

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

BY

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G. 26328

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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Table of Contents.

	Page
Chapter I Introduction	
1. Wage differentials.	1
2. Theories of wages in economics.	4
3. Critique of the principle of supply and demand.	12
4. A rational basis for wages.	17
Chapter II Job evaluation	
1. Definitions of job evaluation.	19
2. Job analysis.	21
3. Development of job evaluation.	24
4. The concept of the job.	29
5. Methods of job evaluation.	33
6. Research in job evaluation.	49
Chapter III Background to this study	
1. The Bantu in the South African economy.	69
2. The Determination of Wages for African workers.	72
3. The background to this study.	76
4. Aims of this investigation.	79
Chapter IV The Judgment of Job Analysts	
1. The conceptual nature of job analysis.	81
2. The method used in this study.	88
3. Rationale of the experiment.	92
4. The experimental method.	95
5. Analysis of the data.	96
6. Results of the experiment.	98
7. Discussion and conclusions.	115
Chapter V The value of work	
1. The nature of value judgments.	124
2. The attitudes to work.	137
3. Rationale and model of experiment.	142
4. Analysis of the data.	150
5. Results of the experiment.	156
6. Discussion and conclusions.	221
Chapter VI Concluding remarks.	241

Index of Tables.

	Page
Table I. Methods of job evaluation	34
Table II. Factor headings in study of Lawshe and Satter (107)	56
Table IIIa. Comparative ranking of jobs under two different evaluation plans (43)	66
Table IIIb. Relative point values in four job evaluation plans (122)	66
Table IV. Significance of mean differences	99
Table V. Differences between experimental and control groups - 1st stage	99
Table VI. Differences between experimental and control groups - 2nd stage	100
Table VII. F ratios for items (Groups A and C)	102
Table VIII. F ratios for items (Groups B and C)	109
Table IXa. Bradley Terry scores for 9 jobs; external wages	157a
Table IXb. Tests of significance (T1 and T4) for Bradley Terry scales	157b
Table X. How the 9 jobs were scaled by European council officials (N = 196)	157c
Table XI. How the 9 jobs were scaled by 28 Bantu nurses (Group AA)	158a
Table XII. How the 9 jobs were scaled by top semi-professional Bantu employees (Group AB, N = 28)	159a
Table XIII. How the 9 jobs were scaled by senior technical and clerical Bantu personnel (Group B, N = 56)	159b
Table XIV. How the 9 jobs were scaled by Bantu clerks (Group C, N = 56)	160a
Table XV. How the 9 jobs were scaled by Bantu artisans (Group D, N = 56)	160b
Table XVI. How the 9 jobs were scaled by high-grade Bantu supervisors (Group EA, N = 28)	160c
Table XVII. How the 9 jobs were scaled by bossboys (Group EB, N = 28)	161a
Table XVIII. How the 9 jobs were scaled by semi-skilled Bantu workers (Group F, N = 56)	161b

Index of Tables (continued)

		Page
Table XIX.	How the 9 jobs were scaled by Bantu policemen (Group G, N = 56)	162a
Table XX.	How the 9 jobs were scaled by Bantu labourers working under unpleasant conditions (Group H, N = 84)	162b
Table XXI.	How the 9 jobs were scaled by Bantu labourers in the lowest wage group (Group K, N = 112)	162c
Table XXII.	How the 9 jobs are scaled by the current monthly wage paid outside Council	175a
Table XXIII.	Product moment correlations between scales	169
Table XXIV.	High status groups - (correlations)	172
Table XXV.	Low status groups (correlations)	172
Table XXVI.	High status and low status groups (correlations)	173
Table XXVII.	Extended high status matrix	174
Table XXVIII.	Extended low status matrix	174
Table XXIX.	Correlations between factor scores and wages paid in the Johannesburg City Council	176a
Table XXX.	Comments about clerk by European group (N = 196)	191
Table XXXI.	Comments made by African groups about clerk	193
Table XXXII.	Proportion of comments referring to mental effort	198
Table XXXIII.	Proportion of comments mentioning cost of education	199
Table XXXIV.	Proportion of comments mentioning consequence of errors	200
Table XXXV.	Proportion of comments dealing with trustworthiness	200
Table XXXVI.	Proportion of comments made by different African groups	201
Table XXXVII.	Comments about medical orderly by European group (N = 196)	204a
Table XXXVIII.	Comments made by African groups about medical orderly	204b

Index of Tables (continued)

	Page
Table XXXIX. Comments about policeman made by European group (N = 196)	206a
Table XL. Comments made by African groups about policeman	206b
Table XLI. Comments about Bossboy by European group (N = 196)	208a
Table XLII. Comments made by African groups about bossboy	208b
Table XLIII. Comments about painter by European group (N = 196)	212a
Table XLIV. Comments made by African group about painter	213a
Table XLV. Comments about pneumatic drill operator by European group (N = 196)	214a
Table XLVI. Comments made by African groups about the pneumatic drill operator	215a
Table XLVII. Comments about artisan's hand made by European group (N = 196)	216a
Table XLVIII. Comments made by African groups about artisan's hand	217a
Table XLIX. Comments about refuse remover made by European group (N = 196)	218a
Table L. Comments made by African groups about refuse remover	218b
Table LI. Comments about the pick and shovel labourer made by European group (N = 196)	219a
Table LII. Comments made by African groups about the pick and shovel labourer	219b
Table LIII. Rank order of seven factors currently used in wage determinations. Europeans (N = 196)	227
Table LIV. Distribution of wage of £10 between five factors - European group (N = 196)	228
Table LV. Combined scales of preferences - European group (N = 196)	228a
Table LVI. Advantages which competitors are seen to have over the Council.	230
Table LVII. Separation rates among different wage grades for second J.C.C. African sample (N = 2,697) (174)	231

Index of Tables (continued)

		Page
Table LVIII.	Percentage distribution of comments by African groups to question "According to what should workers be paid?"	232a
Table LIX.	T5 tests results for group ($N > 28$) Bradley Terry scales	163a
Table LX.	T1 results for subscales where T5 test is significant	163b
Table LXI.	T1 results for subscales where T5 test is not significant	163c
Table LXII.	Scores of the 9 value jobs on Bradley Terry Preference scales where T5 is significant	163d

APPENDICES.

1. Appendix A. J.D. 3 M. job analysis schedule.
2. Appendix B. Jobs selected for job analysis experiment.
3. Appendix C. Communication from R.S. Hall re method of analysis.

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 Bengt (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". Bengt (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 function 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 Bengt 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 ^WLevin's tacit acceptance of the American methods of scientific management. ^WLevin (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 - 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.

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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. Benge (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. Benge (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 Benge 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 delimitation. 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, 135, 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 them 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 be correlated by $+90, \pm 0.018$; 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 headings 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. Working conds. .492
III Job characteristics Hazardous			4.2 Hazards .718 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,

Author Cortis L E

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