

5.5.10 Verbal comments about refuse remover.

The European group have scaled this job seventh, well above the pick and shovel labourer. Their comments (Table XLIX) stress above everything else the work conditions surrounding this job. He works with dirt and filth, can catch any number of diseases and is exposed to a number of hazards, e.g. vicious dogs, traffic. Half as many comments as were made about work conditions are made about physical effort. The work is strenuous and tiring as he carries a heavy load and has to run with it. Comments are also made about the need to have honest people do this job as they have access to private property. The scarcity value of the job (i.e. the particular combination of effort and poor working conditions attracts few people to this job) is mentioned 5% of the time.

African groups generally scale this job at the bottom of the scale with the exception of the three low status groups. Labourers in group H scale it first, very close to the pneumatic drill operator. Groups F and K rank it fifth.

The major portion of the comments made by the low status groups refer to the physical effort involved in the job (Table L). Group H is particularly voluble on this score as one third of the judges are in actual fact referring to their own job. The refuse remover has to go up and down all the time, the load should be carried by two men, he must keep up with the motor truck.

Work conditions are described with slightly greater emphasis by the high status groups, but are also mentioned by all other groups. Comments refer to the hazards of the job, i.e. he must run balancing a heavy bin, he could stumble and fall in the street, and to dangers of infection. Comments range from the specific mention of well-known diseases, e.g. he can get T.B., to general references, i.e. the body is ruined by running with heavy load; he grows old sooner.

Few comments are made about personal attributes; these usually refer to the strong physique required in the job. The responsibility of the job is mentioned more frequently by the high status groups. They acknowledge its importance to

TABLE XLIX. Comments about Refuse Remover made
by European group (N = 196)

CATEGORY (Mean Number of Comments = 1.5)	Number of Comments	% of Total
1. <u>Work conditions</u> - he is exposed to health hazards, dangers of injury and works with dirt and filth.	136	45.1
2. <u>Physical effort</u> - his work is strenuous and tiring - he carries a heavy load and has to run with it.	65	21.6
3. <u>Personal attributes</u> - a man of integrity as he enters private premises and could easily steal.	34	11.3
4. <u>Responsibility</u> - he comes into contact with the European public and must learn to be tactful.	32	10.7
5. <u>What he knows</u> - where the various houses are situated; how to get to the refuse bin quickly.	4	1.3
6. <u>Skill</u> - in tilting a bin on his shoulder and running without spilling its contents.	3	1.0
7. <u>Scarcity value</u> . The particular combination of effort and poor working conditions attracts few people to this job.	17	5.7
8. <u>Sundry comments</u> - he renders a valuable and essential service by keeping areas clean.	10	3.3
TOTAL	301	

TABLE L. Comments made by African groups about Refuse Remover.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	EA (N = 28)	EB (N = 28)	G (N = 56)	
1. Work conditions	32.3	26.5	37.2	15.5	26.4	15.7	28.2	20.6	18.7	22.7	26.7
2. Physical effort	22.6	36.8	35.3	69.1	55.0	67.4	41.0	60.3	45.8	56.8	53.3
3. Personal attributes	-	-	2.0	1.0	0.4	0.6	-	-	-	-	-
4. Responsibility	12.8	19.1	11.8	2.0	0.9	3.5	7.7	9.5	2.1	6.8	6.7
5. Mental effort	-	2.9	-	-	-	-	-	-	2.1	-	1.6
6. Skill	-	-	-	-	-	-	-	-	2.1	-	-
7. Sundry comments	32.3	14.7	13.7	12.4	17.3	12.8	23.1	9.5	29.2	13.6	11.7
Total Number of Comments	31	68	51	97	220	172	39	63	48	44	60
Mean Number of Comments	1.1	1.2	0.9	1.7	2.6	1.5	1.4	1.1	1.7	1.6	1.1
Rank of Job in Scale	7	8	8	5	1	5	7	7	7	7	7

the community life, as the worker prevents diseases by ensuring cleanliness and thus renders an important service to the public. "Without him all places will be dirty and disease will spread ... No one likes to live in dirty places".

Sundry comments refer to the unpleasant nature of the job. "It is a filthy job ... the dirt smells ... the bin may leak and the slime runs on me". These are comments which are made by all groups, more particularly by refuse removers. These comments should dispel the notion commonly held that the African is relatively insensitive to unpleasant jobs and does not mind doing them, or even that he prides himself in the fact that he can do them.

5.5.11 Verbal comments about pick and shovel labourer.

European judges have scaled this job last, and consequently, have made the smallest number of comments (Table LI). These usually refer to work conditions, e.g. that the labourer must work in the open and exert much physical effort.

African judges scale this job at the lower end of the scale with the exception of group K (who ranks it second), group H (who ranks it third), and group AA (who ranks it fourth). The comments most frequently made by these groups and all other African groups refer to physical effort (Table LII). Labourers in group K and H make the more specific comment "You dig into hard ground ... you use the spade to throw rubble over a high wall ... this is very strenuous ... It is a heavy job digging where there are stones". Other judges refer to physical effort in more general terms: "It is very strenuous ... it taxes the energy ... this is strenuous muscular work".

The second most frequent category refers to conditions of work. These include the unpleasant work surroundings ("It is dusty ... working in the sun makes you sweat"), and hazards inherent in the job ("Pick axe may land on somebody's foot"). A number of judges, especially among the labouring groups, show concern about the effect that strenuous work has on the labourer's health. "It gives you backache ... it renders you sterile". The life span is shortened as men age quickly on this job.

TABLE LI. Comments about Pick and Shovel Labourer
made by European group (N = 196)

CATEGORY (Mean Number of Comments = .3)	Number of Comments	% of Total
1. <u>Work conditions</u> - works in the open, is exposed to the weather, to traffic.	21	41.1
2. <u>Physical effort</u> - at the end of the day he would feel much more tired than the person shown in the other card.	18	35.3
3. <u>Skill</u> - some skill involved in digging to proportions.	9	17.6
4. <u>Sundry comments</u> - the work he does is much more important to the Council.	3	6.0
TOTAL	51	

TABLE LII. Comments made by African groups about Pick and Shovel labourer.

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)
1. Work conditions	35.3	38.0	27.4	35.0	30.5	28.0	39.4	29.0	42.0	23.5	37.3
2. Physical effort	50.0	55.0	58.8	61.7	68.3	69.6	54.1	65.1	51.6	66.7	53.7
3. Skill	-	-	-	-	-	-	-	1.2	-	-	-
4. Responsibility	14.7	4.2	9.8	1.1	0.6	1.9	4.9	2.4	3.2	5.9	6.0
5. Personal attributes	-	1.4	4.0	1.1	0.6	0.5	-	-	-	3.9	1.5
6. Sundry comments	-	1.4	-	1.1	-	-	1.6	2.4	3.2	-	1.5
Total Number of Comments	34	71	51	94	164	214	61	86	31	51	67
Mean Number of Comments	1.2	1.3	0.9	1.7	1.9	1.9	2.2	1.5	1.1	1.8	1.2
Rank of Job in Scale	7	6	9	6	3	2	4	6	8	6	6

Comments referring to responsibility mention the important part the digger plays in the development of urban life. "Road mending is important for the community ... they lay water pipes so we can get water". These comments are made mostly by judges in the high status groups. Personal attributes refer to the physique required of a digger, and sundry comments are vague expressions of the general unpleasantness of the job.

It is significant that the emphasis placed by the labouring groups on these two jobs, which characterize their occupation, is on physical effort, rather than the work surroundings. It is also significant that the value of these jobs to community life is expressed much more frequently by the high status groups.

6. Discussion and conclusions.

The hypothesis we set out to test in this experiment was formulated as follows:

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

The hypothesis sets two separate questions. Were the concepts used in the evaluation of jobs, the same for all our jobs? Did they attach the same relative importance to them?

When we speak of concepts, we think of categories into which events or phenomena can be classified. A concept in our experiment meant categories which would help us establish some equivalence between the multiplicity of comments given by various judges.

A concept in this sense was shown to be dependent on the degree of analysis we proposed to carry out. We were able to classify comments from all our subjects into the same eight categories. As each category was based on an extensive definition of a concept, it could be said that in this sense, all occupational groups used the same concepts when evaluating jobs. Yet as the analysis of the comments became more discriminative, the same concept was shown to be interpreted differently by various occupational groups. In the case of the clerk, for example, significant differences were found in the manner in which judges interpreted responsibility.

When we formulate concepts, equivalence is dependent on the level of discrimination we wish to adopt. This in turn is dependent on the purpose for which concepts are formulated, and the nature of the data we are categorizing.

"To categorize" wrote Bruner (18) "is to render discriminably different things equivalent, to group the objects and events and people around us into classes - and to respond to them in terms of their class membership rather than their uniqueness". Equivalence, therefore, is said to exist, when things which could be discriminated as different are considered to be the same kind of thing, or amounting to the same thing".

Categorization is clearly forced upon us. If we did not categorize, the business of living, and for that matter, of conducting psychological experiments would be impossible. We would have to examine in the same highly discriminative manner, all occurrences which we encounter. As it is, we categorize and reserve our refined discriminative activity only for "those segments of the environment with which we are specially concerned".

In an experiment as the one we have carried out, it would not have been possible to categorize comments in a more refined manner. We indicated at times, that a more probing analysis would reveal discriminable differences between African occupational groups, but that these differences did not add materially to our interpretation of the data. The experimental design and the data which were generated, lacked precise controls throughout, and did not really warrant a more detailed analysis.

Bruner (18) points out further that the categories in terms of which we group the events of the world around us, are constructions and inventions. "There exists a near infinitude of ways of grouping events in terms of discriminable properties", and we can only avail ourselves of a few of these. The invention of categories is successful when it enables us to "predict correctly certain consequent events". If we were, for instance, to invent a category of job attributes which no one would recognize or use, then we would have failed in our task of categorization. If, on the other hand, we were to categorize attributes into a category which most of us would readily understand, and use, then we would have succeeded in developing a pragmatic classificatory category.

The categories we invented were based essentially on comments freely made by judges in an evaluative situation. They have the merit of reflecting with some brevity what is common usage when workers and managers are asked to evaluate jobs. Taken, therefore, in this broad sense, the concepts used are the same for a sample of European managers as they would be for Africans at various occupational levels. However different in the details, comments all referred to the same broad concepts. There are numerous examples.

Labourers were just as competent as their European managers to perceive the conceptual nature of the job of the clerk. Judges in all occupational groups discussed the educational requirements of jobs, referred to responsibilities and to conditions of work. Admittedly there were shifts in emphasis, and possibly different connotations as we moved from one occupational group to the other, but the comments could be all seen to refer to the same broad concepts.

The relative importance which various occupational groups attached to these concepts varied, however, markedly. The analysis of the data generated in this experiment, repeatedly pointed to this conclusion, and forced us, on this score, to reject the hypothesis. In this respect, the analysis of the verbal comments corroborated the major impressions we had formed from the initial examination of the Bradley Terry scales.

6.1 Reasons for rejecting aspects of the hypothesis.

We reject the hypothesis that European management officials and Africans at various occupational levels attach the same relative importance to concepts they use in the evaluation of jobs. We do it for the following reasons:

6.1.1 The nine jobs we included in this experiment were scaled differently by the various occupational groups. This was particularly seen in the manner in which the first job was scaled. Occupational groups differed markedly on this issue. One cluster of groups scaled the clerk first; another cluster of groups placed the pneumatic drill operator at the top of their scales.

6.1.2 These differences are not primarily due to the preferences some occupational groups have for their own jobs. The contention made by Shen (157) that raters do not always overestimate themselves in desirable ratings has a counter in this study. Only one occupational group, that of the policemen, could be said to have been biased towards their own jobs. The clerks, who placed their own job first, acted no differently than the semi-professional judges or the senior clerks. The labourers on unpleasant work placed the refuse remover, a job related to theirs, at the top of the scale; they made it share, however, first place with the pneumatic drill operator, a job which occupational groups related to theirs, placed at the top.

