manner in which most African judges view the jobs of the bossboy and the artisan's hand are particular instances of reasoning along the principles of Jaques. Both jobs are held in low esteem because little discretion was in fact given to incumbents in the Johannesburg City Council. They are straw jobs. The negative features of the artisan's hand job are particularly well stressed. No one expects much from him. He does not have to strain his brain thinking because he is told everything he has to do. He is just a fetch and carry man. He does not do the job himself but helps someone else to do it.

We do not know whether this criticism of straw jobs is sufficient ground to state that labourers accept the principle of discretion as the sole basis for evaluating jobs. We think that on balance it does not. The criticism may well be motivated by deep resentment of the statutory restrictions placed upon Africans in the occupational field. The great importance which they attach to qualifications and to the exertion of physical effort is further evidence of the fact that they will not be prepared to evaluate jobs on the basis of discretion alone. Resentment of occupational restrictions is moreover not sufficient evidence to say that "men want to assume that level of discretion which they are capable of assuming". Such resentment may be caused by the

particular phenomenon found in South Africa of two communities living side by side with markedly different standards of living. We must reserve our judgment of Jaques' theory until such time that further investigations have been carried out. Our experiment, however, allows us to state that at the conscious level, jobs are evaluated differently according to the particular experience the judge has had of work. As the relative merit of jobs is discussed and decided primarily at this superficial level, we feel that Jaques' theory has limited value. Its value would clearly be great when managerial posts are analysed and evaluated, or else in situations where labour conflicts need to be resolved by means of Jaques' protracted therapeutic sessions.

We must finally consider the consequence which the rejection of aspects of the hypothesis has on current systems of job evaluation. We must realise that any system of job evaluation which we intend to introduce into an organization must be superimposed on already established evaluating orders. Our experiment has indicated that workers at all occupational levels are quite capable of evaluating the relative worth of jobs. Though such evaluation is at times hurried and uncritical, it is important that we realise that it is in fact carried out and that it gives the worker the same sense of finality which a more involved and complex judgment would give his manager when he has made a particularly difficult decision.

We conclude, therefore, that these evaluational orders are determined primarily by the job the worker holds, and the experience he has gained of work situations. Such evaluational orders differ as we move from one occupational group to another. Consequently, a job evaluation system which appears rational to management may not appear as rational to workers.

It is for this particular reason that job evaluation systems should be introduced only after satisfactory communications have been established with African workers. The need to ascertain their views is all the more important as they are debarred from collective bargaining. It is doubtful, however, whether collective bargaining by itself would succeed in isolating the values various occupational

groups use when evaluating jobs. There is in the relationship between trade union officials and workers, an element of expediency which we do not find in more systematic attitudinal studies. Collective bargaining would, however, be carried out much more effectively if all available facts were collected in a systematic and reliable manner, and placed in front of the bargaining parties.

It is conceivable that Africans would abandon their parochial evaluating orders if an active programme of education were to be carried out. If we were to inform them of the bases on which jobs are evaluated, and appraise them of the need to strike an equitable balance between the demands of different job universes, it is likely that they will modify their evaluating orders to include all workers in the organization. Opportunity costs as applied to job evaluation are only truly considered by managers. They must consider the organisation as a whole, and look at all jobs in relation to each other. Even though their evaluation order shows a particular managerial bias, it is comprehensive enough to include various job universes. The worker, on the other hand, tends to view opportunity costs in an egocentric manner. He is concerned merely with his own labour, and must decide to which employer he will sell it. As we pointed out, the sale of labour is a continuous rather than discrete process. He may reconsider his decision as he gains more experience of the work situation, and so brings further alternatives into his evaluating order. The important thing is that he decides and evaluates primarily with reference to himself. And yet he may in time acquire a manner of evaluating which is less egocentric and more collective. The development of the vertical trade union in the United States is an indication that this is possible.

CHAPTER VI.

CONCLUDING REMARKS.

1. Knowledge is a function of being.

"We are probably safe in saying that the composite demand with respect to any given thing will be more extensive, the deeper our knowledge of that thing and its potential relation to other things. Hence while the potential movement towards wholeness in our valuational life is grounded in the nature of man as a unitary self-conscious demander, the extent to which this movement is actually realised will depend upon his intellectual progress as a 'knower'".

These words were written by Lamont (98) when he discussed the effect which increasing knowledge has on the value judgment. They sum aptly the common finding of our two experiments. We noticed, in the first experiment, that analysts examine and evaluate jobs more competently, as they gain experience and perceive the validity of concepts they were taught to use. In the second experiment, we found that workers and managers evaluate work according to their own personal experience of the work situation.

The relation between knowledge and value has influenced ethical thinkers from the beginnings of our civilization. Herodotus, if we remember, noticed that customs and values varied from tribe to tribe. Religious writers have argued with deep conviction that knowledge is a function of being. Knowledge that certain values are valid does not result from logical thinking. It comes from living the life which epitomizes these values.

There seems to be a fair amount of evidence that this is true. Experience of values is intimately connected to our conscious experiences. The values of a community are intertwined with the history it has lived.

The same principle applies to the determination of wage differentials. For these differentials, like status and legislation, are very much a function of the culture in which they originate. Whether differentials are determined

by economists seeking to establish the payability of organizations, or by wage administrators, working on the basis of a job evaluation programme, the influence of personal values and culture is ubiquitously present. As facts begin to fail them - and whenever behaviour is predicted there are never quite sufficient facts - they will resort to value systems grounded on their own very personal experiences.

We argued that a value judgment invariably gives us a feeling of finality. This is regrettable because it could well prevent us from conceding that other judgments, based on different experiences and values, are equally possible, and just as convincing. Again, this is as pertinent to the subject of wage differentials as it is to matters of education or religion. To leave the determination of wages as the prerogative of one group of people, means in fact that we rely entirely on one set of values and exclude all others. A poorer form of judgment would possibly result.

The very concept of wage differentials implies that at least two points of view need to be considered. We argued that the labour contract involves employer and employee, both of which can be viewed as objects of demand. Our second experiment proved convincingly that they both have their own ways of evaluating work. The value judgments which our subjects were called upon to make, reflected different frames of reference, and were thus at variance from each other. African judges were guided primarily by their own and very personal experience of the work situation. European managers regarded the managerial function and the welfare of the organization as closely intertwined. They both elaborated beyond the stimulus material they were presented, drew inferences which were a compound of the objective world they could perceive, and their own particular motives and values.

As matters stand at present, however, the initiative for determining African wages rests largely with employers. These are men who are keenly concerned with profitability and the survival of their organizations. It is quite natural that they should perceive money as the major motivator of human behaviour. The prime means by which they exercise authority is the fact that they pay the wage at the end of the week. Africans are rarely consulted. Their wages, therefore, are determined purely on the basis of managerial values.

The managerial evaluating order is, in a way, open to partial confirmation. Simon (159) pointed out that confirmation would arise from the fact that any such order of values seeks to predict a future state of affairs. What is it, then, that management seeks to predict through its wage policies? Primarily that it will succeed in attracting and retaining a sufficient number of workers who will co-operate effectively in furthering its aims.

No one will deny the fact that the industrial development of Southern African has reached the stage where Africans are involved in a wide specialization of functions. This in turn means greater managerial dependence on African labour. Its productivity is beginning to affect intimately the profitability of organizations. Wise management knows that productivity is not a simple function of output. It is the compound of all the influences African workers bring to bear on the endeavours of the firm. It is the wastage they control, the duties they assume informally, the image they project on the public, the manner in which they approach their supervisors, their loyalty during periods of unrest, and a multitude of other factors which are never clearly perceived.

In these circumstances, a wage structure which reflects only managerial values is something of an anachronism. We predict that an increasing number of attempts will be made in the future to establish wage differentials which take cognizance of African values. These attempts will present, however, a number of problems.

We argued that values are grounded on experience. What in actual fact is the sum total of experience that Africans have had of work? Their introduction to industrial life is quite recent. Their attitudes to work, we know, are undergoing rapid changes. Are they in actual fact quite ready to participate in the development of wage policies, or in the establishment of differentials?

The answer is possibly still uncertain. Wage differentials have acquired through their long historical existence, the force of a well-established tradition. We know that they are at present applied throughout the whole world. They become meaningful, however, only in complex societies which have developed a money economy and intensive

specialization of functions. Money becomes the commonly accepted unit of exchange and can satisfy a multiplicity of demands. It is a paradigm of well developed societies that the individual no longer needs to do a number of different things to satisfy a number of different needs.

The African has only recently entered into such a complex society. We have little evidence to prove the existence of wages, or of wage differentials, in the more primitive tribal societies from which he has emerged. It seems, however, that the tribal background can be shed in the space of less than a generation. Biesheuvel (11) has shown the rapid changes which are occurring among Africans in their attitudes to work. Our second experiment showed repeatedly that the African is quite capable of differentiating the worth of various occupations. Significant scales were generated by all occupational groups. Moreover, when Africans were asked the question: "According to what should a worker be paid?", most subjects stressed the nature of the work the person did.

Yet this ability of discriminating between jobs varied somewhat from one occupational group to the other. This fact became particularly clear after the examination of the results of the T5 tests. These tests, it will be remembered, showed that most groups used the same broad evaluating patterns, but that subgroups differed from each other within certain well-defined levels. We found that the more advanced occupational groups established the clearest evaluating patterns, and that subgroups differed from one another on a fine basis. This suggests that not all Africans may discriminate as effectively as Europeans, and that there are similar gaps between educated Africans and labourers.

There is one way by which we could close these gaps and remove these differences. We must give the African an opportunity to acquire broader experience of the work situation. This will not solve all our problems because there are, in all racial groups, obvious individual limitations. In Southern Africa, however, these limitations are aggravated by the racial cleavage which predominates in the industrial and economic world.

European minorities in Southern Africa are at present entrenched in political or economic positions of control. De Kiewiet (33) wrote that the issue of race relations had confused the classic labour versus capital struggle. "White artisans ... fought the characteristic vanguard action of labour, in Western world, against capital. It differed, from other labour movements, by fighting a rearguard action against a group of different race and a lower order of skill".

