

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CHAPTER III.

BACKGROUND TO THIS STUDY.

1. The Bantu in the South African economy.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. The Determination of Wages for Bantu workers.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3. The background to this study.

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

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

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

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

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

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

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

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

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

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

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

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

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

4. Aims of this investigation.

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

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

CHAPTER IV.

THE JUDGMENT OF JOB ANALYSTS.

1. The conceptual nature of job analysis.

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

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

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

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

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

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

1.1 The questionnaire or self-description.

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

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

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

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

1.2 Direct observations of the work situation.

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

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

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

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

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

1.3 Interviewing the worker and his supervisor.

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

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

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

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

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

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

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

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

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

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

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

1.4 Work participation.

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

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

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

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

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

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

1.5 Concluding remarks.

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

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

2. The method used in this study.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3. Rationale of the experiment.

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

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

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

1 Biesheuvel, S. Personal communication.

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

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

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

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

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

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

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

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

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

4. The experimental method.

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

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

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

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

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

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

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

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

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

5. Analysis of the data.

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

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

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

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

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

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

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

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

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

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

The same procedure was repeated for groups B and C.

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

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

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

6. Results of the experiment.

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

6.1 Computations based on total job scores.

6.2 Computations based on item scores.

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

a - Group A and group C.

b - Group B and group C.

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

6.1 Computations based on total job scores.

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

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

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

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

TABLE IV. SIGNIFICANCE OF MEAN DIFFERENCES.

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

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

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

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

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

We note, at the outset, the following points:

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

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

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

6.2 Computations based on item scores.

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

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

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

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

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

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

6.21 Item differences between groups A and C.

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

J.D. 3 M.		Item No.	$\bar{X}_1$	$\bar{X}_2$	S.D. ₁	S.D. ₂	F-ratio	Significance level
page	No.							
3	1.2	1	.2	.9	.83	1.7	3.98	1%
3	4	4	.25	.9	.31	1.4	2.84	5%
4	7	6	.9	.3	1.4	2.4	2.7	5%
6	9	11	-1.25	1.0	1.02	2.4	5.6	1%
7	3	15	.2	-.5	1.01	1.3	2.8	5%
10	1	22	.95	1.8	4.3	2.3	3.99	5%
14	2b	33	-.4	.9	.6	1.1	3.4	5%
14	2c	34	-.05	.7	.22	1.1	22.4	1%
16	1b	40	-.05	-.1	.99	.57	3.1	5%
17	8	46	-.1	.7	.55	1.3	5.1	1%
18	10	48	.2	1.3	.62	1.3	4.7	1%
20	4	54	.1	-.6	1.8	3.1	2.9	5%
21	7	56	.3	-.1	.47	1.2	6.5	1%

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

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

Item 1. Assessed level of education.

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

Item 4. Arithmetical computations: degree of complexity.

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

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

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

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

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

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

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

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

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

Item 22. Degree of attention required in the job.

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

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

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

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

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

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

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

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

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

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

Item 48. Types of tasks supervised.

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

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

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

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

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

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

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

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

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

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

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

6.22 Item differences between groups B and C.

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

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

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

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

Item 4. Arithmetical computations: degree of complexity.

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

Item 20. Ability to solve new problems.

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

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

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

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

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

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

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

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

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

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

Item 7 Knowledge of equipment prior to employment.

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

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

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

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

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

Item 19. Degree to which judgment is necessary.

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

Item 21. Degree to which mental ability is required.

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

Item 23. Degree of vigilance required.

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

Item 35. Cost of equipment used by workers.

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

Item 49. Degree of exposure to weather.

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

Item 50. Degree of discomfort in the job.

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

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

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

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

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

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

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

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

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

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

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

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

7. Discussion and conclusions.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CHAPTER V.

THE VALUE OF WORK.

1. The nature of value judgments.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. The attitudes to work.

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

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

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

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

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

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

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