6.1.3 The product-moment correlations between scales indicate that the African occupational groups are divided into three clusters. Differences in the manner in which the nine jobs were scaled are most marked between the cluster of groups we called high status, and the labouring and semi-skilled groups, referred to as the low status cluster. These two clusters are linked by a middle cluster which borrows features from the other two. The manner in which jobs are scaled by these clusters and by the European group suggests that they placed different emphasis on job attributes. Labourers, for instance, placed jobs demanding physical effort at the top of their scales. Clerks and senior technical personnel were guided by educational requirements.

6.1.4 African and European judges differ most markedly in the manner in which the jobs of bossboy and artisan's hand are scaled. The European group places the bossboy fourth in their scales. African groups place it near the bottom of their scales. The artisan's hand is seen by the European group to belong to the semi-skilled group of jobs, and is placed above the labouring jobs. All African groups, including artisan's hands, place it at the bottom of their scales.

6.1.5 Analysis of the comments reveals that the major point of reference used by different occupational groups vary markedly. European officials are concerned primarily with the consequence of delegating work and responsibility to African workers. African groups are on the whole concerned with pragmatic and personal issues. Though they concern themselves with abstract issues, such as the education required in a job, this concern is expressed at the more personal level of the struggle involved in acquiring such education.

6.1.6 The impressions gained from a first examination of the scales and reported under points 6.1.3 and 6.1.4 are corroborated by the analysis of comments. The emphasis of the high status cluster falls on education and training. The low status cluster stresses, on the other hand, physical effort and concrete, tangible achievements. The middle cluster of groups stresses education and physical effort evenly. These differences are characterized by the distribution and nature of comments on four specific jobs:

6.1.6.1 The bossboy - The European group tends to consider the bossboy in the abstract, as a symbol of the front-line supervisor. Africans are guided by a more pragmatic image of the bossboy. Whereas Europeans are concerned with personal attributes and supervisory functions, Africans refer to the general illiteracy of bossboys, and the unpleasant position bossboys find themselves when they assume authority on behalf of Europeans.

6.1.6.2 The painter - European judges stress his responsibilities: he must produce work of good quality. Africans consider primarily the dangers and hazards of the job. Only two African groups, both of which are high status, stress the importance of the apprenticeship the painter has undergone.

6.1.6.3 The policeman - European judges stress the personal attributes demanded of the job and the consequence of errors. African groups, particularly policemen, stress the physical hazards. Labouring groups hardly mention personal attributes.

6.1.6.4 The pneumatic drill operator - Excepting for the European group, and three African groups (the nurses; semi-professional, senior technical and clerical workers) little mention is made of the skill inherent in the job of the pneumatic drill operator. Labouring and semi-skilled workers who place this job at the top of their scales, do so primarily because of the combination of two unpleasant attributes, i.e. great physical effort and poor work conditions.

6.1.7 In the detailed analysis of the comments made about the clerk significant differences between European and African groups revealed the following features:

6.1.7.1 European judges give less emphasis to mental effort.

6.1.7.2 European judges, within the category of responsibility, give more emphasis to the consequence of errors.

6.1.7.3 Within the category of knowledge, European judges give less emphasis to the effort and costs Africans expend when they educate themselves.

6.2 Additional supporting evidence.

The paired comparison experiment which we have just described, was carried out in the context of an attitudinal study (30). Though the paired comparison experiment was aimed to serve particularly our job evaluation assignment, the attitudinal study was aimed at finding reasons for absenteeism and turnover among African workers. All subjects who had participated in the paired comparison experiment were interviewed further on certain aspects of their work. African subjects were asked about their attitudes to work. Questions were put to them on the wages they were paid, the manner in which they were supervised, their attitude to Council as an employer, and so forth. European officials were asked to give their opinions about African labour. They were asked whether Council paid a competitive wage, and the basis on which African wages should be determined.

The attitudinal study was carried out immediately after the paired comparison experiment. The broad findings of the study were reported separately (30), but the detailed analysis of the answers to some of the questions gives supporting evidence to the major findings of the paired comparison experiment.

European judges were asked three questions which are relevant to this study. At the start of the interview, they were asked to rank in order of importance seven factors which were currently used to determine a wage for Natives. A card was shown to them with the seven factors which were: education, responsibility of the job, experience, physical effort, skill, unpleasant working conditions, and long service. The second question was asked in the middle of the interview. After the officials had been asked to discuss who were the Council's greatest competitors for African labour, they were asked "What do they offer to Africans that the Council does not offer?" The question was intended to show the relative importance attached to wages by Council officials. The third question was asked at the very end of the interview and was intended to act as a further check on the comments made during the paired comparison experiment, and the rank order of factors produced in answer to the first question.

Judges were asked to distribute a wage of ten pounds between five factors. The factors were knowledge (comprising education and experience), skills, physical effort, responsibilities (comprising responsibilities for supervision, equipment, and for personal contacts), and job features (comprising hazards and unpleasant surroundings).

The manner in which the seven factors were placed in rank order of importance is shown in Table LIII. The column of sums of weighted frequencies shows the frequencies with which jobs were placed in various ranks, multiplied by a weight equal to the rank and summed together. Table LIII shows that the first two factors cluster together and that responsibility of the job and education are considered as having almost equal importance. In the centre are clustered skill and experience, and at the bottom of the scale, suggested by the Ewf*, appear the remaining three factors - long service is considered least important, and unpleasant working conditions are considered slightly more important than physical effort.

Factors	Rank order	Ewf
1. Responsibility of the job	1	395
2. Education	2	399
3. Skill	3	614
4. Experience	4	642
5. Unpleasant working conditions	6	1096
6. Physical effort	6	1158
7. Long service	7	1182

TABLE LIII. Rank order of seven factors currently used in wage determinations - European group
(N = 196)

The manner in which the wage of ten pounds was distributed between the five factors is shown in Table LIV. W was computed according to the following formula:

$$W = \frac{\sum \frac{E \cdot E_{fa}}{P}}{N}$$

* Ewf = sum of weighted frequencies

where f = the frequency of subjects who selected amount a_i for factor i .

a = the actual amount in money of the frequency cell.

p = the preference in a rank order for subject i suggested by the amount allocated.

N = the number of subjects in the experiment.

E = sum of.

Factors	Rank order	W
1. Knowledge (education, experience)	1	£3.776
2. Responsibilities (for supervision, equipment and personal contacts)	2	£3.416
3. Skills	3	£1.655
4. Job features (hazards, unpleasant surroundings)	4	£0.662
5. Physical effort	5	£0.491

TABLE LIV. Distribution of wage of £10 between five factors - European group ($N = 196$)

As will appear, W was so computed as to take account not only of the mean amount of money allocated to a factor, but also to take account of the rank order of preferences suggested by the distribution of money. The amounts of Table LIV show a distribution which is very similar to that suggested by the Ewf in Table LIII. Knowledge and responsibility receive almost similar amounts, and are placed at the top of the scale, skill is placed in the centre, job features and physical effort are placed at the bottom of the scale, with physical effort once again last.

We adjoined in Table LV three scales, each showing an order of preferences expressed by the European group; these were the scale of Ewf from Table LIII; the Bradley Terry scale computed from the preference matrix of the nine jobs in the paired comparison experiment; and the scale of W from Table LIV. We notice a consistent pattern in the manner in which preferences are expressed. Physical effort is placed at the bottom of both factor preference scales.

TABLE LV. Combined scales of preferences
European Group N = 196.

wf (Table LIII)		Bradley Terry scale (Table X)	W (Table LIV)
20			
30			
40	Responsibility Education	0	4.00
		Clerk	
50		10	Knowledge 3.50
		Medical orderly	Responsibilities
60	Skill	20	3.00
	Experience		
70		Policeman Bossboy	2.50
		Painter	
80		40	2.00
		Pneumatic drill operator	
90		50	Skills 1.50
		Artisan's hand	
		Refuse remover	
100	Unpleasant working conditions	60	1.00
110		70	Job features .50
	Physical effort	Pick and shovel labourer	Physical effort
120	Long service	80	0

At the bottom of the Bradley Terry scale, the pick and shovel labourer is placed. This is a job which has primarily a physical effort content. At the top of the two factor preference scales are education and responsibility. Similarly, at the top of the Bradley Terry scale are two jobs making predominant demands on education and responsibility. At the centre of both factor preference scales appears the factor skill. At the centre of the Bradley Terry scale is the job of the painter. Unpleasant working conditions is preferred to physical effort, the refuse remover is preferred to the pick and shovel labourer.

These similarities not only support the conclusions of our paired comparison experiments, but suggest strongly that European judges used the same evaluating order in three different situations. It is true that these situations are closely related to each other, not only in time, but also in the content of the separate evaluating tasks. The presentation of each task was, however, separated from the other. The experimental design in each case was tangibly different, i.e. a paired comparison, a rank order of a priori determined factors, and the distribution of a sum of money between five factors. The similarity of the results obtained from a large sample suggests therefore that European judges are consistent in the manner in which they evaluate the relative worth of job attributes.

The answers given to the middle question "What do competitors offer to African labour that the Council does not offer?" are tabulated in Table LVI. They reveal the views European managers have about competing for African labour. The greatest advantage competitors are seen to have over Council is in their ability to pay higher wages and because they have developed less rigid wage policies; nearly half the comments made, fall in this category. Wages are seen by managers as the most important factor in the competition for African labour. This is further stressed in the importance given to fringe benefits, particularly those which help extend the wage, e.g. free food, transport allowance. We can assume with a fair amount of certainty that the subject of African wages was of great concern to our sample of European managers.

Categories of comments	% of Total	Number of comments
1. Higher wages, better systems of pay with rapid increments, rewards for initiative, etc...	48	196
2. Better working conditions for African labour, e.g. fewer hazards, more personal attention, systematic training.	21	88
3. Fringe benefits which help extend the wage, e.g. free food; medical benefit; transport allowance.	12	50
4. Fringe benefits, i.e. pension scheme.	2	9
5. Sundry comments	10	40
6. Does not know	7	30

TABLE LVI. Advantages which competitors are seen to have over the Council.

African judges were interviewed extensively on the wages they were paid. Questions dealt with their overall satisfaction, with the manner in which wages should be determined, with fringe benefits, and with their knowledge of wages paid to African workers by competitors of the Council.

A detailed analysis of the answers to these questions revealed that wages formed the major source of dissatisfaction among African subjects. They were mentioned as the main reason for wishing to change jobs within Council, or else for wanting to leave Council altogether. This observation was supported by an analysis of separation rates for a second random sample of African Council employees (N = 2,697) over a period of six months (30). Table LVII shows that the separations increased quite markedly with the lower wage grades in the weekly and monthly paid establishments. The highest proportion of those who left, among weekly paid workers in the sample, were in the lowest wage groups, but equally interesting is the fact that this pattern repeated itself among monthly paid workers. Here again, the highest proportion of those who left were in the two lowest wage categories.

		Wage category Rand per month	Left	Stayed	Proportion Separating
Weekly paid groups	1	R16.00 - R20	0	5	0
	2	R20.01 - R24	5	12	29.4
	3	R24.01 - R26	294	1035	22.1
	4	R26.01 - R28	108	592	15.4
	5	R28.01 - R30	13	105	11.0
	6	R30.01 - R32	29	267	9.8
	7	R32.01 - R34	0	41	0
	8	R34.01 - R36	0	17	0
Monthly paid groups	1	R36.01 - R42	3	24	11.1
	2	R42.01 - R48	6	44	12.0
	3	R48.01 - R54	3	37	7.6
	4	R54.01 - R60	1	16	6.3
	5	R60.01 - R66	1	14	7.1
	6	R66.01 - R72	0	2	0
	7	R72.01 - R78	0	19	0
	8	R78.01 - R88	0	12	0
	9	R88.01 - R98	0	3	0
	10	R98.01 - R108	0	3	0

TABLE LVII. Separation rates among different grades
for second J.C.C. African sample (N = 2,697) (30)

We found that 92% of the 588 African subjects who took part in the paired comparison experiment were not satisfied with the wages they were paid. This dissatisfaction was common to all occupational groups. The bulk of the criticism made against wages currently paid fell into two groups:

- a - the wage was too low to meet the requirements of the subject (61% of all comments made).
- b - in his opinion, the wage was not related to various job demands (36% of all comments made).