Any attempts to extend the work experience of African must take cognizance of this fact: that the white population is in effective control of the government and the economy of Southern Africa. There are two sets of policies which need concern us. They operate in neighbouring territories and both seek to control the evolution of the African into a position of greater control and participation in the political affairs of the respective countries. In the Republic of South Africa, the policy of separate development has placed many statutory restrictions on the African. In the Federation, the policy of multiracial development is endeavouring to bring about an orderly evolution towards a fuller measure of control, but in a shorter span of time. It has resulted in the development of active African trade unions.

Both policies are being implemented with difficulty. The emergence of African nationalism and the threat it presents to the vested interests of white communities, still in effective control, is among the many factors which contribute to these difficulties. The impact that these forces have on the problem of wage differentials is most acute in the Federation. There is, there, a great sense of urgency as the wide discrepancy between European and African earnings is in the process of being resolved. The greatest difficulty which has been encountered, however, is the fact that Europeans in the lower occupational groups were earning much in excess of what their jobs were relatively worth. As Africans begin to enter into these jobs, wages are reduced to a more realistic figure. This in turn is much higher than average earnings of the majority of Africans.

We have here the problem of reconciling two different base lines for the same universe of jobs. The base lines were imposed artificially through social forces. They must be reconciled in the context of a period of acute social transition as exemplified by African advancement. The problem could not be much more difficult. African advancement, forced against the inner conviction of the European minority, raises additional problems. Its success is in fact dependent upon the good will of European supervisors and managers. If they are not convinced, however, that Africans can competently assume responsibilities, then it should be relatively easy for them to prove it. The definition of sub-standard performance is highly subjective and dependent on the attitudes of line management. This will in turn influence the determination of wage differentials as these are related to the responsibilities delegated to workers.

The position in the Republic of South Africa is paradoxically simpler. The presence of a much larger European group and its effective control of all aspects of economical and political life has resulted in the promulgation of a number of acts. Africans have few opportunities to enter into any form of collective bargaining. They may form trade unions, but these are not officially recognized. African workers may not strike or participate in negotiations with statutory bodies such as the Industrial Councils.

The initiative for developing adequate industrial relations with Africans lies entirely with the employer. In terms of the Native Labour Settlement of Disputes Act (Act No. 59 of 1955), the establishment of works committees becomes a legal liability, if African workers request them. Horrell (74) reports that some manufacturing concerns have had successful experiences with such committees. Discussing a particular instance where the committee had made well thought-out representations for increased wages, she writes: "The management not only agreed to these, but granted even slightly larger amounts than had been requested. This naturally enhanced the committee's prestige in the eyes of the worker".

Therein lies perhaps, the most crucial factor in the development of African representation. Works committees can function effectively only when they have gained the acceptance of workers. Employers must concede these committees the right to discuss wages however contraversial an issue this proves to be. The alternative is quite simple. No effective communications are established with workers, the establishment of wage differentials would fail to achieve the aims management believes could be reached, and there is the ever-present possibility of sudden, unexpected industrial unrest.

It seems, therefore, that a great number of problems will be experienced both in the Federation and the Republic. The development of sounder wage policies will depend on our ability of overcoming two major obstacles. We must educate our management to perceive clearly how dependent they are on African labour, and to realize that this dependence will increase with further industrial expansion. We must also train African workers to participate effectively in the development of wage policies. Whether we speak of the Federation or the Republic, we have to deal with an African labour force whose experience of industrial life is somewhat limited. Africans will have to move away from their egocentric work values to understand more fully the problems which beset management. The task is not as difficult as many industrialists fear it to be. There is sufficient evidence (30, 74) to show that African workers usually take a sober and realistic view when they are given an opportunity of discussing their wages.

2. The concept of equity.

With the development of African trade unionism in the Federation, and, possibly, with the further development of works councils in South Africa, the question of equity will increasingly be raised in relation to wages.

What is, in fact, "equity"? When we seek to define it, we feel just as perplexed as St. Augustine, when he tried to define time. "What then is time? If no one asks me, I know. If I wish to explain it to one that asks, I know not".

When we discuss equity, in relation to wages, we find that it is synonymous to the concept of the fair wage, which according to Jaques is "the wage paid in relation to the discretion the person must exercise and is in actual fact capable of exercising". A discussion of equity under such a broad frame of reference will, however, be somewhat unrealistic. The discussion will fail to take account of real limitations imposed upon the African by current circumstances. Even in the Federation, where the mood is for determined changes, the fact that these changes need to be gradual is generally accepted. African technicians cannot be trained overnight. Any sudden changes on the pattern of wage distributions will bring in its wake serious social and economic repercussions. When we discuss equity and wages, we must accept that for the moment, separate base lines will be maintained for African and European wages. African advancement into higher occupational levels will depend moreover, on the assistance European communities are prepared to extend to African workers.

These limitations suggest that we should consider equity within the principle of "ars aequi et boni", which Hart (63) considers fundamental to the judicial process. We would not be far out in adopting this principle, for there are strong similarities between the administration of wages and the implementation of legal enactments. The concepts of "aequum" (the equitable) and "bonum" are just as applicable to the determination of wage differentials as they are to the administration of justice. The equitable means, in essence, the proportionately equal. We cannot apply a rule, any rule for that matter, as a rule unless we treat in accordance of its terms all cases and persons coming within the definition of its terms. We cannot, at this stage, be concerned with the morality, or the expediency, behind our system of rules. We are merely concerned with the principle that rules, once they have been formulated, will be applied equitably. If, for example, present circumstances in Southern Africa impose upon us the constraint of two separate base lines, then we shall apply this constraint equitably to all instances which are presented to us. We could say that the same rate of progression will apply to both racial groups, but that all persons who qualify for one base line will start at one point, and all others at another.

The concept of the "good", as well, has, by itself, no moral connotations. The administrative body - whether this be the civil service of a country, or the wage administrators of a company - does not enquire whether the ends of those who made the rules were wise, prudent or moral, but merely that they had some "end in view". The end may, in some instances, be quite clear and implicitly stated in the rule. In other instances, however, the end is not so clear and the rule requires to be interpreted. When a court of justice is asked to interpret a rule, it does not always find its guidance in ends specified by the legislature, but in inferences as to what these ends may reasonably be assumed to have been. This could well mean the welfare of the community, or the maintenance of the legal system taken in toto.

Ambiguous rules are just as frequent in wage administration as they are in any system of jurisprudence. The rules may have been formulated by the board of directors, or the management of an organization in compliance with general principles of company policy. The interpretation of these rules is usually made by the personnel department, or whomever has been delegated the responsibility of nurturing the wage structure. It is safe to assume that the personnel officer, or any other company official, would also be guided by the general principle of the "bonum". In such a case, the maintenance of the firm as an efficient organization will be assumed to be the end which the rule, and company policy as a whole, intended to serve.

It is at this stage that we realize how intimately the wage policy of a company is related to the philosophy of its management. For in the final instance, a wage policy reflects the manner in which management has decided to share its profits with labour.

This will become apparent if we consider briefly one of the most advanced wage policies which has come to our notice. It has come to be known as the Scanlon plan (97). The plan, in essence, provides a means of sharing whatever economic gains accrue from improvements in organizational performance. It uses a ratio between the total personnel costs of the organization, and some measure of output, such as total sales or a value added by production. The ratio is

by no means easy to derive. It requires extensive study and analysis of the particular organization into which it is to be introduced. Special allowances have to be made subjectively for a variety of factors which cannot be objectively measured.

As the ratio improves, it reflects an overall economic gain for the organization. A portion of the resultant savings - at times the full amount - is paid regularly to all persons who participate in the plan. The distinguishing feature of the plan, however, is the coupling of this monetary incentive with a second and rather important feature. The plan will not function unless every member of the organization is provided with the opportunity of making suggestions and seeing that they are immediately considered. This is done through a series of committees, so organized that they can evaluate and authorize the implementation of suggestions with the minimum of delay. Representatives from every occupational group and function serve on these committees. Departmental committees of workers and front-line supervisors are, in actual fact, empowered to put into practice ideas appropriate to their levels. Suggestions which have broader implications are referred to higher level committees, comprising worker representatives, supervisors and higher management.

The Scanlon plan reflects a new philosophy of management. Management accepts deliberately the conception of a fuller participation of workers in the affairs of the organization. One can well imagine the extensive evolution in managerial thinking which must precede the introduction of the plan. It is clearly not easy to administer; it creates at the start, recriminative discussions. If we consider, however, that most of these discussions centre around improved performance, and that individuals, at every level, are given a share in the success of the organization, then the initial disadvantages are easily outweighed by the final advantages.

The Scanlon plan is a good example of the strong relation which exists between the philosophy of management and the wage policy of an organization. If labour is seen as a cheap commodity to be exploited for the sole benefit of the organization, then the wages paid will be as low as the

market permits. If, on the other hand, labour is viewed as an active promoter of company objectives, then policies akin to the Scanlon plan will be implemented. The range of policies available to management in Southern Africa is particularly wide.

There is an important consequence to all this: management in Southern Africa retains the initiative for injecting a strong moral note into labour relations. Whereas the administration, and to some extent, the development of wage policies can be guided by the principle of "ars aequi et boni", management cannot altogether escape from the contention of St. Augustine that "an unjust law is not a law". This is not a new experience for management, according to serious students of organization such as Fayol (47), Barnard (8) and Simon (159). If management in Southern Africa were to view industrial development on a long term basis, then it cannot consider equity in the narrow sense of the equitable and the good, but should also consider the just in the full morale sens meant by St. Augustine.

With particular reference to the African, this will require a fine awareness of his needs and motives. Management should be able to draw that important distinction between the African who belongs to a subsistence economy, and one who does not. It is not just to draw the African into an industrial community and then to expect him to retain the meagre satisfactions of tribal life. New needs are experienced, and these soon acquire the same urgency of the more primitive, almost physiological needs. A just wage policy is one which will include, at the very least, a base line which adequately meets the minimum of these needs. We are still quite some way from having developed and widely implemented such a policy. This will involve a combination of fine psychological research with important economic and moral considerations.

Having established a just base line, we must introduce into our wage structure adequate differentials between various skills and various occupations. The differentiation must also be done on a just and equitable basis. It is for this reason perhaps that job evaluation plans have found

favour with management. They give the impression that justice is done because of their thorough and painstaking assessment of all job attributes. But the techniques we use are far from perfect and need, still, extensive research and development. There are a great many questions we could ask: they range from methodological issues to pragmatic economic considerations. It is our sincere hope that the answers to many of these questions will become available in the near future.