The remaining three per cent of the comments referred to factors in managerial policy, such as slow increments or not being told the range of the wage scale.

It is important to note that subjects in all occupational groups considered the wage as inadequate to meet their personal requirements. The middle and lower occupational groups stated more specifically that the wage they received was not related to the number of dependents they had to support.

It did not take account of high taxes and rentals which had to be paid, nor of the high transport costs. The top occupational groups said that their wages were too low to maintain the standard of living they were expected to keep.

It is clear that African subjects were even more concerned about the wages they were paid than their European managers. To the latter group, wages were indispensable to compete effectively for good quality labour. They were seen in the abstract as a managerial problem. To the African group, however, the concern with wages was at a more personal level. Inadequate wages meant that rentals or taxes could not be paid, or that the subject could not maintain a higher standard of living. It is important to note moreover that most of the African subjects we interviewed were well aware of wages paid by other employers of African labour for the type of work they did. The large majority of workers in the lower occupational groups felt that their wages were worse than those paid elsewhere. The greatest number of those in the higher occupational groups felt that their wages were the same or better than those paid elsewhere. Both these points of view were proved to be correct by a survey of external wages (31).

Because of this keen interest in wages, we were particularly anxious to learn how the determination of wages was viewed by Africans. The paired comparison experiment answered partially this question. We wanted to verify the impressions we had formed from the data of this experiment by asking our subjects in addition, this omnibus question "According to what should workers be paid?" We preferred an open-ended question to a rank ordering of factors because a fair proportion of our African subjects would be illiterate. The question was put to them at an early stage in the interview after they had discussed extensively the manner in which they viewed their current wages.

The answers given by various occupational groups were categorized and appear in Table LVIII. The figures given for each category are percentages of total number of comments made by various occupational groups. The categories we used were essentially the same as those used in the paired comparison experiment. "What he knows" refers to the education, qualifications, experience the worker is required

TABLE IVIII. Percentage distribution of comments by African group to question:
"According to what should workers be paid?"

CATEGORY	AB (N = 28)	B (N = 56)	C (N = 56)	F (N = 56)	H (N = 84)	K (N = 112)	AA (N = 28)	D (N = 56)	EA (N = 28)	EB (N = 28)	G (N = 56)	Total Comments
1. What he knows	33.3	28.1	32.4	20.1	8.8	13.5	28.4	16.8	22.2	24.5	20.3	22.6
2. What he does	16.7	28.1	23.5	31.2	25.0	24.2	9.5	46.7	35.2	30.2	29.7	27.3
3. Physical effort	11.1	8.9	6.2	24.8	39.7	36.5	17.6	13.2	18.5	22.6	13.6	19.3
4. Work conditions	9.7	3.0	0.7	8.3	16.2	5.1	10.8	5.6	3.7	3.8	13.6	7.3
5. Personal attributes	11.1	9.6	11.7	7.3	-	6.7	6.8	8.4	3.7	3.8	4.2	6.7
6. Responsibility	9.7	8.2	8.3	3.7	2.2	1.7	4.0	0.9	5.6	11.3	4.2	5.4
7. Economic needs	5.6	7.4	13.1	3.7	5.1	5.6	18.9	1.9	7.4	1.9	9.3	7.3
8. Length of service	2.8	6.7	4.1	0.9	3.0	3.9	4.0	6.5	3.7	1.9	5.1	3.9
9. All should get the same wage	-	-	-	-	-	2.8	-	-	-	-	-	0.2
Total Number of Comments	72	135	145	109	136	178	74	107	54	53	118	1181
Mean Number of Comments	2.6	2.4	2.6	1.9	1.6	1.6	2.6	1.9	1.9	1.9	2.1	2.0

to have to do his job. "Work conditions" means hazards and unpleasant work surroundings. "Personal attributes" refer primarily to the merit of the worker and the interest he shows in his work, but also to the fact that the job may require someone who is intelligent. Effort and responsibility were rarely qualified, but were given as self-evident comments.

Four new concepts had to be introduced to take care of the remainder of the comments. "What he does" had variable connotations with different groups. It meant usually the work a man did, and so was a strong plea for differentiation on the basis of job demands. Comments were not always qualified, but when they were, they carried connotations particular to the occupational group. Labourers implied primarily physical work; artisans referred to skill; policemen referred to the importance of jobs for the community. Economic needs referred either to the size of the family the worker needed to support, or else to the high cost of living. Length of service referred to long service increments. Five labourers in group K felt that all workers should get the same wage.

There is a close similarity between the manner in which various occupational groups answered this question, and the manner in which they scaled the nine jobs in the paired comparison experiment. Groups AB, B and C stress education over physical effort. They also place the clerk at the top of their scales. Groups F, H and K stress physical effort over education. The pneumatic drill operator and labouring jobs are pushed to the top of their scales. Work conditions are emphasized by labourers in group H, nurses and policemen each giving their own particular connotation. Labourers in group H mean by it unpleasant work surroundings, nurses refer to hours of work, and policemen refer to dangers. Economic needs are stressed particularly by nurses and clerks. These are two occupational groups whose earnings place them at the lower end of the African middle class. They experience particular difficulties in maintaining the middle class standard of living.

The category "what he does" features prominently in all occupational groups with the exception of the nurses. As we have indicated, this category makes an indirect plea for job evaluation. When a subject says that a worker should be paid according to what he does, this implies that differentials should be introduced in earnings because workers do different jobs. This point is made particularly strongly by the artisans and the high-grade supervisors. Both these two groups have only recently acquired a competence in one of the trades.

The data from the attitudinal study which we have just presented support the major findings of our paired comparisons. The differences we observed between occupational groups are confirmed. We could speculate that the same evaluating order was used by subjects when they compared jobs and when they took part in the attitudinal study. There are strong indications, however, that this evaluating order is influenced by the experience the subject has had of work, more particularly by the work he is currently doing. We turn to examine this point next.

6.3 Value and cognition.

In his discussion of the value judgment, Lamont (98) noted that the attribution of goodness implied the prior and continuing cognition of an objective order. Approval arises only as a response to the perception or awareness of an objective order. The objective order acts in the nature of an ultimate criterion.

When European officials and African subjects evaluated jobs, this objective order was quite apparent. It showed itself in the first place, in the manner in which subjects elaborated the rather restricted stimuli presented to them by the photograph. The policeman was shown in a fight. But the picture clearly conveyed the impression that the policeman could take care of himself. He was armed with a stick, his assailant was shorter than him, and had thrown a punch which had missed badly. Similarly, the painter was placed on a ladder, but this was a short ladder, and the painter appeared to stand quite firmly on it. Yet in both cases, subjects from all occupational groups waxed quite eloquent on the dangers of the job. The fumes and

corrosive property of paints were frequently mentioned. Similarly, with the policeman. Subjects drew heavily from their experience of township life: the streets are inadequately patrolled; the policeman is insufficiently armed when he faces a thug with a firearm. Finally, when we discussed the comments about the pneumatic drill operator, we noticed that Africans from all occupational groups described vividly and in a detailed manner the hazards of the job. Their description went beyond the information supplied by the picture and made us wonder whether we had not struck with this job a powerful African stereotype.

The examples we have given so far illustrate the influence on the evaluative order of broad patterns, cognition of which are largely cultural. There are, however, many numerous instances of a more specific nature. These can all be related to the particular experience the subject had from working with the City Council. The best example is seen in the manner in which the bossboy is consistently scaled low by most African judges. The abstract demands of the job and its hypothetical responsibilities are completely eclipsed by the current experience African judges have of this job. Other jobs are seen as physically more demanding; the bossboy does little which is physically strenuous and so on. Labourers in group H, working under markedly unpleasant conditions, stressed more than any other group, the unpleasant features in the job of the orderly, e.g. he has to deal with dying, dead and mangled people. The unpopular nature of the job of the policeman, the fact that he is resented by the public was stressed by policemen themselves. The labourers in group I often having to work in dangerous situations, were very sensitive of dangers in other jobs, e.g. the painter, the policeman and the bossboy. The manner in which groups B and K evaluated the job of the clerk reflected their divergent experience of the job. Group K stressed the position of power the clerk had, and how he could influence the life of the labourer. Group B spoke of the mental effort required in the job and the need to produce accurate work and contend with frequent interruptions, often under pressure to meet a deadline. Judges in the other high status groups spoke of the greater value of work, which relies on abstractions, to labouring work, which relies on perception.

Similarly, supervisors in groups EA and EB were more competent than other African judges to discuss the responsibilities of the bossboy, though this did not make them more sensitive to the concept of responsibility in general.

We mentioned that the tendency to use more personal comments when substantiating an evaluative judgment, was to be expected from men who were themselves intimately connected with jobs. Egocentric judgments were made, particularly with reference to the medical orderly. His personal attributes were not frequently mentioned, but emphasis was given to the paradigm "he will certainly hurt me if he is not careful".

As for the European group, their whole evaluating order was guided by their experience as managers and administrators. The significant stress on the consequence of errors, their ability to view the bossboy in the abstract, their concern about competing effectively for labour were all signs of managerial bias. The process of self-development which managers underwent to attain positions of responsibility was reflected in the importance they attached consistently to factors such as education and training.

There is sufficient evidence to suggest that judges drew heavily from their experience of the work situation to evaluate the nine jobs they were presented. As this experience was largely determined by the functions the judge served, we can safely assume that it varied just as the functions of the judge varied. This in turn influences the development of the evaluating order the judge would ultimately adopt to determine the relative worth of jobs. It is possibly this fact which explains the major differences we observed in the evaluating orders of judges from various occupational groups.

6.4 Consequence of rejecting aspects of the hypothesis.

The evidence we have presented clearly forces us to reject the hypothesis that European officials and Africans in various occupational groups attach the same importance to broad concepts used in the evaluation of jobs. The main consequence of rejecting this aspect of the hypothesis is to accept the views put forward by Otis and Leukart (135) and Sayles (155) that both management and workers have their own different ways of evaluating jobs. We must go further and say that as workers evaluate jobs according to their own personal experience of work, they differ among themselves on the manner in which jobs are to be evaluated.

This conclusion is consistent with findings of other research workers in related situations. We reported Biesheuvel (11) as saying "the more deeply Africans are drawn into that essentially Western culture, the more thoroughly do they acquire the personalities functional for that culture". Biesheuvel was considering the African in his broad social setting. The more experience the African gains of Western culture, the more he tends to develop the personality which will function in that culture. This in turn implies that he will acquire the necessary system of values which will guide and control his behaviour in that culture. A similar development can be shown to occur in the narrower field of work values. He enters an industrial society which actively practices wage differentiation. He accepts such differentiation and as the paired comparison experiment indicated, he is quite competent to differentiate himself, i.e. to say which of two jobs should be paid more. But the basis on which he differentiates, and the results of such differentiations, vary according to the experience that he has himself had of work. The more developed his work and the greater his integration into Western culture, the more his pattern of evaluation resembles that of fully-fledged members of the Western community (only in so far as European officials are said to represent a Western community). The less developed the work he does, the less likely his pattern of evaluation will resemble that of European officials.

The theory which Jaques (85) has propounded, appears to be refuted in part. The concept of the time span of discretion was apparent in the concern expressed by managers about the consequence of errors. But it is negated by the extensive documentation we presented to prove that workers in different occupational groups have different evaluating orders. Our criticism that discretion would not be considered as crucial by workers who do not experience it is moreover substantiated by the evidence we have presented. Managers have experienced the exercise of discretion and value it. So much is evident from the importance they attach to responsibilities and the personal attributes. Labourers on the other hand, rarely experience it and so largely ignore it.