BIBLIOGRAPHY.

1. ALLPORT, G.W. and J.W. Gillespie - Youth outlook on the future - a cross national study. Doubleday and Co. - Inc. N.Y. - 1955 quoted by Biesheuvel, S. (11).
2. ANNET, J., C.W. Golly and H. Kay - The measurement of elements in an assembly task - The information output of the human motor system. The quarterly journal of the Experimental Psychology, Vol. X - part 1 - 1958, p. 1 - 11.
3. ANNET, J. and H. Kay - Knowledge of results and skilled performance. Occupational Psychology, 31, 2, 1957, p. 70 - 79.
4. ARBOUS, A.G. - Unpublished - Report on pilot study of job evaluation at Iscor. Johannesburg, National Institute for Personnel Research - 1953.
5. ASH, P. - The reliability of job evaluation ratings. J. Appl. Psychol. 1948, 32, p. 313 - 320.
6. ASCH, S.E., H. Block and M. Hertzman - Studies in the principles of judgments and attitudes: I. Two basic principles of judgment. J. Psychol. 1938, 5, 219 - 251.
7. BAKER, H. and J.M. True - The operation of job evaluation plans. Princeton Industrial Relations Section, Princeton University, 1947.
8. BARNARD, C.I. - The functions of the executive. Cambridge Moss: Harvard University Press, 1938.
9. BELLOWS, R.M. and F.M. Estep - Job evaluation simplified: the utility of the occupational characteristics test list. J. Appl. Psychol. 1948, 32, 354 - 359.
10. BENGE, E.L., S.L.H. Burk and E.N. Hay - Manual of job evaluation. New York, Harper and Bro. 1941.

11. BIESHEUVEL, S. - Race, culture and personality -
The 1959 Hoernlé Memorial Lecture. Johannesburg.
S.A. Institute of Race Relations, 1959.
12. BIESHEUVEL, S. - Further studies on the measurement
of attitudes towards Western ethical concepts -
Journal Nat. Inst. Pers. Res. 1959, 7, 141 - 155.
13. BOSE, R.C. - Paired comparison design for testing
concordance between judges. Biometrika - 1956, 43, p. 113.
14. BRADLEY, R.A. and M.E. Terry - Rank analysis of
incomplete block design. Biometrika 1952, 39, 324 - .
15. BRADLEY, R.A. and M.E. Terry - Rank analysis of incom-
plete block design. Biometrika 1954, 41, 502 - .
16. BRASH, J.A. - Time study methods applied to job
evaluation. J. Consult. Psychol. 1945, 9, 152 - 160.
17. BRITISH Institute of Management - Job evaluation. A
practical guide. Personnel Management Series 4,
London 1951, p. 77.
18. BRUNER, J.S., J.D. Goodman, G.A. Austin - A study of
thinking - New York - John Wiley 1957.
19. CAIRNCROSS, A.K. - Introduction to economics.
London - Butterworth 1955.
20. CHAPANIS, A. - Research techniques in human engineering -
Baltimore - John Hopkins Press 1959.
21. CHESLER, D.A. - Reliability and comparability of
different job evaluation systems. J. Appl. Psychol.,
1948, 32, 465 - 475.
22. CLARK, C. - The conditions of economic progress -
London, Macmillan 1957.
23. COHEN, L. - More reliable job evaluation. Personnel
Psychol. 1948, 4, 457 - 464.

24. COLE, G.D.H. - Labour in Chambers Encyclopedia - London - George Newness - 1950.
25. COMMISSION of Enquiry into Industrial Legislation - Report of the Commission U.G. 62, 1951.
26. CONRAD, R. - The timing of signals in skill. J. Exp. Psychol. 1956, 51, 6, 365 - 370.
27. COOK, W.F. - The technique of wage negotiation and adjustment - Personnel Series No. 30. New York - American Management Association 1937.
28. CORTIS, L.E. - Job evaluation and merit rating - Paper read at 5th convention of S.A. Institute for Personnel Management. Vereeniging 1961.
29. CORTIS, L.E. - A comparative study in work attitudes. Psychologia Africana 1962, 9, 148 - 167.
30. CORTIS, L.E. - Absenteeism and separation among Bantu workers. Unpublished report at the National Institute for Personnel Research - Johannesburg 1961.
31. CORTIS, L.E. and S. Biesheuvel - The analysis and evaluation of Bantu jobs in the Johannesburg City Council. Unpublished report at the National Institute for Personnel Research - Johannesburg 1961.
32. DE LAGUNA, G.A. - Speech, its functions and development - Yale University Press - New Haven - 1927.
33. DE KIEWIET, C.W. - A history of South Africa - Social and Economic. Oxford University Press - 1957.
34. DEPARTMENT of Labour - U.S. Employment Service. Industrial Job Evaluation Systems. Washington 1947.
35. DEWEY, J. - Theory of valuation. International Encyclopedia of Unified Sciences, Vol. II, Number 4.
36. DOBB, M. - Wages. Cambridge University Press 1946.

37. DOOHER, M.J. and V. Marquis ed. The A.M.A. Handbook of wage and salary administration. New York. American Management Association 1950.
38. DOXEY, G.V. - The industrial colour bar in South Africa. London. Oxford University Press 1961.
39. DUKES, W.F. - Psychological studies of values. Psychol. Bull. 1955, 52, 24 - 50.
40. DUNLOP, J.T. - The theory of wage determination. London. Macmillan 1957.
41. DUNLOP, J.T. - The task of contemporary wage theory in "New Concepts in wage determination" Taylor, G.W. and F.C. Pierson ed. London McGraw Hill 1957.
42. EDWARDS, A.L. - Studies of stereotypes. The directionability and uniformity of responses to stereotypes. J. Soc. Psychol., 1940, 12, 357 - 366.
43. EDWARDS, P.M. - Statistical methods in job evaluation. Advanced Management - 1948, 13, 158 - 163.
44. EITINGTON, J.E. - Cutting the cost of the job evaluation programme. Personnel, 1949, 25, 291 - 294.
45. ELLIOTT, A.G.P. - Job Evaluation: Science Fiction? - Personnel Management, London, 1960, 42, p. 36 - 47.
46. ENGLISH, H.B. and A.V. English - A comprehensive dictionary of psychological and psychoanalytical terms. Longmans Green, London, 1958.
47. FAYOL, H. - Industrial and general administration. London, Sir Isaac Pitman and Sons Ltd., 1930.
48. FISHER, L.V. - as quoted in Proceedings of the 18th Annual National Time and Motion Study and Management Clinic. Chicago, Industrial Management Society, 1955.
49. FLANAGAN, J.C. - The critical incident technique. Psychol. Bull. 1954, 51, 4, 327 - 358.

50. FLANAGAN, J.C. - Techniques for developing criteria of performance. Proceedings of the 12th Congress of the International Association of Applied Psychology. 1955, p. 55 - 61.
51. FRANK, T. - An economic history of Rome. Jonathan Cape. London 1927.
52. GAGNE, R.M. - Methods of forecasting maintenance job requirements - Symposium Electronic Maintenance. Washington D.C. 1955.
53. GALE, J. - Transport notebook: Rumblings in the Underground, p. 3. The Observer, Sunday, January 28, 1962.
54. GILMOUR, R.W. - Industrial Wage and Salary Control. New York. John Wiley and Sons. 1956.
55. GLASS, Y. - The black industrial worker: a social psychological study. Johannesburg, National Institute for Personnel Research, 1960.
56. GLASS, Y. - Industrial Man in Southern Africa. Address to the Institute for the Study of Man in Africa. Johannesburg 1961.
57. GOLDBERG, H. - The case for improving Native productivity and Wages. Quoted by E.R. Silberbauer (158)
58. GOLDSCHMIDT, W. and R.B. Edgerton - A picture technique for the study of values. American Anthropologist 1961, 63, 26 - 47.
59. GRAY, J.S. - Custom made systems of job evaluation. J. Appl. Psychol. 1950, 34, 378 - 380.
60. GRAY, J.S. and M.C. Jones - Ready made versus custom made systems of job evaluation. J. Appl. Psychol. 1951, 35, 11 - 14.
61. GROSS, E. The Occupational Variable as a research category. American Social. Rev. 1959, 24, 640 - 649.

62. GUILFORD, J.P. - Psychometric Methods. New York, McGraw Hill. 1954.
63. HART, H.L.A. - The concept of Law - Oxford. At the Clarendon Press. 1961.
64. HAY, E.N. - Creating factor comparisons key scales by the percent method. J. Appl. Psychol. 1948, 32, 456 - 464.
65. HAY, E.N. - Job evaluation. A discussion. Personnel Journal. 1949, 28, 262 - 266.
66. HAY, E.N. - The application of Weber's law to job evaluation estimates. J. Appl. Psychol. 1950, 34, 102 - 104.
67. HAY, E.N. - The profile method of high level job evaluation. Personnel 1951, 28, 162 - 170.
68. HAY, E.N. and D. Purves - A new method of job evaluation - the guide chart profile method. Personnel, 1954, 31, 72 - 80.
69. HICKS, J.R. - The theory of Wages. London. Macmillan 1932.
70. HILL, J.M.M.H. - The time span of discretion in job analysis. Tavistock Pamphlets No. I. London - Tavistock Publications Ltd. 1957.
71. HILL, J.M.M.H. - A note on time span and economic theory. Human Relations 1958, Vol. 9, No. 4.
72. HOLDEN, C.S. and H.J. Ruttenberg. - The dynamics of industrial democracy. Harper and Bros. New York 1942.
73. HOLT, D. and R.J. Wherry - Relationship of officer personnel to promotion board decisions. HFORL Memorandum No. TN, 54, 12, 1954. as quoted in (92).
74. HORRELL, M. - South African Trade Unionism. South African Institute of Race Relations, Johannesburg. 1961.

75. HORST, P. et al. - The predictions of personal adjustment. New York, Social Service Research Council, 1941.
76. HOWARD, A.H. and H.G. Schutz - A factor analysis of a salary jobs evaluation plan. J. Appl. Psychol. 1952, 36, 243 - 247.
77. HUDSON, W. and C.O. Murray. A methodology for job evaluation studies of tasks performed by Africans in four industrial enterprises. J. Nat. Inst. Personnel Rés., 1958, 7, 83 - 87.
78. HUTT, M.L. and D.R. Miller - Value interiorization and democratic education. J. Soc. Issues 1949, 5, 4, 31 - 43.
79. INTERNATIONAL Association of Machinists. What's wrong with job evaluation? Washington 1954.
80. INTERNATIONAL Committee for Scientific Management - Report of international conference on job evaluation. Geneva. 1950.
81. INTERNATIONAL Labour Office - Job Evaluation. Geneva. 1960.
82. INTERNATIONAL Labour Review - Vol. 79, 1, p. 1 - 24. I.L.O. Geneva 1959. Some aspects of wage policy in the planned economies of Eastern Europe.
83. JAQUES, E. - The changing culture of a factory. London. Tavistock Publications 1951.
84. JAQUES, E. - Measurement of responsibility. London. Tavistock Publications 1956.
85. JAQUES, E. - Equitable payment. London. Heineman 1961.
86. JAQUES, E. - Disturbances in the capacity to work. Int. J. Psychoanal. 1960, 41, 357 - 367.

87. JOHNSON, D.M. - The psychology of thought and judgment. New York. Harper and Bros. 1955.
88. JOHNSON, D.M. - A systematic treatment of judgment. Psychol. Bull. 1945, 42, 193 - 224.
89. JONES, A.M. - Job evaluation of non-academic work at the University of Illinois. J. Appl. Psychol, 1948, 32, 15 - 19.
90. JONES, M.H., S.F. Hubbard and R.H. Haase. - A survey of the literature on job analysis of technical positions. Pers. Psychol. 1953, 6, 173 - 194.
91. JONES, P.W. - Practical job evaluation. John Wiley New York - 1948.
92. KERSHNER, A.M. - A report on job analysis - Office of Naval Research. Department of the Navy Washington D.C. 1955.
93. KING, P.H.M. - Task Perception and interpersonal relations in industrial training II. Human Relations, vol. I, iii, August 1948.
94. KITSON, H.D. - Scientific method in job analysis. Journ. Polit. Econ. 1921, 29, 508 - 514.
95. KNIGHT, G.E. - Fallacies in job evaluation Adv. Managmt. 1950, 19, 6, 21 - 22.
96. KOHLER, W. - The mentality of apes. Kegan Paul - London 1927.
97. KRULEE, G.K. - The Scanlon plan: cooperation through participation. The Journal of Business, vol. 28, No. 2, 1955.
98. LAMONT, W.D. - The value judgment. Edinburgh - at the University Press - 1955.

99. LANGSTROTH, L. - Job evaluation discussion. Person.
J. 1950, 29, 180 - 182.
100. LANHAM, E. - Policies and practices in job evaluation.
Personnel - 1953, 29, 492 - 499.
101. LANHAM, E. - Job evaluation - New York -
McGraw Hill - 1955.
102. LAWSHE, C.H. - The adequacy of abbreviated point
ratings. J. Appl. Psychol. 1945, 29, 117 - 184.
103. LAWSHE, C.H. and S.L. Alessi. - Analysis of another
point rating scale for hourly paid jobs and the adequacy
of an abbreviated scale. J. Appl. Psychol. 1946,
30, 310 - 319.
104. LAWSHE, C.H., E.E. Dudek, and R.F. Wilson. - A factor
analysis on two point rating methods of job evaluation.
J. Appl. Psychol. 1948, 32, 118 - 129.
105. LAWSHE, C.H. and A.A. Maleski. - Analysis of point
ratings for salary paid jobs in an industrial plant.
J. Appl. Psychol. 1946 - 30, 117 - 128.
106. LAWSHE, C.H. and R.F. Wilson - An analysis of the
factor comparison system as it functions in a paper
mill. J. Appl. Psychol. 1946, 30, 426 - 434.
107. LAWSHE, C.H. and G.A. Satter - Studies in job evaluation
I, Factor analyses of point ratings for hourly paid jobs
in 3 industrial plants. J. Appl. Psychol. 1944, 28,
189 - 198.
108. LENIN. - Selected works, vol. vii, p. 332 - 333 -
vol. viii, p. 238 - 246, vol. ix, p. 447.
109. LIVERNASH, E.R. - Job evaluation in W.S. Woytinski
et al - Employment and Wages in the United States -
New York: The Twentieth Century Fund. 1953.

110. LIVERNASH, E.R. - The Internal wage structure in Taylor G.W. and Pierson F.C. New Concepts in Wage Determination - New York - McGraw Hill 1957.
111. LOTT, M.R. - Wage scales and job evaluation. New York, Ronald Press, 1926.
112. LUTZ, L.D. - What kind of job evaluation? Pub. Personnel Rev. 1953, 14, 119 - 122.
113. LYTTLE, C.W. - Job evaluation methods. New York, Ronald Press - 1946.
114. MCGREGOR, D. - The human side of enterprise, McGraw Hill, London, 1960.
115. MCNEMAR, Q. - Opinion attitude methodology. Psychol. Bull., 1946, 43, 289 - 374.
116. McQUITTY, L.L., C. Wrigley and E. Gaier. - An approach to isolating dimensions of job success. J. Appl. Psychol., 1954, 38, 227 - 232.
117. MALLART, J. La profesilogia de España - Antecedes - Psicotecnia, 1945, 5, 29 - 40.
118. MARRIOTT, R. - Some problems in attitude survey methodology. Occup. Psychol. 1953, 27, 117 - 127.
119. MARRIOTT, R. and R.A. Denerley. - A method of interviewing used in studies of workers' attitudes. Occup. Psychol. 1955, 29, 1 - 14.
120. MASLOW, A. - Motivation and Personality. New York - Harper Brothers. 1954.
121. MATCHETT, G.J. - Wages - Encyclopedia Britannica. Chicago. 1956.
122. MAYNARD, H. ed. Industrial Engineering Handbook, McGraw Hill, New York, 1956.

123. MELINSKY, L. and F.B. du Randt - Urban Native Law,
Port Elizabeth, Grotius Publications, 1959.
124. METER, D. - Bantu Wages - Talk broadcast by the
South African Broadcasting Corporation, 16th March, 1962.
125. MICHEL, H. - The Economics of Ancient Greece.
Cambridge, University Press - 1940.
126. MILES, M.C. - Studies in job evaluation: validity of
a check list for job evaluation of office jobs.
J. Appl. Psychol. 1952, 36, 97 - 101.
127. MILL, J.S. - Principle of Political Economy.
Ashley edition - London. Longman's 1909.
128. MILLER, D.R. and M.L. Hutt. - Value interiorization
and personality development. J. Soc. Issues, 1949,
5, 4, 2 - 30.
129. MOTHERLY, R.L. - Job evaluation. Bull. University
Wisconsin, 1947.
130. MURRAY, J.A. - A new English dictionary, Oxford -
University Press 1914.
131. OAKLEY, K.P. - Skill as a human possession in "A
History of Technology". edited by Singer C. et al.
Oxford University Press. London 1954.
132. OLIVER, J.A. and A. Winn. - An abbreviated job
evaluation plan for salaried personnel. Personnel
1951, 28, 225 - 229.
133. OMBREDANE, A. and F. Faverge. - L'analyse du travail.
Paris. Presses Universitaires de France - 1955.
134. OPPENHEIMER, R. quoted in Bruner et al. A study of
thinking. New York, John Wiley 1957.

135. OTIS, J.L. and R.H. Leukart. - Job evaluation - a basis for sound wage administration. New York, Prentice Hall, 1954.
136. PACKARD, V. - The Status Seekers - London Longman's 1960.
137. PATTON, J.A. and C.L. Littlefield. - Job evaluation: text and cases. Illinois, Richard Irwin, 1957.
138. PATTON, J.A., and R.S. Smith. - Job evaluation. Chicago, R.D. Irwin, 1949.
139. PEPPER, S.C. - The sources of value. Los Angeles - University of California Press, 1958.
140. PERRY, R.B. - General theory of value. New York, Longman's Green and Company 1926.
141. PIERSON, F.C. - An evaluation of wage theory in "New Concepts in Wage Determination" ed. Taylor G.W. and F.C. Pierson. New York - McGraw Hill - 1957.
142. PLATO. The Republic (369 B.C.) London, Dent, 1935.
143. POSTAN, M. and E.E. Rich. - The Cambridge Economic History of Europe. Cambridge University Press - 1952.
144. POSTMAN, L. and G.A. Miller. - Anchoring of temporal judgments. The American Journal of Psychology, 1958, 58, 43 - 53.
145. REYNOLDS, L.G. and C.H. Taft. - The evolution of wage structure. London. Oxford University Press 1956.
146. RICARDO, D. - Principles of Political Economy and Taxation (1817). London, Dent - 1923.
147. RICHARDS, I.A. - Practical criticism - a study of literary judgment - London - Routledge and Kegan 1949.
148. ROFF, H.E. and J.W. Baer. Job analysis, O.E.E.C. Paris, 1956.

149. ROGER, J.E.T. - Six centuries of work and wages. London, Unwin 1919.
150. ROGERS, R.C. - Analysis of two point rating job evaluation plans. J. Appl. Psychol. 1946, 30, 579 - 585.
151. ROSENBERG, M. - Occupations and values. Glencoe. The Free Press, 1957.
152. ROSS, W.D. - Foundations of Ethics. Oxford, The Clarendon Press 1939.
153. RUPE, J.C. - Research into basic methods and techniques of Air Force job analysis. I. U.S. Air Force - Human Resources Research Centre, Lackland Air Force Base. Technical Report 52 - 16. December 1956.
154. RUSH, C.H. and R.M. Bellows, jnr. - Job evaluation for a small business. Pers. Psychol. 1949, 2, 301 - 310.
155. SAYLES, L.R. - Worker values in job evaluation. Personnel 1954, 30, 266 - 274.
156. SELLS, S.B. - The atmosphere effect. Arch, Psychol., 1936. No. 200.
157. SHEN, E. - The reliability coefficient of personal ratings. J. educ. Psychol. 1925, 16, 232 - 236.
158. SILBERBAUER, E.R. - Bantu wages: achievements to date and further possibilities. Talk broadcast by South African Broadcasting Corporation - 9th March, 1962.
159. SIMON, H.A. - Administrative Behaviour. Macmillan - New York - 1957.
160. SIMON, H.A. - The compensation of executives. Sociometry. 1957, 20, 32 - 35.
161. SINGER, C. et al ed. A history of technology. Vol. 1, London. Oxford University Press 1954.