And yet the evidence is not so convincing that we should reject the theory of Jaques out of hand. The concern shown by African judges over mental effort in conceptual jobs suggests they consider discretion under another name. The manner in which most African judges view the jobs of the bossboy and the artisan's hand are particular instances of reasoning along the principles of Jaques. Both jobs are held in low esteem because little discretion was in fact given to incumbents in the Johannesburg City Council. They are straw jobs. The negative features of the artisan's hand job are particularly well stressed. No one expects much from him. He does not have to strain his brain thinking because he is told everything he has to do. He is just a fetch and carry man. He does not do the job himself but helps someone else to do it.

We do not know whether this criticism of straw jobs is sufficient ground to state that labourers accept the principle of discretion as the sole basis for evaluating jobs. We think that on balance it does not. The criticism may well be motivated by deep resentment of the statutory restrictions placed upon Africans in the occupational field. The great importance which they attach to qualifications and to the exertion of physical effort is further evidence of the fact that they will not be prepared to evaluate jobs on the basis of discretion alone. Resentment of occupational restrictions is moreover not sufficient evidence to say that "men want to assume that level of discretion which they are capable of assuming". Such resentment may be caused by the

particular phenomenon found in South Africa of two communities living side by side with markedly different standards of living. We must reserve our judgment of Jaques' theory until such time that further investigations have been carried out. Our experiment, however, allows us to state that at the conscious level, jobs are evaluated differently according to the particular experience the judge has had of work. As the relative merit of jobs is discussed and decided primarily at this superficial level, we feel that Jaques' theory has limited value. Its value would clearly be great when managerial posts are analysed and evaluated, or else in situations where labour conflicts need to be resolved by means of Jaques' protracted therapeutic sessions.

We must finally consider the consequence which the rejection of aspects of the hypothesis has on current systems of job evaluation. We must realise that any system of job evaluation which we intend to introduce into an organization must be superimposed on already established evaluating orders. Our experiment has indicated that workers at all occupational levels are quite capable of evaluating the relative worth of jobs. Though such evaluation is at times hurried and uncritical, it is important that we realise that it is in fact carried out and that it gives the worker the same sense of finality which a more involved and complex judgment would give his manager when he has made a particularly difficult decision.

We conclude, therefore, that these evaluational orders are determined primarily by the job the worker holds, and the experience he has gained of work situations. Such evaluational orders differ as we move from one occupational group to another. Consequently, a job evaluation system which appears rational to management may not appear as rational to workers.

It is for this particular reason that job evaluation systems should be introduced only after satisfactory communications have been established with African workers. The need to ascertain their views is all the more important as they are debarred from collective bargaining. It is doubtful, however, whether collective bargaining by itself would succeed in isolating the values various occupational

groups use when evaluating jobs. There is in the relationship between trade union officials and workers, an element of expediency which we do not find in more systematic attitudinal studies. Collective bargaining would, however, be carried out much more effectively if all available facts were collected in a systematic and reliable manner, and placed in front of the bargaining parties.

It is conceivable that Africans would abandon their parochial evaluating orders if an active programme of education were to be carried out. If we were to inform them of the bases on which jobs are evaluated, and appraise them of the need to strike an equitable balance between the demands of different job universes, it is likely that they will modify their evaluating orders to include all workers in the organization. Opportunity costs as applied to job evaluation are only truly considered by managers. They must consider the organisation as a whole, and look at all jobs in relation to each other. Even though their evaluation order shows a particular managerial bias, it is comprehensive enough to include various job universes. The worker, on the other hand, tends to view opportunity costs in an egocentric manner. He is concerned merely with his own labour, and must decide to which employer he will sell it. As we pointed out, the sale of labour is a continuous rather than discrete process. He may reconsider his decision as he gains more experience of the work situation, and so brings further alternatives into his evaluating order. The important thing is that he decides and evaluates primarily with reference to himself. And yet he may in time acquire a manner of evaluating which is less egocentric and more collective. The development of the vertical trade union in the United States is an indication that this is possible.

CHAPTER VI.

CONCLUDING REMARKS.

1. Knowledge is a function of being.

"We are probably safe in saying that the composite demand with respect to any given thing will be more extensive, the deeper our knowledge of that thing and its potential relation to other things. Hence while the potential movement towards wholeness in our valuational life is grounded in the nature of man as a unitary self-conscious demander, the extent to which this movement is actually realised will depend upon his intellectual progress as a 'knower'".

These words were written by Lamont (98) when he discussed the effect which increasing knowledge has on the value judgment. They sum aptly the common finding of our two experiments. We noticed, in the first experiment, that analysts examine and evaluate jobs more competently, as they gain experience and perceive the validity of concepts they were taught to use. In the second experiment, we found that workers and managers evaluate work according to their own personal experience of the work situation.

The relation between knowledge and value has influenced ethical thinkers from the beginnings of our civilization. Herodotus, if we remember, noticed that customs and values varied from tribe to tribe. Religious writers have argued with deep conviction that knowledge is a function of being. Knowledge that certain values are valid does not result from logical thinking. It comes from living the life which epitomizes these values.

There seems to be a fair amount of evidence that this is true. Experience of values is intimately connected to our conscious experiences. The values of a community are intertwined with the history it has lived.

The same principle applies to the determination of wage differentials. For these differentials, like status and legislation, are very much a function of the culture in which they originate. Whether differentials are determined

by economists seeking to establish the payability of organizations, or by wage administrators, working on the basis of a job evaluation programme, the influence of personal values and culture is ubiquitously present. As facts begin to fail them - and whenever behaviour is predicted there are never quite sufficient facts - they will resort to value systems grounded on their own very personal experiences.

We argued that a value judgment invariably gives us a feeling of finality. This is regrettable because it could well prevent us from conceding that other judgments, based on different experiences and values, are equally possible, and just as convincing. Again, this is as pertinent to the subject of wage differentials as it is to matters of education or religion. To leave the determination of wages as the prerogative of one group of people, means in fact that we rely entirely on one set of values and exclude all others. A poorer form of judgment would possibly result.

The very concept of wage differentials implies that at least two points of view need to be considered. We argued that the labour contract involves employer and employee, both of which can be viewed as objects of demand. Our second experiment proved convincingly that they both have their own ways of evaluating work. The value judgments which our subjects were called upon to make, reflected different frames of reference, and were thus at variance from each other. African judges were guided primarily by their own and very personal experience of the work situation. European managers regarded the managerial function and the welfare of the organization as closely intertwined. They both elaborated beyond the stimulus material they were presented, drew inferences which were a compound of the objective world they could perceive, and their own particular motives and values.

As matters stand at present, however, the initiative for determining African wages rests largely with employers. These are men who are keenly concerned with profitability and the survival of their organizations. It is quite natural that they should perceive money as the major motivator of human behaviour. The prime means by which they exercise authority is the fact that they pay the wage at the end of the week. Africans are rarely consulted. Their wages, therefore, are determined purely on the basis of managerial values.

The managerial evaluating order is, in a way, open to partial confirmation. Simon (159) pointed out that confirmation would arise from the fact that any such order of values seeks to predict a future state of affairs. What is it, then, that management seeks to predict through its wage policies? Primarily that it will succeed in attracting and retaining a sufficient number of workers who will co-operate effectively in furthering its aims.

No one will deny the fact that the industrial development of Southern African has reached the stage where Africans are involved in a wide specialization of functions. This in turn means greater managerial dependence on African labour. Its productivity is beginning to affect intimately the profitability of organizations. Wise management knows that productivity is not a simple function of output. It is the compound of all the influences African workers bring to bear on the endeavours of the firm. It is the wastage they control, the duties they assume informally, the image they project on the public, the manner in which they approach their supervisors, their loyalty during periods of unrest, and a multitude of other factors which are never clearly perceived.

In these circumstances, a wage structure which reflects only managerial values is something of an anachronism. We predict that an increasing number of attempts will be made in the future to establish wage differentials which take cognizance of African values. These attempts will present, however, a number of problems.

We argued that values are grounded on experience. What in actual fact is the sum total of experience that Africans have had of work? Their introduction to industrial life is quite recent. Their attitudes to work, we know, are undergoing rapid changes. Are they in actual fact quite ready to participate in the development of wage policies, or in the establishment of differentials?

The answer is possibly still uncertain. Wage differentials have acquired through their long historical existence, the force of a well-established tradition. We know that they are at present applied throughout the whole world. They become meaningful, however, only in complex societies which have developed a money economy and intensive

specialization of functions. Money becomes the commonly accepted unit of exchange and can satisfy a multiplicity of demands. It is a paradigm of well developed societies that the individual no longer needs to do a number of different things to satisfy a number of different needs.

The African has only recently entered into such a complex society. We have little evidence to prove the existence of wages, or of wage differentials, in the more primitive tribal societies from which he has emerged. It seems, however, that the tribal background can be shed in the space of less than a generation. Biesheuvel (11) has shown the rapid changes which are occurring among Africans in their attitudes to work. Our second experiment showed repeatedly that the African is quite capable of differentiating the worth of various occupations. Significant scales were generated by all occupational groups. Moreover, when Africans were asked the question: "According to what should a worker be paid?", most subjects stressed the nature of the work the person did.

Yet this ability of discriminating between jobs varied somewhat from one occupational group to the other. This fact became particularly clear after the examination of the results of the T5 tests. These tests, it will be remembered, showed that most groups used the same broad evaluating patterns, but that subgroups differed from each other within certain well-defined levels. We found that the more advanced occupational groups established the clearest evaluating patterns, and that subgroups differed from one another on a fine basis. This suggests that not all Africans may discriminate as effectively as Europeans, and that there are similar gaps between educated Africans and labourers.

There is one way by which we could close these gaps and remove these differences. We must give the African an opportunity to acquire broader experience of the work situation. This will not solve all our problems because there are, in all racial groups, obvious individual limitations. In Southern Africa, however, these limitations are aggravated by the racial cleavage which predominates in the industrial and economic world.

European minorities in Southern Africa are at present entrenched in political or economic positions of control. De Kiewiet (33) wrote that the issue of race relations had confused the classic labour versus capital struggle. "White artisans ... fought the characteristic vanguard action of labour, in Western world, against capital. It differed, from other labour movements, by fighting a rearguard action against a group of different race and a lower order of skill".

Any attempts to extend the work experience of African must take cognizance of this fact: that the white population is in effective control of the government and the economy of Southern Africa. There are two sets of policies which need concern us. They operate in neighbouring territories and both seek to control the evolution of the African into a position of greater control and participation in the political affairs of the respective countries. In the Republic of South Africa, the policy of separate development has placed many statutory restrictions on the African. In the Federation, the policy of multiracial development is endeavouring to bring about an orderly evolution towards a fuller measure of control, but in a shorter span of time. It has resulted in the development of active African trade unions.

Both policies are being implemented with difficulty. The emergence of African nationalism and the threat it presents to the vested interests of white communities, still in effective control, is among the many factors which contribute to these difficulties. The impact that these forces have on the problem of wage differentials is most acute in the Federation. There is, there, a great sense of urgency as the wide discrepancy between European and African earnings is in the process of being resolved. The greatest difficulty which has been encountered, however, is the fact that Europeans in the lower occupational groups were earning much in excess of what their jobs were relatively worth. As Africans began to enter into these jobs, wages are reduced to a more realistic figure. This in turn is much higher than average earnings of the majority of Africans.

We have here the problem of reconciling two different base lines for the same universe of jobs. The base lines were imposed artificially through social forces. They must be reconciled in the context of a period of acute social transition as exemplified by African advancement. The problem could not be much more difficult. African advancement, forced against the inner conviction of the European minority, raises additional problems. Its success is in fact dependant upon the good will of European supervisors and managers. If they are not convinced, however, that Africans can competently assume responsibilities, then it should be relatively easy for them to prove it. The definition of sub-standard performance is highly subjective and dependent on the attitudes of line management. This will in turn influence the determination of wage differentials as these are related to the responsibilities delegated to workers.

The position in the Republic of South Africa is paradoxically simpler. The presence of a much larger European group and its effective control of all aspects of economical and political life has resulted in the promulgation of a number of acts. Africans have few opportunities to enter into any form of collective bargaining. They may form trade unions, but these are not officially recognized. African workers may not strike or participate in negotiations with statutory bodies such as the Industrial Councils.

The initiative for developing adequate industrial relations with Africans lies entirely with the employer. In terms of the Native Labour Settlement of Disputes Act (Act No. 59 of 1955), the establishment of works committees becomes a legal liability, if African workers request them. Horrell (74) reports that some manufacturing concerns have had successful experiences with such committees. Discussing a particular instance where the committee had made well thought-out representations for increased wages, she writes: "The management not only agreed to these, but granted even slightly larger amounts than had been requested. This naturally enhanced the committee's prestige in the eyes of the worker".

Therein lies perhaps, the most crucial factor in the development of African representation. Works committees can function effectively only when they have gained the acceptance of workers. Employers must concede these committees the right to discuss wages however contraversial an issue this proves to be. The alternative is quite simple. No effective communication are established with workers, the establishment of wage differentials would fail to achieve the aims management believes could be reached, and there is the ever-present possibility of sudden, unexpected industrial unrest.

It seems, therefore, that a great number of problems will be experienced both in the Federation and the Republic. The development of sounder wage policies will depend on our ability of overcoming two major obstacles. We must educate our management to perceive clearly how dependent they are on African labour, and to realize that this dependence will increase with further industrial expansion. We must also train African workers to participate effectively in the development of wage policies. Whether we speak of the Federation or the Republic, we have to deal with an African labour force whose experience of industrial life is somewhat limited. Africans will have to move away from their egocentric work values to understand more fully the problems which beset management. The task is not as difficult as many industrialists fear it to be. There is sufficient evidence (30, 74) to show that African workers usually take a sober and realistic view when they are given an opportunity of discussing their wages.

2. The concept of equity.

With the development of African trade unionism in the Federation, and, possibly, with the further development of works councils in South Africa, the question of equity will increasingly be raised in relation to wages.

What is, in fact, "equity"? When we seek to define it, we feel just as perplexed as St. Augustine, when he tried to define time. "What then is time? If no one asks me, I know. If I wish to explain it to one that asks, I know not".

When we discuss equity, in relation to wages, we find that it is synonymous to the concept of the fair wage, which according to Jaques is "the wage paid in relation to the discretion the person must exercise and is in actual fact capable of exercising". A discussion of equity under such a broad frame of reference will, however, be somewhat unrealistic. The discussion will fail to take account of real limitations imposed upon the African by current circumstances. Even in the Federation, where the mood is for determined changes, the fact that these changes need to be gradual is generally accepted. African technicians cannot be trained overnight. Any sudden changes on the pattern of wage distributions will bring in its wake serious social and economic repercussions. When we discuss equity and wages, we must accept that for the moment, separate base lines will be maintained for African and European wages. African advancement into higher occupational levels will depend moreover, on the assistance European communities are prepared to extend to African workers.

These limitations suggest that we should consider equity within the principle of "ars aequi et boni", which Hart (63) considers fundamental to the judicial process. We would not be far out in adopting this principle, for there are strong similarities between the administration of wages and the implementation of legal enactments. The concepts of "aequum" (the equitable) and "bonum" are just as applicable to the determination of wage differentials as they are to the administration of justice. The equitable means, in essence, the proportionately equal. We cannot apply a rule, any rule for that matter, as a rule unless we treat in accordance of its terms all cases and persons coming within the definition of its terms. We cannot, at this stage, be concerned with the morality, or the expediency, behind our system of rules. We are merely concerned with the principle that rules, once they have been formulated, will be applied equitably. If, for example, present circumstances in Southern Africa impose upon us the constraint of two separate base lines, then we shall apply this constraint equitably to all instances which are presented to us. We could say that the same rate of progression will apply to both racial groups, but that all persons who qualify for one base line will start at one point, and all others at another.

The concept of the "good", as well, has, by itself, no moral connotations. The administrative body - whether this be the civil service of a country, or the wage administrators of a company - does not enquire whether the ends of those who made the rules were wise, prudent or moral, but merely that they had some "end in view". The end may, in some instances, be quite clear and implicitly stated in the rule. In other instances, however, the end is not so clear and the rule requires to be interpreted. When a court of justice is asked to interpret a rule, it does not always find its guidance in ends specified by the legislature, but in inferences as to what these ends may reasonably be assumed to have been. This could well mean the welfare of the community, or the maintenance of the legal system taken in toto.

Ambiguous rules are just as frequent in wage administration as they are in any system of jurisprudence. The rules may have been formulated by the board of directors, or the management of an organization in compliance with general principles of company policy. The interpretation of these rules is usually made by the personnel department, or whomever has been delegated the responsibility of nurturing the wage structure. It is safe to assume that the personnel officer, or any other company official, would also be guided by the general principle of the "bonum". In such a case, the maintenance of the firm as an efficient organization will be assumed to be the end which the rule, and company policy as a whole, intended to serve.

It is at this stage that we realize how intimately the wage policy of a company is related to the philosophy of its management. For in the final instance, a wage policy reflects the manner in which management has decided to share its profits with labour.

This will become apparent if we consider briefly one of the most advanced wage policies which has come to our notice. It has come to be known as the Scanlon plan (97). The plan, in essence, provides a means of sharing whatever economic gains accrue from improvements in organizational performance. It uses a ratio between the total personnel costs of the organization, and some measure of output, such as total sales or a value added by production. The ratio is

by no means easy to derive. It requires extensive study and analysis of the particular organization into which it is to be introduced. Special allowances have to be made subjectively for a variety of factors which cannot be objectively measured.

As the ratio improves, it reflects an overall economic gain for the organization. A portion of the resultant savings - at times the full amount - is paid regularly to all persons who participate in the plan. The distinguishing feature of the plan, however, is the coupling of this monetary incentive with a second and rather important feature. The plan will not function unless every member of the organization is provided with the opportunity of making suggestions and seeing that they are immediately considered. This is done through a series of committees, so organized that they can evaluate and authorize the implementation of suggestions with the minimum of delay. Representatives from every occupational group and function serve on these committees. Departmental committees of workers and front-line supervisors are, in actual fact, empowered to put into practice ideas appropriate to their levels. Suggestions which have broader implications are referred to higher level committees, comprising worker representatives, supervisors and higher management.

The Scanlon plan reflects a new philosophy of management. Management accepts deliberately the conception of a fuller participation of workers in the affairs of the organization. One can well imagine the extensive evolution in managerial thinking which must precede the introduction of the plan. It is clearly not easy to administer; it creates at the start, recriminative discussions. If we consider, however, that most of these discussions centre around improved performance, and that individuals, at every level, are given a share in the success of the organization, then the initial disadvantages are easily outweighed by the final advantages.

The Scanlon plan is a good example of the strong relation which exists between the philosophy of management and the wage policy of an organization. If labour is seen as a cheap commodity to be exploited for the sole benefit of the organization, then the wages paid will be as low as the

market permits. If, on the other hand, labour is viewed as an active promoter of company objectives, then policies akin to the Scanlon plan will be implemented. The range of policies available to management in Southern Africa is particularly wide.

There is an important consequence to all this: management in Southern Africa retains the initiative for injecting a strong moral note into labour relations. Whereas the administration, and to some extent, the development of wage policies can be guided by the principle of "ars aequi et boni", management cannot altogether escape from the contention of St. Augustine that "an unjust law is not a law". This is not a new experience for management, according to serious students of organization such as Fayol (47), Barnard (8) and Simon (159). If management in Southern Africa were to view industrial development on a long term basis, then it cannot consider equity in the narrow sense of the equitable and the good, but should also consider the just in the full morale sense meant by St. Augustine.

With particular reference to the African, this will require a fine awareness of his needs and motives. Management should be able to draw that important distinction between the African who belongs to a subsistence economy, and one who does not. It is not just to draw the African into an industrial community and then to expect him to retain the meagre satisfactions of tribal life. New needs are experienced, and these soon acquire the same urgency of the more primitive, almost physiological needs. A just wage policy is one which will include, at the very least, a base line which adequately meets the minimum of these needs. We are still quite some way from having developed and widely implemented such a policy. This will involve a combination of fine psychological research with important economic and moral considerations.

Having established a just base line, we must introduce into our wage structure adequate differentials between various skills and various occupations. The differentiation must also be done on a just and equitable basis. It is for this reason perhaps that job evaluation plans have found

favour with management. They give the impression that justice is done because of their thorough and painstaking assessment of all job attributes. But the techniques we use are far from perfect and need, still, extensive research and development. There are a great many questions we could ask: they range from methodological issues to pragmatic economic considerations. It is our sincere hope that the answers to many of these questions will become available in the near future.

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APPENDIX A

J.D. 3 M. Schedule

7043/8042 JD3m NEW

N.I.P.R. 999

DATE ANALYST

DEPARTMENT BRANCH

LOCALITY SECTION

NAME OF JOB ANALYSED

UNOFFICIAL NAME (IF ANY)

NUMBER OF JOB INCUMBENTS

IMMEDIATE SUPERVISOR OR SUPERIOR OF EMPLOYEE:

(a) EUROPEAN

(b) NON-EUROPEAN

WAGE FOR JOB:

GRADES					
MINIMUM					
C.O.L.					
INCREMENT					
C.O.L.					
MAXIMUM					
C.O.L.					

ADDITIONAL WAGE ALLOWANCES:

ADDITIONAL PRIVILEGES IN JOB:

Must the worker supply his own protective clothing?

Must the worker supply any additional form of equipment?

YES	NO

Explain if necessary

Where a job consists of a number of distinct, unrelated, separate units, enumerate each unit (viz. 1, 2, 3 etc.,) and describe them in order of importance. Try to give the relative frequency with which the worker is occupied with each unit (viz. takes sample three times a week, ten minutes work on these days), or cleans laboratory for greater part of his shift every day.

[illegible]

Where any section of this schedule applies to some units of the job and not to others, indicate in the section the units to which it applies. Where a worker has additional duties which are not officially a part of his job, (viz. where a worker is "lent" to another section or department when he is not busy) make this quite separate from his official job.

SECTION 1.

EDUCATIONAL BACKGROUND.

This section deals with the amount of knowledge or schooling required before a worker is considered for the job.

1. GENERAL EDUCATION:

(a)

None	Elemen- tary Grades, incl. Std. 2	Std. 4	Std. 6	Std. 8	Matric	Addi- tional Train- ing	Post- Matric Train- ing

(1)

NOTE: The training here referred to means training before commencing on the job and not job training.

1 = Council's Standard of Education.

2 = Analyst's own assessment of required standard.

(b) Give details of any additional post-school or post-matric training necessary:

2. READING: Give a characteristic sample of material which must be read and understood. Where the worker learns certain symbols by experience but cannot read them in the accepted sense of the word, your answer should be none.

None	Clear Letters	Simple Sentences	Reports, Letters	Advanced Tech. Matter

(2)

3. WRITING: Give a characteristic example of writing required:

None	Simple Lettering	Simple Sentences	Reports, Letters	Advanced Tech. Matter

(3)

4. ARITHMETIC: Give instances which indicate the degree of knowledge required:

None	Deals with whole numbers	Simple Calcula- tions (+, -)	Fairly Complex calculations (+, -, x, + fractions, decimals)	Complicated Formulae, Calculations

(4)

SECTION 2.

WORK BACKGROUND.

This section deals with what training the worker must have before being considered as suitable for the job.

1. What operations, relating to the work, must the worker know before being considered for his job?

.....