162. SINGER, S.L. and B. Steffere - Age differences in job values and desires. J. Counsel Psych. 1954, 1, 89 - 91.
163. SINGER, S.L. and B. Steffere - The relationship of job values and desires to vocational aspirations of adolescents. J. Appl. Psychol. 1954, 38, 419 - 422.
164. SMITH, A. - Wealth of Nations (1826). New York, The Modern Library, 1937.
165. SMYTH, R.C. and M.J. Murphy - Job evaluation and employee rating. New York, McGraw Hill. 1946.
166. SOMMERFELT, A. - Speech and language in a history of technology - Singer, Holmyard, Hall ed. Oxford University Press 1954.
167. STANWAY, H.G. - Applied job evaluation: a manual of installation and operating methods. New York. Ronald Press. 1947.
168. STIEBER, J. - The steel industry wage structure. Cambridge; Harvard University Press. 1959.
169. TRATHNER, M.H. and J.F. Kubis - A comparison of worker requirement ratings made by reading job descriptions and by direct job observation. Personnel Psychol. 1955, 8, 183 - 194.
170. TURNER, W.D. - The "percent" method of job evaluation. Personnel 1948, 24, 6, 476 - 492.
171. TURNER, W.D. - Mathematical bases of "percent" job evaluation. Personnel 1948, 25, 2, 154 - 160.
172. TURNER, W.D. - Some precautions in the use of the % method of job evaluation. J. Appl. Psychol. 1949, 33, 547 - 552.
173. UNITED NATIONS - Economic Survey of Europe in 1955. Research and planning division economic commission for Europe. Geneva, 1956.

174. VILJOEN, F.J. - Some economic views on the increase of Bantu Wages by South African Industries - Talk broadcast by South African Broadcasting Corporation, 2nd March, 1962.
175. VITELES, M.S. - Industrial Psychology. New York. W.W. Norton and Co. 1932.
176. VITELES, M.S. - A psychologist looks at job evaluation. Personnel, 17, 3, 1941, 165 - 176.
177. WAR MANPOWER Commission Division of Occupational Analysis: Training and Reference Manual for Job Analysis. Washington 1944.
178. WEVER, E.G. and K.E. Zener - The method of absolute judgment in psychophysics. Psychol. Rev. 1928, 466 - 493.
179. WOOTON, B. - The social foundations of wage policy. London. George Allen and Unwin Ltd., 1955.
180. ZERGA, J.E. - Job analysis: A resumé and bibliography. J. Appl. Psychol. 1943, 27, 249 - 267.

APPENDIX A

J.D. 3 M. Schedule

7043/8042 JD3m NEW

N.I.P.R. 999

DATE ANALYST

DEPARTMENT BRANCH

LOCALITY SECTION

NAME OF JOB ANALYSED

UNOFFICIAL NAME (IF ANY)

NUMBER OF JOB INCUMBENTS

IMMEDIATE SUPERVISOR OR SUPERIOR OF EMPLOYEE:

(a) EUROPEAN

(b) NON-EUROPEAN

WAGE FOR JOB:

GRADES					
MINIMUM					
C.O.L.					
INCREMENT					
C.O.L.					
MAXIMUM					
C.O.L.					

ADDITIONAL WAGE ALLOWANCES:

.....

ADDITIONAL PRIVILEGES IN JOB:

.....

Must the worker supply his own protective clothing?

Must the worker supply any additional form of
equipment?

YES	NO

Explain if necessary

.....

GENERAL DESCRIPTION OF DUTIES OF EMPLOYEE

Where a job consists of a number of distinct, unrelated, separate units, enumerate each unit (viz. 1, 2, 3 etc.,) and describe them in order of importance. Try to give the relative frequency with which the worker is occupied with each unit (viz.takes sample three times a week, ten minutes work on these days),or cleans laboratory for greater part of his shift every day.

DESCRIPTION	FREQUENCY
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.....

Where any section of this schedule applies to some units of the job and not to others, indicate in the section the units to which it applies. Where a worker has additional duties which are not officially a part of his job, (viz. where a worker is "lent" to another section or department when he is not busy) make this quite separate from his official job.

SECTION 1.

EDUCATIONAL BACKGROUND.

This section deals with the amount of knowledge or schooling required before a worker is considered for the job.

1. GENERAL EDUCATION:

(a)	None	Elemen- tary Grades, incl. Std. 2	Std. 4	Std. 6	Std. 8	Matric	Addi- tional Train- ing	Post- Matric Train- ing	(1)
	1								
	2								

NOTE: The training here referred to means training before commencing on the job and not job training.

1 = Council's Standard of Education.

2 = Analyst's own assessment of required standard.

(b) Give details of any additional post-school or post-matric training necessary:

2. READING: Give a characteristic sample of material which must be read and understood. Where the worker learns certain symbols by experience but cannot read them in the accepted sense of the word, your answer should be none.

.....
.....

None	Clear Letters	Simple Sentences	Reports, Letters	Advanced Tech. Matter	(2)

3. WRITING: Give a characteristic example of writing required:

.....

None	Simple Lettering	Simple Sentences	Reports, Letters	Advanced Tech. Matter	(3)

4. ARITHMETIC: Give instances which indicate the degree of knowledge required:

.....

None	Deals with whole numbers	Simple Calcula- tions (+, -)	Fairly Complex calculations (+, -, x, ÷ fractions, decimals)	Complicated Formulae, Calculations	(4)

SECTION 2.

WORK BACKGROUND.

This section deals with what training the worker must have before being considered as suitable for the job.

1. What operations, relating to the work, must the worker know before being considered for his job?

.....
.....

Minimal (Pick and Shovel)	Little Training (General 'Household' work)	Fair Degree of Training (Producer Fire Boy)	Extensive Training (Lawn Mower Operator)	Must be fully trained on jobs	(5)

2. Take into account the complexity of the sequence of activity of the operation.

Explain
.....

Simple Sequence (e.g. Pick and Shovel)	Long Repeti- tive Sequence (Producer Fire Boy)	Long Variable Sequence	Complex Sequence requiring variable response.	Complex Sequence requiring consi- derable learning and theoretical knowledge	(6)

3. What equipment must the worker know how to use himself before being employed (Do not describe screwdrivers, spanners, etc., separately, but list them as "Tools used in Builders trade, etc." or whatever the case might be).

.....

None	Everyday implements (brooms, dusters, etc.)	General Knowledge	Considerable Knowledge	Considerable Knowledge in- volving theo- retical back- ground	(7)

4. What equipment is the worker expected to be familiar with before being employed without necessarily being able to use it himself (Again do not itemise equipment).

.....

Minimal	General Knowledge	Considerable Knowledge	(8)

5. Is linguistic ability necessary in the job applicant?

Explain -

.....

.....

.....

.....

.....

.....

.....

.....

Minimal	One or Both Official Languages	Official Languages and Four Vernaculars (e.g. Police Boys).

(9)

6. For Clerical Jobs only:

What knowledge of office routine is necessary before
being employed?

Give example -

.....

.....

.....

.....

.....

None (Straight from School)	Minimal (General Of- fice Work)	Average (Telephone Operator)	Considerable (Clerical Operator)	Extensive

(10)

NOTE: Extensive knowledge of office routine may well be possible without any knowledge of typing, using calculating machine, etc.

SECTION 3.

JOB TRAINING.

This section assesses the degree of on-the-job training necessary for satisfactory performance. Where there is no accepted training procedure, the analyst may have to rely entirely on the estimates of the European Supervisors directly concerned with such training.

Yes	No

1. Is the worker fully trained prior to employment?
2. Is the worker partly trained prior to employment?

If the answer to 2 is YES, what additional training must he get on the job?

.....

3. Does the job require that the worker should be trained for some time?

.....

Minimal	Less than 2 weeks	Less than 1 month	Less than 3 months	More than 3 months (state)

(11)

4. How much care, time and teaching must be given to train an average worker for the job? By whom must he be trained?

.....

Minimal	Occasional	Fairly Considerable	Extensive	Full-time Training

(12)

5. Where a job is composed of units, as described on page 2, enumerate those in terms of training required for each:

MOST TRAINING:

LEAST TRAINING:

6. Does the learning of the task involve more than can be communicated by verbal instructions, i.e. does the worker have to learn the correct 'feel' for himself?

Explain:

.....

.....

.....

.....

SECTION 4.

EXTENT OF KNOWLEDGE ON THE JOB.

This section endeavours to assess the amount of knowledge which a worker must have to perform satisfactorily.

1. What is the degree of complexity of the sequence of activities of the job?

Explain:

Simple Sequence (Pick and Shovel)	Long Repetitive Sequence	Long Variable Sequence	Complex Sequence requiring Variable Response	Complex Sequence requiring considerable learning and theoretical knowledge

(13)

2. What checks must be made by the worker to ensure that his work is going smoothly?

.....

Minimal			Straight-forward checks			More Complicated checks			A = Frequent B = Occasional C = Very Occasional	(14)
A	B	C	A	B	C	A	B	C		

3. What equipment must the worker know how to use himself? (Do not describe screwdrivers, spanner, etc. separately, but list them as "Tools used in builders trade, etc." or whatever the case might be).

.....
.....

None	Everyday Implements	General Knowledge	Considerable Knowledge	Considerable Knowledge involving theoretical background

(15)

4. What equipment is the worker expected to be familiar with without necessarily being able to use it himself? (Again do not itemise equipment).

.....

Minimal	General Knowledge	Considerable Knowledge

(16)

5. Do you see any evidence that the worker discriminates between tools and/or objects, using cues other than obvious ones, e.g. numbers, names?

.....

6. What knowledge of standing rules and regulations is required in the job?

.....

Those applicable to all employees only (Minimal)	Additional Rules specific to Job	Fairly extensive knowledge (Police Boys, Drivers)	Complex Knowledge (Clerks dealing with legal documents).