Minimal (Pick and Shovel)	Little Training (General 'Household' work)	Fair Degree of Training (Producer Fire Boy)	Extensive Training (Lawn Mower Operator)	Must be fully trained on jobs	(5)

2. Take into account the complexity of the sequence of activity of the operation.

Explain

.....

Simple Sequence (e.g. Pick and Shovel)	Long Repeti- tive Sequence (Producer Fire Boy)	Long Variable Sequence	Complex Sequence requiring variable response.	Complex Sequence requiring consi- derable learning and theoretical knowledge	(6)

3. What equipment must the worker know how to use himself before being employed (Do not describe screwdrivers, spanners, etc., separately, but list them as "Tools used in Builders trade, etc." or whatever the case might be).

.....

None	Everyday implements (brooms, dusters, etc.)	General Knowledge	Considerable Knowledge	Considerable Knowledge in- volving theo- retical back- ground	(7)

4. What equipment is the worker expected to be familiar with before being employed without necessarily being able to use it himself (Again do not itemise equipment).

.....

Minimal	General Knowledge	Considerable Knowledge	(8)

5. Is linguistic ability necessary in the job applicant?
Explain -

.....

.....

.....

.....

.....

.....

.....

Minimal	One or Both Official Languages	Official Languages and Four Vernaculars (e.g. Police Boys).

(9)

6. For Clerical Jobs only:

What knowledge of office routine is necessary before
being employed?

Give example -

.....

.....

.....

.....

.....

None (Straight from School)	Minimal (General Of- fice Work)	Average (Telephone Operator)	Considerable (Clerical Operator)	Extensive

(10)

NOTE: Extensive knowledge of office routine may well be possible without any knowledge of typing, using calculating machine, etc.

SECTION 3.

JOB TRAINING.

This section assesses the degree of on-the-job training necessary for satisfactory performance. Where there is no accepted training procedure, the analyst may have to rely entirely on the estimates of the European Supervisors directly concerned with such training.

Yes	No

1. Is the worker fully trained prior to employment?
2. Is the worker partly trained prior to employment?

If the answer to 2 is YES, what additional training must he get on the job?

.....

3. Does the job require that the worker should be trained for some time?

.....

Minimal	Less than 2 weeks	Less than 1 month	Less than 3 months	More than 3 months (state)

(11)

4. How much care, time and teaching must be given to train an average worker for the job? By whom must he be trained?

.....

Minimal	Occasional	Fairly Considerable	Extensive	Full-time Training

(12)

5. Where a job is composed of units, as described on page 2, enumerate those in terms of training required for each:

MOST TRAINING:

LEAST TRAINING:

6. Does the learning of the task involve more than can be communicated by verbal instructions, i.e. does the worker have to learn the correct 'feel' for himself?

Explain:

.....

SECTION 4.

EXTENT OF KNOWLEDGE ON THE JOB.

This section endeavours to assess the amount of knowledge which a worker must have to perform satisfactorily.

1. What is the degree of complexity of the sequence of activities of the job?

Explain:

Simple Sequence (Pick and Shovel)	Long Repetitive Sequence	Long Variable Sequence	Complex Sequence requiring Variable Response	Complex Sequence requiring considerable learning and theoretical knowledge

(13)

2. What checks must be made by the worker to ensure that his work is going smoothly?

.....

Minimal			Straight-forward checks			More Complicated checks		
A	B	C	A	B	C	A	B	C

A = Frequent
B = Occasional
C = Very Occasional

(14)

3. What equipment must the worker know how to use himself?
(Do not describe screwdrivers, spanner, etc. separately, but list them as "Tools used in builders trade, etc." or whatever the case might be).

.....
.....

None	Everyday Implements	General Knowledge	Considerable Knowledge	Considerable Knowledge involving theoretical background

(15)

4. What equipment is the worker expected to be familiar with without necessarily being able to use it himself? (Again do not itemise equipment).

.....

Minimal	General Knowledge	Considerable Knowledge

(16)

5. Do you see any evidence that the worker discriminates between tools and/or objects, using cues other than obvious ones, e.g. numbers, names?

.....

6. What knowledge of standing rules and regulations is required in the job?

.....

Those applicable to all employees only (Minimal)	Additional Rules specific to Job	Fairly extensive knowledge (Police Boys, Drivers)	Complex Knowledge (Clerks dealing with legal documents).

(17)

7. Are there ANY incentive and promotion schemes which the worker knows about?

.....
.....

8. For Clerical Jobs only: What knowledge of office routine is necessary? Describe and give examples:

.....
.....
.....
.....
.....
.....

Minimal (General Office work)	Average (Telephone Operator)	Considerable (Clerical Operator)	Extensive

(18)

NOTE: Extensive knowledge of office routine does not necessarily entail knowing how to use typewriter, calculator, etc.

SECTION 5.

MENTAL SKILLS.

This section is aimed at assessing the degree to which judgement, insight and mental ability is necessary in the job.

1. To what degree is judgment necessary in the job?
(Judgment is here defined as the checks and comparisons the worker must make mentally in order to determine future action).

.....

Low (Street Sweeper)	Below average (Producer fire boy, striker boy)	Average (Telephone Operator)	Above average (Nurse)	High (Surveyor, Social worker)

(19)

2. What ability must the worker have to solve new problems in his work as opposed to problems he deals with every day?

.....

Low (Street Sweeper)	Below Average (Telephone Operator)	Average (Nurse)	Above average (Midwife, Surveyor)	High (Social worker, Doctor)

(20)

3. To what degree does the job require mental ability in the worker? (Distinguish between mental ability and attention).
-
-

Low (Street Sweeper)	Below average (Producer fire boy, striker boy)	Average (Telephone Operator)	Above average (Nurse)	High (Surveyor, Social worker)

(21)

SECTION 6.

MENTAL EFFORT.

This section is aimed at assessing mental effort and for the purposes of this section, mental effort is taken as being independent of mental ability.

1. To what degree does the work demand full attention of the worker?

.....

Low (Street Sweeper, Trench digger)			Below Average (Producer Fire Boy)			Average Amount of Concentra- tion (Lawn Mower Driver)			Above average (Lorry Driver)			High (Striker Boy, Doctor)		
A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

(22)

2. What degree of vigilance is required for this job?
(Does it require of the worker to be mentally alert and ready for any action following any particular cue or signal, other than stereotyped or accustomed reactions)?

.....
.....
.....
.....

Low (Producer Fire Boy, Street Sweeper)			Below Average (Social Worker)			Average (Lawn Mower Driver)			Above Average (Steam- hammer boy)			High (Lorry Driver)		
A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

(23)

- A = Continual
B = Paid part of shift
C = Occasional.

SECTION 7.

PHYSICAL SKILLS.

This section endeavours to assess the degree of physical skill involved in the efficient performance of the job. Physical skills are here defined as co-ordination between sensory cues and motor responses.

1. Must a high degree of muscular control be exercised in performing the task, or is there a wide margin of tolerance?

None (Police Boy Clerk)	Minimal Muscular Control (Street Sweeper, Artisan Hand)	Fair Degree of Muscular Control (Producer Fire Boy)	Muscular Control of Primary Importance

(24)

2. To what degree does the worker have to distribute his attention to receive or collect the sensory cues necessary for the correct response?

Not necessary	Minimal	Significant	Extensive

(25)

3. Are there any elements of the job requiring timing of motor behaviour in response to sensory stimuli? Discuss -

Try to estimate the degree to which such timing is important in the job.

Not necessary (e.g.) Police Boy Clerk)	Minimal (Pick and Shovel work)	Important but with Fair de- gree of Lati- tude	Essential

(26)

4. To what degree are physical skills necessary in the job?

Not necessary	Minimal	Significant	Essential

(27)

5. To what degree is motor accuracy important in the job?

Not important (Clerk, Police Boy)	Increasing Degree of Tolerance of Error			Essential (Striker Boy)
	e.g. Pick & Shovel Wor- ker	e.g. Producer Fire Boy	e.g. Lorry Driver	

(28)

SECTION 8.

PHYSICAL EFFORT.

This section deals with the physical exertion required by the job and the frequency with which such physical exertion occurs. The letter A represents physical exertion throughout the shift. The letter B represents physical exertion for a fair part of the shift. The letter C represents occasional physical exertion only during the shift.

1. Predominant working position:

Describe:

Sitting (e.g. Clerical Work)	Standing	Moving (by own musculature)	Awkward positions

(29)

2. This question refers to the extent to which weights are handled in the job. It should not be filled in in respect of tasks which do not have some meaningful degree of physical exertion (viz. worker lifts spanners out of a box, or clerk carries briefcase weighing 5½ lbs.) Fill in the appropriate square in the table and make a rough estimate of the time spent in such tasks.

Handled over long distances				A			
Handled over fair distances				B			
Handled over short distances				C			
	Light	Medium	Heavy		Light	Medium	Heavy
	Weight				Weight		

Explanations: (if necessary)

3. What degree of physical exertion does the daily work routine entail?

Explain:

Degree of Exertion	Hardly any (Clerks etc.)			Minimal			Average			Maximal		
Amount of Time Spent	A	B	C	A	B	C	A	B	C	A	B	C

(30)

NOTE: In questions 2 and 3, if more than one category is applicable, these should also be fitted in.

4. With particular reference to questions 2 and 3, what muscle groups are predominantly used in the activity? Are any muscle groups used in particular against a background of use of all the body's musculature? Are the movements made of a variable or stereotyped kind?

.....
.....
.....
.....

5. Is the job one which by its very nature involves short periods of exertion alternating with periods in which no further work can be done?

Yes	No

Explain:
.....
.....

(31)

6. The pacing of the job is determined by:

A Machine	The Team (Artisan or Supervisor)	The Worker (i.e. unpaced)

7. (a) Does the job involve

5	6	7

 days a week.

- (b) What are the hours of work?
(c) What is the length of the shift in minutes?
.....
(d) Estimate roughly the number of minutes of work per hour on shift?
(e) What is the length of the lunch period?
(f) Are there any additional rest periods?

Describe:
Have systematic studies and observation helped to determine these rest periods?

- (g) Are there any mechanical aids (here defined as devices to minimise physical exertion such as pulleys, trolleys, barrows, etc.) in this job? Describe:

.....

SECTION 8: RESPONSIBILITY FOR EQUIPMENT AND MATERIAL

This section attempts to assess the extent to which the worker is responsible for equipment and material. Responsibility for material which is guarded (case of police boys, etc.) should be considered only in Question 7.

1. Give a detailed list of equipment which the worker:-

A Uses himself	B Handles	C Has occasional contact with
.....		
.....		
.....		
.....		
.....		
.....		
.....		
.....		

2. What is the probability of equipment in each of the above three categories becoming damaged due to the fault of the worker? Indicate in table below:

Categories above	A			
	B			
	C			
	Remote	Has happened once or twice	Has happened more often	

(32)

(33)

(34)

3. Where the worker himself uses equipment, what is the value of the equipment?

£1	£1 - 10	£11 - 50	£51 - 200	Over £200 (State approximate value)

(35)

4. Where the worker handles any material, what is the value of such material?

Little value (Cheap and easily available)	Some value (Mishandling might involve expense of a few pounds)	Valuable Material (error in handling might involve expensive replacement)

(36)

5. What is the probability of such damage as mentioned in 4 above arising through the fault of the worker?

Remote	Has happened once or twice	Has happened more often

(37)

6. What degree of inspection is necessary by the worker for taking reasonable care of equipment and/or material?

Explain:

Casual Inspection	Set Routine	Complex Inspection

(38)

7. Where the worker is responsible for guarding buildings, equipment, material, etc., discuss the nature of his responsibility.

.....

.....

.....

.....

.....

.....

SECTION 10:

RESPONSIBILITY FOR PERSONAL CONTACTS.

This section attempts to assess the degree of responsibility for personal contacts the job makes upon the worker.