(17)

7. Are there ANY incentive and promotion schemes which the worker knows about?

.....

.....

8. For Clerical Jobs only: What knowledge of office routine is necessary? Describe and give examples:

.....

.....

.....

.....

.....

.....

Minimal (General Office work)	Average (Telephone Operator)	Considerable (Clerical Operator)	Extensive

(18)

NOTE: Extensive knowledge of office routine does not necessarily entail knowing how to use typewriter, calculator, etc.

SECTION 5.

MENTAL SKILLS.

This section is aimed at assessing the degree to which judgement, insight and mental ability is necessary in the job.

1. To what degree is judgment necessary in the job?
(Judgment is here defined as the checks and comparisons the worker must make mentally in order to determine future action).

.....

Low (Street Sweeper)	Below average (Producer fire boy, striker boy)	Average (Telephone Operator)	Above average (Nurse)	High (Surveyor, Social worker)

(19)

2. What ability must the worker have to solve new problems in his work as opposed to problems he deals with every day?

.....

Low (Street Sweeper)	Below Average (Telephone Operator)	Average (Nurse)	Above average (Midwife, Surveyor)	High (Social worker, Doctor)

(20)

3. To what degree does the job require mental ability in the worker? (Distinguish between mental ability and attention).

.....

.....

Low (Street Sweeper)	Below average (Producer fire boy, striker boy)	Average (Telephone Operator)	Above average (Nurse)	High (Surveyor, Social worker)

(21)

SECTION 6.

MENTAL EFFORT.

This section is aimed at assessing mental effort and for the purposes of this section, mental effort is taken as being independent of mental ability.

1. To what degree does the work demand full attention of the worker?

.....

Low (Street Sweeper, Trench digger)			Below Average (Producer Fire Boy)			Average Amount of Contentra- tion (Lawn Mower Driver)			Above average (Lorry Driver)			High (Striker Boy, Doctor)		
A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

(22)

2. What degree of vigilance is required for this job?
(Does it require of the worker to be mentally alert and ready for any action following any particular cue or signal, other than stereotyped or accustomed reactions)?

.....

.....

.....

.....

Low (Producer Fire Boy, Street Sweeper)			Below Average (Social Worker)			Average (Lawn Mower Driver)			Above Average (Steam- hammer boy)			High (Lorry Driver)		
A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

(23)

- A = Continual
B = Paid part of shift
C = Occasional.

SECTION 7.

PHYSICAL SKILLS.

This section endeavours to assess the degree of physical skill involved in the effecient performance of the job. Physical skills are here defined as co-ordination between sensory cues and motor responses.

1. Must a high degree of muscular control be exercised in performing the task, or is there a wide margin of tolerance?

None (Police Boy Clerk)	Minimal Muscular Control (Street Sweeper, Artisan Hand)	Fair Degree of Muscular Control (Producer Fire Boy)	Muscular Control of Primary Importance

(24)

2. To what degree does the worker have to distribute his attention to receive or collect the sensory cues necessary for the correct response?

.....

Not necessary	Minimal	Significant	Extensive

(25)

3. Are there any elements of the job requiring timing of motor behaviour in response to sensory stimuli? Discuss -

.....

Try to estimate the degree to which such timing is important in the job.

Not necessary (e.g.) Police Boy Clerk)	Minimal (Pick and Shovel work)	Important but with Fair de- gree of Lati- tude	Essential

(26)

4. To what degree are physical skills necessary in the job?

.....

Not necessary	Minimal	Significant	Essential

(27)

5. To what degree is motor accuracy important in the job?

.....

Not important (Clerk, Police Boy)	Incrcasing Degree of Tolerance of Error			Essential (Striker Boy)
	e.g. Pick & Shovel Wor- ker	e.g. Producer Fire Boy	e.g. Lorry Driver	

(28)

SECTION 8.

PHYSICAL EFFORT.

This section deals with the physical exertion required by the job and the frequency with which such physical exertion occurs. The letter A represents physical exertion throughout the shift. The letter B represents physical exertion for a fair part of the shift. The letter C represents occasional physical exertion only during the shift.

1. Predominant working position:

Describe:

Sitting (e.g. Clerical Work)	Standing	Moving (by own musculature)	Awkward positions

(29)

2. This question refers to the extent to which weights are handled in the job. It should not be filled in in respect of tasks which do not have some meaningful degree of physical exertion (viz. worker lifts spanners out of a box, or clerk carries briefcase weighing $5\frac{1}{4}$ lbs.) Fill in the appropriate square in the table and make a rough estimate of the time spent in such tasks.

Handled over long distances				A			
Handled over fair distances				B			
Handled over short distances				C			
	Light	Medium	Heavy		Light	Medium	Heavy
	Weight				Weight		

Explanations: (if necessary)

.....

3. What degree of physical exertion does the daily work routine entail?

Explain:

.....

Degree of Exertion	Hardly any (Clerks etc.)			Minimal			Average			Maximal		
Amount of Time Spent												
	A	B	C	A	B	C	A	B	C	A	B	C

(30)

NOTE: In questions 2 and 3, if more than one category is applicable, these should also be fitted in.

4. With particular reference to questions 2 and 3, what muscle groups are predominantly used in the activity? Are any muscle groups used in particular against a background of use of all the body's musculature? Are the movements made of a variable or stereotyped kind?

.....
.....
.....
.....

5. Is the job one which by its very nature involves short periods of exertion alternating with periods in which no further work can be done?

Yes	No

Explain:

..... (31)

.....

6. The pacing of the job is determined by:

A Machine	The Team (Artisan or Supervisor)	The Worker (i.e. unpaced)

7. (a) Does the job involve

5	6	7

 days a week.

(b) What are the hours of work?

(c) What is the length of the shift in minutes?
.....

(d) Estimate roughly the number of minutes of work per hour on shift?

(e) What is the length of the lunch period?

(f) Are there any additional rest periods?

Describe:

Have systematic studies and observation helped to determine these rest periods?

(g) Are there any mechanical aids (here defined as devices to minimise physical exertion such as pulleys, trolleys, barrows, etc.) in this job? Describe:

.....
.....

SECTION 8: RESPONSIBILITY FOR EQUIPMENT AND MATERIAL

This section attempts to assess the extent to which the worker is responsible for equipment and material. Responsibility for material which is guarded (case of police boys, etc.) should be considered only in Question 7.

1. Give a detailed list of equipment which the worker:-

A Uses himself	B Handles	C Has occasional contact with
.....
.....
.....
.....
.....
.....
.....

2. What is the probability of equipment in each of the above three categories becoming damaged due to the fault of the worker? Indicate in table below:

Categories above	A			(32)
	B			(33)
	C			(34)
		Remote	Has happened once or twice	Has happened more often

3. Where the worker himself uses equipment, what is the value of the equipment?

£1	£1 - 10	£11 - 50	£51 - 200	Over £200 (State approximate value)

(35)

4. Where the worker handles any material, what is the value of such material?

Little value (Cheap and easily available)	Some value (Mishandling might involve expense of a few pounds)	Valuable Material (error in handling might involve expensive replacement)

(36)

5. What is the probability of such damage as mentioned in 4 above arising through the fault of the worker?

Remote	Has happened once or twice	Has happened more often

(37)

6. What degree of inspection is necessary by the worker for taking reasonable care of equipment and/or material?

Explain:

.....

Casual Inspection	Set Routine	Complex Inspection

(38)

7. Where the worker is responsible for guarding buildings, equipment, material, etc., discuss the nature of his responsibility.

.....

.....

.....

.....

.....

.....

SECTION 10:

RESPONSIBILITY FOR PERSONAL CONTACTS.

This section attempts to assess the degree of responsibility for personal contacts the job makes upon the worker.

1. To what degree does the worker come into contact with:

	No Con- tact	Purely Inci- dental	An essential ele- ment of the job.		
			Occasional	Frequent	
a) The European Public					(39)
b) The non-European Public					(40)

2. What is the level of such contact? Although technically-speaking all Municipal Employees are servants, one can draw a clear distinction between rubbish collectors, telephone operators and doctors or midwives. The aim of the question is to make this distinction. Explain:

.....

	As Servant	Higher level	
a) European public			(41)
b) Non-European public			(42)

3. What is the nature of the contact?

.....

4. How tactful must the worker be in such contact?

.....

.....

Try do assess this:-

	Merely has to avoid rudeness	Has to show fair degree of tact	Has to display considerable tact (Traffic Inspectors, etc)	
a) European public				(43)
b) Non-European public				(44)

5. Are there any aspects of this job that makes dealing with other employees of Council a special feature? Explain:

.....
.....

6. List the persons supervised by the worker:

--	--	--

Comment if necessary
.....

- 7.

	Instructions given to Supervisor	
	Broad Directive (He must fill in details)	Very specific instructions (No planning necessary)
Supervisor is apart from Group		
Supervisor works within the Group		

(45)

Comment if necessary
.....

8. What technical knowledge must the supervisor have concerning the job he is supervising, i.e. must have learnt the jobs thoroughly before being made a supervisor?

Comment
.....

The supervisor must know:-

Nothing about the work supervised	Only as much as the Workers	More than the Workers

(46)

9. What instructions must the supervisor convey to his workers?

Give examples:
.....
.....
.....
.....
.....
.....

Simple	Fairly Straightforward	Complex

(47)

10. On what types of tasks is the supervisor expected to supervise?

Give examples:
.....
.....
.....
.....
.....
.....

Simple	Fairly Straightforward	Complex

(48)

SECTION 11:

WORK SURROUNDINGS.

This section endeavours to assess those environmental or physical conditions under which the worker must perform his job and over which he has no control.

1. Is this job carried out

Indoors	Outdoors	Both

2. If the work is done outdoors, what happens in bad weather? Explain:

.....

Stops Work completely	Is employed on other work	Continues despite weather

(49)

3. Under what predominant conditions does the worker perform his duties?

High degree of Discomfort	Some Discomfort	Reasonable	Good

(50)

4. Indicate factors below which cause unsatisfactory work surroundings.

Fumes	Heat	Glare	Vibration	Weather
Gas	Cold	Noise	Dust	Steam
Unpleasant Smells	Any Others			

(51)

5. Discuss these conditions giving the cause, frequency and the degree of discomfort:

.....

.....

.....

.....

.....

.....

.....

SECTION 12.

WORK HAZARDS.

This section of the schedule deals with the degree of exposure to accidents and the probability of resulting injury.

1. Do the job methods currently used incorporate some danger elements for the worker?

Yes	No

(52)

2. Indicate types of accidents which may occur in this job:

Heights	Traffic	Sharp Instruments	Acid	Any other
Dropped objects	Moving Objects	Heavy Objects	Electric Shocks	
Flying Parts	Machinery	Hot material	Depth	

(53)

3. Discuss with reference to actual records, if possible, types of accidents which have occurred.

.....
.....

4. What are the possibilities of injury to the worker in this job?

Frequently happens			Has happened once or twice			Remote		
A	B	C	A	B	C	A	B	C

A = Major Injury
B = Injury causing 1-7 days absence of work
C = Minor Injury (54)

5. Do the work methods currently used incorporate some danger elements for fellow workers through some fault of the worker?

(Try to assess in terms of reality)
.....

Frequently happens			Has happened once or twice			Remote		
A	B	C	A	B	C	A	B	C

A = Major injury
B = Injury causing 1-7 days absence of work
C = Minor Injury (55)

6. Does the worker have to know any safety regulations apart from these:

(a) Applied to all employees in Department

(b) Applied to all employees in Section

Yes	No

Discuss:

.....

7. What degree of knowledge must the worker have of Safety Regulations?

Minimal	Some	Extensive

(56)

8. Rank types of accident in order of frequency of occurrence (viz. 1, 2, and 3).

The material being handled	Machines or Tools used	The work location

- (a) Have the workers or supervisors been trained in any methods of accident prevention?

- (b) Are accurate accident records kept?

Yes	No

APPENDIX B.

Jobs selected for job analysis experiment.

Group 1. Skilled jobs.

1.1 Technical assistant - trained by the municipality as a surveyor and skilled in precise levelling, making the necessary calculations and drawings, and at times called upon to supervise the construction of buildings, the excavation of sewers, etc.

1.2 Ambulance driver - trained in first aid and responsible for collecting and delivering patients who reside in a large section of the townships. This requires him to know the layout of a large urban sector, and to maintain his vehicle, at a superficial mechanical level.

1.3 Motor mechanic - trained artisan who carries all mechanical work connected with the repair and maintenance of motor vehicles (petrol and diesel), cement mixers, compressors and mechanical rammers. He carries out, in addition, electrical repairs to vehicles, and welds chassis, gear boxes using an oxy-acetylene torch.

1.4 Clerk-cashier - works behind a counter receiving cash from the Non-European public in payment of rent, electricity deposits and for any of the services supplied by the municipality, e.g. the hire of hearses. He issues receipts and makes entries on Burroughs machines. At the end of the day balances the cash receipts with the total registered by the machine.

1.5 Carpenter - trained artisan mainly engaged in the erection of roofs to houses, hostels and schools. He may at times be involved in other activities on a building site, e.g. the hanging of doors or else to do woodwork in a joinery shop.

1.6 Bricklayer teamleader - trained artisan working with a group of four bricklayers to erect weekly a set quota of houses. He acts as their teamleader which means that in addition to maintaining the pace and ensuring that quality standards are observed, he does all the bricklaying of the corners in houses.

1.7 Foreman bricklayer - he is responsible to a civil engineer of the municipality for the complete erection of a weekly quota of houses. He controls about 160 artisans and is assisted by teamleaders and assistant foremen. He requisitions materials, plans the flow of work, deals with disciplinary matters, and inspects the quality of finished work.

1.8 Senior Nurse - she is responsible for supervising and co-ordinating the activities of 34 qualified nurses in a municipal clinic. She allocates duties, checks report books, ensures that quality standards are maintained, and controls the issue of medical stocks, linen, etc.

1.9 Drainlayer - trained artisan in charge of a team of three workers, whose task is to lay pipes in sewer trenches. He must establish levels between manholes from pegs set by the surveyor; he assists in the laying of earthenware pipes, an activity which requires a judgment and manipulation to ensure that levels and slopes are achieved. The work is repetitive.

1.10 Traffic inspector. He controls pedestrian and motor traffic in urban areas, either in the townships or in the industrial portions of the European district which have large numbers of African pedestrians. This involves him in scholar and pedestrian control, in patrol duties and in the preparation of reports and indictments, where traffic by-laws are contravened.

Group 2. Semi-skilled jobs.

2.1 A.D.V. (animal drawn vehicle) driver. He drives, through the European and African districts, a refuse collection vehicle, drawn by 6 mules. He must negotiate town traffic and manoeuvre the vehicle at the refuse dump to tip its contents in a given spot. He is assisted by two refuse removers (dustmen) whose pace of work he maintains, he levels the refuse in the vehicle, and checks spillage. He grooms his animals, and checks daily on the general condition of his vehicle.

2.2 Survey employee - his main function is to assist a fully qualified European surveyor to take precise measurements in the field. He works at some distance from the surveyor, must anticipate the various stages in measurement, and understand instructions given by means of hand signals. He reads out measures on a tape and on a telescopic surveying staff. He must be relied upon to hold the tape at the correct tension and the staff at an angle of 90 degrees. He acts as general assistant, collecting equipment, transporting it, setting tripods in position and digging out pre-positioned pegs.

2.3 Bossboy: road construction gang. He supervises a gang of 20 road workers, by ensuring that they maintain a reasonable pace of work, he conveys to them instructions given by the constructor; and assists him in his inspection of levels and slopes by helping him to use spirit levels, boning rods and straight edges. Crude reference points are given to the bossboy who must then ensure that required levels and slopes are achieved almost entirely by visual checks and without the use of instruments. He is responsible for the safe-keeping of equipment on the work site.

2.4 Area bossboy. He supervises the removal of refuse and the cleaning of streets in an urban district. He travels from point to point on a bicycle and is responsible for the work of fifteen street sweepers and twenty refuse removers. He checks on work done, ensures that standards of cleanliness are maintained, notes down complaints from European householders. He may take action himself or report the matter to his overseer.

2.5 Senior compound clerk. He deals with the personnel records of 2,000 labourers attached to a cleansing depot and housed in a compound. He is assisted by four clerks, ensures that records are kept up-to-date, and abstracts from them information for various returns to central administration of the department, e.g. time sheets, special accident forms. He interviews work seekers, engages them, and directs them to various sections of the department.

2.6 Lorry driver. He drives a 5-ton truck transporting building materials from stores to sites. He transports labour early in the morning and at the end of a shift. He is held responsible for the material transported, ensures that the quantities issued tally with the requisitions. He is assisted by four labourers who handle material and equipment.

2.7 Concrete mixer operator. He operates a power-driven concrete mixer. He ensures that the correct quantities of various ingredients are poured into the bowl of the mixer, operates the mixer until the amalgam is of the correct consistency, then tilts the bowl to pour concrete into barrows waiting below a platform.

2.8 Road rammer operator. He operates an internal combustion power rammer which is used for stamping down earth, gravel, asphalt. The essence of his skill lies in his being able to ignite the explosion when the rammer has hit the ground and immediately before it recoils upward. He must moreover, manoeuvre the rammer at the apex of its upward flight when it has little weight. He fuels and oils his machine and cleans the spark plug at regular intervals.

2.9 Chief time-keeper's clerk. He controls and checks the work of ten African clerks who transcribe information, i.e. badge numbers, hours worked, etc... from daily time sheets into returns forwarded to central administration. As the work is done for the first time by Africans, it is extensively checked. When errors occur, he must be sufficiently experienced to spot quickly its probable cause and to rectify it. Work is done under pressure as the computation of the weekly pay roll depends upon it. He deals directly with pay queries brought to his office either by European supervisors or African workers.

2.10 Pneumatic drill operator. He operates a jack-hammer or pneumatic drill both driven by compressed air. The essence of his job lies in his being able to control a heavy, vibrating piece of equipment (100 lbs in weight and 6ft long) as well as apply sufficient muscular pressure to penetrate into rock or ground. He must check visually that the direction of the hole and its depth will satisfy the blasting requirements. He works generally in wet and dusty conditions. He cleans and lubricates his machine periodically.

2.11 Compressor boy. He operates a diesel-powered air compressor machine. He connects the batteries to terminals, turns on fuel and air cocks, disengages clutch, places valve control in "NO COMPRESSION" position, releases air from fuel system, and pulls the fuel control system to start. He starts the motor with a crank, runs the engine light for five minutes, and then engages the clutch. He does little else besides watching that the air pressure remains satisfactory by watching a gauge and listening to the pitch of the engine. He greases and cleans the machine at regular intervals.

2.12 Pointsman: tramways. He adjusts "points" in the track of trams and "frogs" in the overhead wire to direct trams into their proper course, i.e. to a given shed or on the outgoing track. He operates points by inserting a rod in the track; the frog is operated by pulling a wire attached to a pole. He controls at least two sets of points and frogs. He must operate point and frog almost simultaneously and unerringly at peak periods. He must contend with heavy motor traffic.

2.13 Senior recorder. He controls the work of 28 African clerks employed in the central time office. Their job is to sort, stamp, classify 18,000 Hollerith cards every week. He allocates African escorts for paymasters going out every week, and deals with pay queries brought to his office. He checks requests to go on leave against personnel records, and deals with various personnel records of the clerks in his department.

2.14 Nursing assistant. She assists in the general work of a hospital ward undertaking a series of duties which range in skill. She makes beds, washes and feeds patients, watches them in the absence of a trained nurse, takes temperatures, as well as dusting the furniture, sweeping floors and doing a number of household duties. She must adhere to a strict code of hygiene.

2.15 Clinic clerk. He establishes, maintains and files the records of a large number ($\pm 2,000$) of out patients attending an ante-natal clinic. The responsibility of the job is reflected by the distress which would result from an error. A blood test result entered in the wrong card would mean that a syphilitic remains untreated and possibly infects her foetus, whereas a perfectly healthy woman is told that she suffers from a venereal disease. He compiles monthly statistics of cases treated at the clinic.