1. To what degree does the worker come into contact with:

	No Con- tact	Purely Inc- idental	An essential ele- ment of the job.		
			Occasional	Frequent	
a) The European Public					(39)
b) The non-European Public					(40)

2. What is the level of such contact? Although technically-speaking all Municipal Employees are servants, one can draw a clear distinction between rubbish collectors, telephone operators and doctors or midwives. The aim of the question is to make this distinction. Explain:

.....

	As Servant	Higher level	
a) European public			(41)
b) Non-European public			(42)

3. What is the nature of the contact?

.....

4. How tactful must the worker be in such contact?

.....

Try do assess this:-

	Merely has to avoid rudeness	Has to show fair degree of tact	Has to display considerable tact (Traffic Inspectors, etc)	
a) European public				(43)
b) Non-European public				(44)

5. Are there any aspects of this job that makes dealing with other employees of Council a special feature? Explain:

.....

6. List the persons supervised by the worker:

--	--	--

Comment if necessary

.....

- 7.

	Instructions given to Supervisor	
	Broad Directive (He must fill in details)	Very specific instructions (No planning necessary)
Supervisor is apart from Group		
Supervisor works within the Group		

(45)

Comment if necessary

.....

8. What technical knowledge must the supervisor have concerning the job he is supervising. i.e. must have learnt the jobs thoroughly before being made a supervisor?

Comment

.....

The supervisor must know:-

Nothing about the work supervised	Only as much as the Workers	More than the Workers

(46)

9. What instructions must the supervisor convey to his workers?

Give examples:

.....

.....

.....

.....

.....

.....

Simple	Fairly Straightforward	Complex

(47)

10. On what types of tasks is the supervisor expected to supervise?

Give examples:

.....

.....

.....

.....

.....

.....

Simple	Fairly Straightforward	Complex

(48)

SECTION 11:

WORK SURROUNDINGS.

This section endeavours to assess those environmental or physical conditions under which the worker must perform his job and over which he has no control.

1. Is this job carried out

Indoors	Outdoors	Both

2. If the work is done outdoors, what happens in bad weather? Explain:

.....

Stops Work completely	Is employed on other work	Continues despite weather

(49)

3. Under what predominant conditions does the worker perform his duties?

High degree of Discomfort	Some Discomfort	Reasonable	Good

(50)

4. Indicate factors below which cause unsatisfactory work surroundings.

Fumes	Heat	Glare	Vibration	Weather
Gas	Cold	Noise	Dust	Steam
Unpleasant Smells	Any Others			

(51)

5. Discuss these conditions giving the cause, frequency and the degree of discomfort:

.....
.....
.....
.....
.....
.....
.....
.....

SECTION 12.

WORK HAZARDS.

This section of the schedule deals with the degree of exposure to accidents and the probability of resulting injury.

1. Do the job methods currently used incorporate some danger elements for the worker?

Yes	No

(52)

2. Indicate types of accidents which may occur in this job:

Heights	Traffic	Sharp Instruments	Acid	Any other
Dropped objects	Moving Objects	Heavy Objects	Electric Shocks	
Flying Parts	Machinery	Hot material	Depth	

(53)

3. Discuss with reference to actual records, if possible, types of accidents which have occurred.

.....
.....

4. What are the possibilities of injury to the worker in this job?

Frequently happens	Has happened once or twice	Remote
A B C	A B C	A B C

A = Major Injury
B = Injury causing 1-7 days absence of work
C = Minor Injury (54)

5. Do the work methods currently used incorporate some danger elements for fellow workers through some fault of the worker?

(Try to assess in terms of reality)

Frequently happens	Has happened once or twice	Remote
A B C	A B C	A B C

A = Major injury
B = Injury causing 1-7 days absence of work
C = Minor Injury (55)

6. Does the worker have to know any safety regulations apart from these:

(a) Applied to all employees in Department

(b) Applied to all employees in Section

Yes	No

Discuss:

.....

7. What degree of knowledge must the worker have of Safety Regulations?

Minimal	Some	Extensive

(56)

8. Rank types of accident in order of frequency of occurrence (viz. 1, 2, and 3).

The material being handled	Machines or Tools used	The work location

- (a) Have the workers or supervisors been trained in any methods of accident prevention?
- (b) Are accurate accident records kept?

Yes	No

APPENDIX B.

Jobs selected for job analysis experiment.

Group 1. Skilled jobs.

1.1 Technical assistant - trained by the municipality as a surveyor and skilled in precise levelling, making the necessary calculations and drawings, and at times called upon to supervise the construction of buildings, the excavation of sewers, etc.

1.2 Ambulance driver - trained in first aid and responsible for collecting and delivering patients who reside in a large section of the townships. This requires him to know the layout of a large urban sector, and to maintain his vehicle, at a superficial mechanical level.

1.3 Motor mechanic - trained artisan who carries all mechanical work connected with the repair and maintenance of motor vehicles (petrol and diesel), cement mixers, compressors and mechanical rammers. He carries out, in addition, electrical repairs to vehicles, and welds chassis, gear boxes using an oxy-acetylene torch.

1.4 Clerk-cashier - works behind a counter receiving cash from the Non-European public in payment of rent, electricity deposits and for any of the services supplied by the municipality, e.g. the hire of hearses. He issues receipts and makes entries on Burroughs machines. At the end of the day balances the cash receipts with the total registered by the machine.

1.5 Carpenter - trained artisan mainly engaged in the erection of roofs to houses, hostels and schools. He may at times be involved in other activities on a building site, e.g. the hanging of doors or else to do woodwork in a joinery shop.

1.6 Bricklayer teamleader - trained artisan working with a group of four bricklayers to erect weekly a set quota of houses. He acts as their teamleader which means that in addition to maintaining the pace and ensuring that quality standards are observed, he does all the bricklaying of the corners in houses.

1.7 Foreman bricklayer - he is responsible to a civil engineer of the municipality for the complete erection of a weekly quota of houses. He controls about 160 artisans and is assisted by teamleaders and assistant foremen. He requisitions materials, plans the flow of work, deals with disciplinary matters, and inspects the quality of finished work.

1.8 Senior Nurse - she is responsible for supervising and co-ordinating the activities of $\frac{3}{4}$ qualified nurses in a municipal clinic. She allocates duties, checks report books, ensures that quality standards are maintained, and controls the issue of medical stocks, linen, etc.

1.9 Drainlayer - trained artisan in charge of a team of three workers, whose task is to lay pipes in sewer trenches. He must establish levels between manholes from pegs set by the surveyor; he assists in the laying of earthenware pipe, an activity which requires a judgment and manipulation to ensure that levels and slopes are achieved. The work is repetitive.

1.10 Traffic inspector. He controls pedestrian and motor traffic in urban areas, either in the townships or in the industrial portions of the European district which have large numbers of African pedestrians. This involves him in scholar and pedestrian control, in patrol duties and in the preparation of reports and indictments, where traffic by-laws are contravened.

Group 2. Semi-skilled jobs.

2.1 A.D.V. (animal drawn vehicle) driver. He drives, through the European and African districts, a refuse collection vehicle, drawn by 6 mules. He must negotiate town traffic and manoeuvre the vehicle at the refuse dump to tip its contents in a given spot. He is assisted by two refuse removers (dustmen) whose pace of work he maintains, he levels the refuse in the vehicle, and checks spillage. He grooms his animals, and checks daily on the general condition of his vehicle.

1.7 Foreman bricklayer - he is responsible to a civil engineer of the municipality for the complete erection of a weekly quota of houses. He controls about 160 artisans and is assisted by teamleaders and assistant foremen. He requisitions materials, plans the flow of work, deals with disciplinary matters, and inspects the quality of finished work.

1.8 Senior Nurse - she is responsible for supervising and co-ordinating the activities of 34 qualified nurses in a municipal clinic. She allocates duties, checks report books, ensures that quality standards are maintained, and controls the issue of medical stocks, linen, etc.

1.9 Drainlayer - trained artisan in charge of a team of three workers, whose task is to lay pipes in sewer trenches. He must establish levels between manholes from pegs set by the surveyor; he assists in the laying of earthenware pipes, an activity which requires a judgment and manipulation to ensure that levels and slopes are achieved. The work is repetitive.

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2.1 A.D.V. (animal drawn vehicle) driver. He drives, through the European and African districts, a refuse collection vehicle, drawn by 6 mules. He must negotiate town traffic and manoeuvre the vehicle at the refuse dump to tip its contents in a given spot. He is assisted by two refuse removers (dustmen) whose pace of work he maintains, he levels the refuse in the vehicle, and checks spillage. He grooms his animals, and checks daily on the general condition of his vehicle.

2.2 Survey employee - his main function is to assist a fully qualified European surveyor to take precise measurements in the field. He works at some distance from the surveyor, must anticipate the various stages in measurement, and understand instructions given by means of hand signals. He reads out measures on a tape and on a telescopic surveying staff. He must be relied upon to hold the tape at the correct tension and the staff at an angle of 90 degrees. He acts as general assistant, collecting equipment, transporting it, setting tripods in position and digging out pre-positioned pegs.

2.3 Bossboy: road construction gang. He supervises a gang of 20 road workers, by ensuring that they maintain a reasonable pace of work, he conveys to them instructions given by the constructor; and assists him in his inspection of levels and slopes by helping him to use spirit levels, boning rods and straight edges. Crude reference points are given to the bossboy who must then ensure that required levels and slopes are achieved almost entirely by visual checks and without the use of instruments. He is responsible for the safe-keeping of equipment on the work site.

2.4 Area bossboy. He supervises the removal of refuse and the cleaning of streets in an urban district. He travels from point to point on a bicycle and is responsible for the work of fifteen street sweepers and twenty refuse removers. He checks on work done, ensures that standards of cleanliness are maintained, notes down complaints from European householders. He may take action himself or report the matter to his overseer.

2.5 Senior compound clerk. He deals with the personnel records of 2,000 labourers attached to a cleansing depot and housed in a compound. He is assisted by four clerks, ensures that records are kept up-to-date, and abstracts from them information for various returns to central administration of the department, e.g. time sheets, special accident forms. He interviews work seekers, engages them, and directs them to various sections of the department.

2.6 Lorry driver. He drives a 5-ton truck transporting building materials from stores to sites. He transports labour early in the morning and at the end of a shift. He is held responsible for the material transported, ensures that the quantities issued tally with the requisitions. He is assisted by four labourers who handle material and equipment.

2.7 Concrete mixer operator. He operates a power-driven concrete mixer. He ensures that the correct quantities of various ingredients are poured into the bowl of the mixer, operates the mixer until the amalgam is of the correct consistency, then tilts the bowl to pour concrete into barrows waiting below a platform.

2.8 Road rammer operator. He operates an internal combustion power rammer which is used for stamping down earth, gravel, asphalt. The essence of his skill lies in his being able to ignite the explosion when the rammer has hit the ground and immediately before it recoils upward. He must moreover, manoeuvre the rammer at the apex of its upward flight when it has little weight. He fuels and oils his machine and cleans the spark plug at regular intervals.

2.9 Chief time-keeper's clerk. He controls and checks the work of ten African clerks who transcribe information, i.e. badge numbers, hours worked, etc... from daily time sheets into returns forwarded to central administration. As the work is done for the first time by Africans, it is extensively checked. When errors occur, he must be sufficiently experienced to spot quickly its probable cause and to rectify it. Work is done under pressure as the computation of the weekly pay roll depends upon it. He deals directly with pay queries brought to his office either by European supervisors or African workers.

2.10 Pneumatic drill operator. He operates a jack-hammer or pneumatic drill both driven by compressed air. The essence of his job lies in his being able to control a heavy, vibrating piece of equipment (100 lbs in weight and 6ft long) as well as apply sufficient muscular pressure to penetrate into rock or ground. He must check visually that the direction of the hole and its depth will satisfy the blasting requirements. He works generally in wet and dusty conditions. He cleans and lubricates his machine periodically.