2.16 Cycle truer. He repairs tubes used in animal-drawn vehicles and in tricycles of council. He operates a simple vulcanizing machine. He also maintains and repairs a number of bicycles or tricycles used in the council. He must diagnose malfunctions, dismantle and re-assemble parts, and replace spares.

2.17 Steam roller fire boy. He services a steam-powered heavy roller used in road work. He lights and attends to the fire, cleans the steam tubes in the boiler, fills the bunker with coal and the tank with water, oils and greases various points in the roller. He guards the road construction camp for the rest of the day.

2.18 Plasterer. He covers brick wall surfaces with mortar to give it an even surface and to cover any errors in the quality of the brickwork. The essence of the job lies in his ability to throw mortar from board to wall without spilling and applying the trowel before the blob falls off. He must, in addition, be able to judge whether the surface is level, and prevent too much mortar building up in one spot. He checks on his work by means of spirit level and straight edge, he scrapes off excess mortar and adds mortar where cavities show. He serves a two years apprenticeship in which he is taught how to obtain smooth surfaces, lay concrete floors and steps.

2.19 Sergeant - Induna. His main function is to maintain discipline, law and order in a compound which houses 1,600 African workers. He is assisted by 5 corporals and 28 policemen. He must be able to assess the prevalent mood of workers and to prevent as far as is possible unrest and violence. He makes sure that all workers housed in the compound have left for their jobs, and that those who are left behind have a valid reason. He acts as headman when workers or their relatives involve him in their domestic quarrels. He supervises the cleanliness of the compound and directs the work of 30 cleaners.

2.20 Mechanic's hand. He assists a European motor mechanic engaged in the routine inspection of motor bus engines. He prepares the work site by laying out the tools, and carrying out a number of preliminary operations, e.g. emptying the sump of oil. He hands out tools, assists the mechanic by holding tools or applying counter force, and runs errands for him.

Group 3. Unskilled jobs.

3.1 Sewer blockage labourer. He removes blockages in sewers either manually or else by using lengths of sewer rods. He may have to excavate ground to go to the sewer or else may go down a manhole, after necessary safety precautions have been taken. He works in a gang of four.

3.2 Watchman. He stands at the gate of a large municipal workshop and guides incoming and outgoing vehicles. He locks various doors and gates at the end of the work shift, and thereafter patrols yards and reports anything suspicious to the police, or summons help.

3.3 Battery boy. He tops up batteries in a bus garage, with distilled water. He checks on the terminals, reports whether they are corroded, and notes on a card whether the battery appears to be leaking or needs attention.

3.4 Coal offloading gang labourer. He offloads coal from railway trucks into special bunkers. He opens the truck door and then proceeds to shovel the coal out. He may have to sweep around a bunker or else dislodge coal which has packed into a bunker by going into it, attached to a safety belt.

3.5 Subway cleaner. Slaughterers in an abattoir remove the edible parts from a carcass. The remnants, e.g. unborn calves, diseased udders, the contents of stomach and bowels slide down a chute into a subway. Here the subway cleaner removes all solid parts, places them in a trolley and pushes the semi-liquid matter down a sewer. Walls of the subway and the floors are hosed and scrubbed with steel wire brushes.

3.6 Office cleaner. He dusts, sweeps and cleans a suite of offices. He makes and serves tea to office staff three times a day and carries heavy parcels and ledgers when called upon to do so.

3.7 Compound cleaner. He sweeps floors in the dormitories, washes down and sweeps gutters, removes solid refuse from bins, and hoses down the yard.

3.8 Road gang labourer. He excavates the shallow bed on which the road will be laid, carries material from heaps on wheelbarrow, spreads gravel and rakes it smooth, and levels pavements, applying tarmac haunching.

3.9 Foundry pot boy. Assists European moulders in a foundry by carrying pots of molten metal from furnace to mould in a pot held in a brace. The moulder directs the pour and the pot boy supplies the necessary leverage. He undertakes a number of additional labouring duties, e.g. shovelling sand into frames, removing cores, cleaning moulds.

3.10 Bricklayer's labourer. Assists bricklayer by collecting bricks, positioning them in a heap next to the wall being erected, fetching mortar from cement mixers, erecting scaffolds, and cleaning site of rubble.

APPENDIX C.

Communication from R.S. Hall re Method of Analysis.

(I)

Given: 4 scores $A_1 B_1 C_1 D_1$ on each of 20 jobs and another 4 scores $A_2 B_2 C_2 D_2$ on each of 10 jobs together with the corresponding Means and Standard Deviations.

Required: The significance of the difference between $\overline{(A_1+B_1)-(C_1+D_1)}$ and $\overline{(A_2+B_2)-(C_2+D_2)}$ working from the original distribution of the 8 scores.

Analyses:

$$(i) \quad \overline{(A_1+B_1)-(C_1+D_1)} = \bar{A}_1 + \bar{B}_1 - \bar{C}_1 - \bar{D}_1$$

$$\overline{(A_2+B_2)-(C_2+D_2)} = \bar{A}_2 + \bar{B}_2 - \bar{C}_2 - \bar{D}_2$$

(ii) The standard deviation of $\overline{(A_1+B_1)-(C_1+D_1)}$ is:-

$$\sigma_1 = S.d._1 = \sqrt{\left[\sigma_{A_1}^2 + \sigma_{B_1}^2 + \sigma_{C_1}^2 + \sigma_{D_1}^2 + 2\sigma_{A_1 B_1} \sigma_{A_1 B_1} r_{A_1 B_1} - 2\sigma_{A_1 C_1} \sigma_{A_1 C_1} r_{A_1 C_1} - 2\sigma_{A_1 D_1} \sigma_{A_1 D_1} r_{A_1 D_1} - 2\sigma_{B_1 C_1} \sigma_{B_1 C_1} r_{B_1 C_1} - 2\sigma_{B_1 D_1} \sigma_{B_1 D_1} r_{B_1 D_1} + 2\sigma_{C_1 D_1} \sigma_{C_1 D_1} r_{C_1 D_1} \right]}$$

where $r_{A_1 B_1}$ is the correlation between scores A_1 and B_1 over the 20 jobs.

Likewise the Standard Deviation of $\overline{(A_2+B_2)-(C_2+D_2)}$ is:-

$$\sigma_2 = S.d._2 = \sqrt{\left[\sigma_{A_2}^2 + \sigma_{B_2}^2 + \sigma_{C_2}^2 + \sigma_{D_2}^2 + 2\sigma_{A_2 B_2} \sigma_{A_2 B_2} r_{A_2 B_2} - 2\sigma_{A_2 C_2} \sigma_{A_2 C_2} r_{A_2 C_2} - 2\sigma_{A_2 D_2} \sigma_{A_2 D_2} r_{A_2 D_2} - 2\sigma_{B_2 C_2} \sigma_{B_2 C_2} r_{B_2 C_2} - 2\sigma_{B_2 D_2} \sigma_{B_2 D_2} r_{B_2 D_2} + 2\sigma_{C_2 D_2} \sigma_{C_2 D_2} r_{C_2 D_2} \right]}$$

The above are simply examples of the well-known result.

Given two variables X,Y with means \bar{X}, \bar{Y} and variances σ_X^2, σ_Y^2 ,

then the mean and S.D. of their sum are, respectively,

$$\bar{X} + \bar{Y}, \text{ and } \sqrt{(\sigma_X^2 + \sigma_Y^2 + 2\sigma_X \sigma_Y r_{XY})}$$

The proof of this is obtained by expanding

$$\Sigma(X+Y)^2 = \Sigma X^2 + 2\Sigma XY + \Sigma Y^2$$

If X,Y are measured from their means, the result is immediate.

(iii) In testing the significance of the difference

$\overline{(A_1+B_1)} - \overline{(C_1+D_1)} - \overline{(A_2+B_2)} - \overline{(C_2+D_2)}$ it is reasonable to assume that the scores on the 20 jobs are independent of those on the 10 jobs.

If a "t" test is valid the "t" value can be computed from (this assumes homogeneous S.D.'s.)

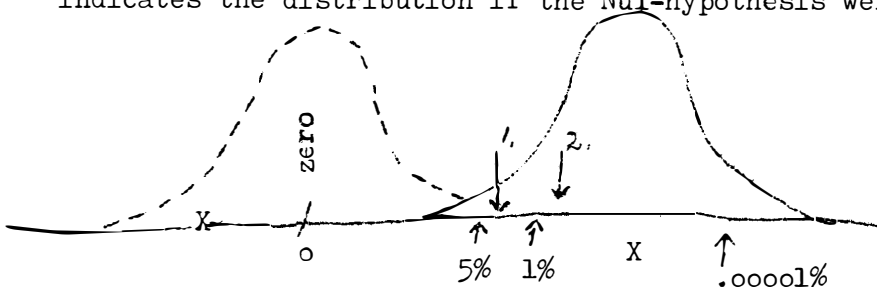
$$t = \frac{\bar{A}_1 + \bar{B}_1 - \bar{C}_1 - \bar{D}_1 - \bar{A}_2 - \bar{B}_2 + \bar{C}_2 + \bar{D}_2}{\sqrt{\frac{20\sigma_1^2 + 10\sigma_2^2}{(20+10-2)}} \sqrt{\frac{20+10}{20 \cdot 10}}} \quad \text{where } \sigma_1 \text{ and } \sigma_2 \text{ are given in (ii) above.}$$

or σ_1 and σ_2 could be used in Welch's test.

(II)

If tests were carried out on $\overline{(A_1+B_1)} - \overline{(C_1+D_1)}$ and $\overline{(A_2+B_2)} - \overline{(C_2+D_2)}$ separately, the fact that the "t" ratio for the second was much longer than that for the first, might suggest that the difference $\left[\overline{(A_2+B_2)} - \overline{(C_2+D_2)} \right] - \left[\overline{(A_1+B_1)} - \overline{(C_1+D_1)} \right]$ was different from zero but would not prove it. The reason is as follows:-

If the first ratio is significantly different from zero then the sampling distribution of such differences is shown by the heavy line curve below. The dotted line curve indicates the distribution if the Null-hypothesis were true.



The two ratios are marked 1. and 2. and it can be seen that it would be quite possible to have one at the 5% point on the dotted curve, and one far beyond its .00001% and yet for both these results to be neither significantly different from one another nor from X.