2.11 Compressor boy. He operates a diesel-powered air compressor machine. He connects the batteries to terminals, turns on fuel and air cocks, disengages clutch, places valve control in "NO COMPRESSION" position, releases air from fuel system, and pulls the fuel control system to start. He starts the motor with a crank, runs the engine light for five minutes, and then engages the clutch. He does little else besides watching that the air pressure remains satisfactory by watching a gauge and listening to the pitch of the engine. He greases and cleans the machine at regular intervals.

2.12 Pointsman: tramways. He adjusts "point" in the track of trams and "frogs" in the overhead wire to direct trams into their proper course, i.e. to a given shed or on the outgoing track. He operates points by inserting a rod in the track; the frog is operated by pulling a wire attached to a pole. He controls at least two sets of points and frogs. He must operate point and frog almost simultaneously and unerringly at peak periods. He must contend with heavy motor traffic.

2.13 Senior recorder. He controls the work of 28 African clerks employed in the central time office. Their job is to sort, stamp, classify 18,000 Hollerith cards every week. He allocates African escorts for paymasters going out every week, and deals with pay queries brought to his office. He checks requests to go on leave against personnel records, and deals with various personnel records of the clerks in his department.

2.14 Nursing assistant. She assists in the general work of a hospital ward undertaking a series of duties which range in skill. She makes beds, washes and feeds patients, watches them in the absence of a trained nurse, takes temperatures, as well as dusting the furniture, sweeping floors and doing a number of household duties. She must adhere to a strict code of hygiene.

2.15 Clinic clerk. He establishes, maintains and files the records of a large number (±2,000) of out patients attending an ante-natal clinic. The responsibility of the job is reflected by the distress which would result from an error. A blood test result entered in the wrong card would mean that a syphilitic remains untreated and possibly infects her foetus, whereas a perfectly healthy woman is told that she suffers from a venereal disease. He compiles monthly statistics of cases treated at the clinic.

2.16 Cycle truer. He repairs tubes used in animal-drawn vehicles and in tricycles of council. He operates a simple vulcanizing machine. He also maintains and repairs a number of bicycles or tricycles used in the council. He must diagnose malfunctions, dismantle and re-assemble parts, and replace spares.

2.17 Steam roller fire boy. He services a steam-powered heavy roller used in road work. He lights and attends to the fire, cleans the steam tubes in the boiler, fills the bunker with coal and the tank with water, oils and greases various points in the roller. He guards the road construction camp for the rest of the day.

2.18 Plasterer. He covers brick wall surfaces with mortar to give it an even surface and to cover any errors in the quality of the brickwork. The essence of the job lies in his ability to throw mortar from board to wall without spilling and applying the trowel before the blob falls off. He must, in addition, be able to judge whether the surface is level, and prevent too much mortar building up in one spot. He checks on his work by means of spirit level and straight edge, he scrapes off excess mortar and adds mortar where cavities show. He serves a two years apprenticeship in which he is taught how to obtain smooth surfaces, lay concrete floors and steps.

2.19 Sergeant - Induna. His main function is to maintain discipline, law and order in a compound which houses 1,600 African workers. He is assisted by 5 corporals and 28 policemen. He must be able to assess the prevalent mood of workers and to prevent as far as is possible unrest and violence. He makes sure that all workers housed in the compound have left for their jobs, and that those who are left behind have a valid reason. He acts as headman when workers or their relatives involve him in their domestic quarrels. He supervises the cleanliness of the compound and directs the work of 30 cleaners.

2.20 Mechanic's hand. He assists a European motor mechanic engaged in the routine inspection of motor bus engines. He prepares the work site by laying out the tools, and carrying out a number of preliminary operations, e.g. emptying the sump of oil. He hands out tools, assists the mechanic by holding tools or applying counter force, and runs errands for him.

Group 3. Unskilled jobs.

3.1 Sewer blockage labourer. He removes blockages in sewers either manually or else by using lengths of sewer rods. He may have to excavate ground to go to the sewer or else may go down a manhole, after necessary safety precautions have been taken. He works in a gang of four.

3.2 Watchman. He stands at the gate of a large municipal workshop and guides incoming and outgoing vehicles. He locks various doors and gates at the end of the work shift, and thereafter patrols yards and reports anything suspicious to the police, or summons help.

3.3 Battery boy. He tops up batteries in a bus garage, with distilled water. He checks on the terminals, reports whether they are corroded, and notes on a card whether the battery appears to be leaking or needs attention.

3.4 Coal offloading gang labourer. He offloads coal from railway trucks into special bunkers. He opens the truck door and then proceeds to shovel the coal out. He may have to sweep around a bunker or else dislodge coal which has packed into a bunker by going into it, attached to a safety belt.

3.5 Subway cleaner. Slaughterers in an abattoir remove the edible parts from a carcass. The remnants, e.g. unborn calves, diseased udders, the contents of stomach and bowels slide down a chute into a subway. Here the subway cleaner removes all solid parts, places them in a trolley and pushes the semi-liquid matter down a sewer. Walls of the subway and the floors are hosed and scrubbed with steel wire brushes.

3.6 Office cleaner. He dusts, sweeps and cleans a suite of offices. He makes and serves tea to office staff three times a day and carries heavy parcels and ledgers when called upon to do so.

3.7 Compound cleaner. He sweeps floors in the dormitories, washes down and sweeps gutters, removes solid refuse from bins, and hoses down the yard.

3.8 Road gang labourer. He excavates the shallow bed on which the road will be laid, carries material from heaps on wheelbarrow, spreads gravel and rakes it smooth, and levels pavements, applying tarmac haunching.

3.9 Foundry pot boy. Assists European moulders in a foundry by carrying pots of molten metal from furnace to mould in a pot held in a brace. The moulder directs the pour and the pot boy supplies the necessary leverage. He undertakes a number of additional labouring duties, e.g. shovelling sand into frames, removing cores, cleaning moulds.

3.10 Bricklayer's labourer. Assists bricklayer by collecting bricks, positioning them in a heap next to the wall being erected, fetching mortar from cement mixers, erecting scaffolds, and cleaning site of rubble.

APPENDIX C.

Communication from R.S. Hall re Method of Analysis.

(I)

Given: 4 scores $A_1 B_1 C_1 D_1$ on each of 20 jobs and another 4 scores $A_2 B_2 C_2 D_2$ on each of 10 jobs together with the corresponding Means and Standard Deviations.

Required: The significance of the difference between $(\overline{A_1+B_1})-(\overline{C_1+D_1})$ and $(\overline{A_2+B_2})-(\overline{C_2+D_2})$ working from the original distribution of the 8 scores.

Analyses:

$$(i) \quad \overline{(A_1+B_1)}-(\overline{C_1+D_1}) = \bar{A}_1 + \bar{B}_1 - \bar{C}_1 - \bar{D}_1$$

$$\overline{(A_2+B_2)}-(\overline{C_2+D_2}) = \bar{A}_2 + \bar{B}_2 - \bar{C}_2 - \bar{D}_2$$

(ii) The standard deviation of $\overline{(A_1+B_1)}-(\overline{C_1+D_1})$ is:-

$$\sigma_1 = \text{S.d.}_1 = \sqrt{\sigma_{A_1}^2 + \sigma_{B_1}^2 + \sigma_{C_1}^2 + \sigma_{D_1}^2 + 2\sigma_{A_1 B_1} \sigma_{A_1} \sigma_{B_1} r_{A_1 B_1} - 2\sigma_{A_1 C_1} \sigma_{A_1} \sigma_{C_1} r_{A_1 C_1} - 2\sigma_{A_1 D_1} \sigma_{A_1} \sigma_{D_1} r_{A_1 D_1} - 2\sigma_{B_1 C_1} \sigma_{B_1} \sigma_{C_1} r_{B_1 C_1} - 2\sigma_{B_1 D_1} \sigma_{B_1} \sigma_{D_1} r_{B_1 D_1} + 2\sigma_{C_1 D_1} \sigma_{C_1} \sigma_{D_1} r_{C_1 D_1}}$$

where $r_{A_1 B_1}$ is the correlation between scores A_1 and B_1 over the 20 jobs.

Likewise the Standard Deviation of $\overline{(A_2+B_2)}-(\overline{C_2+D_2})$ is:-

$$\sigma_2 = \text{S.d.}_2 = \sqrt{\sigma_{A_2}^2 + \sigma_{B_2}^2 + \sigma_{C_2}^2 + \sigma_{D_2}^2 + 2\sigma_{A_2 B_2} \sigma_{A_2} \sigma_{B_2} r_{A_2 B_2} - 2\sigma_{A_2 C_2} \sigma_{A_2} \sigma_{C_2} r_{A_2 C_2} - 2\sigma_{A_2 D_2} \sigma_{A_2} \sigma_{D_2} r_{A_2 D_2} - 2\sigma_{B_2 C_2} \sigma_{B_2} \sigma_{C_2} r_{B_2 C_2} - 2\sigma_{B_2 D_2} \sigma_{B_2} \sigma_{D_2} r_{B_2 D_2} + 2\sigma_{C_2 D_2} \sigma_{C_2} \sigma_{D_2} r_{C_2 D_2}}$$

The above are simply examples of the well-known result.

Given two variables X, Y with means $\bar{X}, \bar{Y}$ and variances σ_X^2, σ_Y^2 ,

then the mean and S.D. of their sum are, respectively,

$$\bar{X} + \bar{Y}, \text{ and } \sqrt{(\sigma_X^2 + \sigma_Y^2 + 2\sigma_X \sigma_Y r_{XY})}$$

The proof of this is obtained by expanding

$$\Sigma(X+Y)^2 = \Sigma X^2 + 2\Sigma XY + \Sigma Y^2$$

If X, Y are measured from their means, the result is immediate.

(iii) In testing the significance of the difference

$(A_1+B_1)-(C_1+D_1) - (A_2+B_2)-(C_2+D_2)$ it is reasonable to assume that the scores on the 20 jobs are independent of those on the 10 jobs.

If a "t" test is valid the "t" value can be computed from (this assumes homogeneous S.D.'s.)

$$t = \frac{\bar{A}_1 + \bar{B}_1 - \bar{C}_1 - \bar{D}_1 - \bar{A}_2 - \bar{B}_2 + \bar{C}_2 + \bar{D}_2}{\sqrt{\frac{20\sigma_1^2 + 10\sigma_2^2}{(20+10-2)}} \sqrt{\frac{20+10}{20 \cdot 10}}}$$

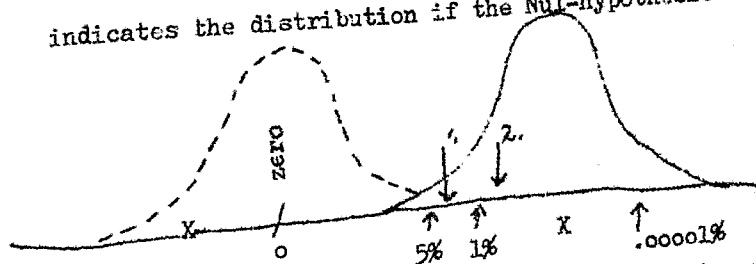
where σ_1 and σ_2 are given in (ii) above.

or σ_1 and σ_2 could be used in Welch's test.

(II)

If tests were carried out on $(A_1+B_1)-(C_1+D_1)$ and $(A_2+B_2)-(C_2+D_2)$ separately, the fact that the "t" ratio for the second was much longer than that for the first, might suggest that the difference $[(A_2+B_2)-(C_2+D_2)] - [(A_1+B_1)-(C_1+D_1)]$ was different from zero but would not prove it. The reason is as follows:-

If the first ratio is significantly different from zero then the sampling distribution of such differences is shown by the heavy line curve below. The dotted line curve indicates the distribution if the Null-hypothesis were true.



The two ratios are marked 1. and 2. and it can be seen that it would be quite possible to have one at the 5% point on the dotted curve, and one far beyond its .00001% and yet for both these results to be neither significantly different from one another nor from X.

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