A STUDY OF SOME OF THE SOCIAL FACTORS

INFLUENCING LABOUR PRODUCTIVITY IN COAL MINES

by

ROBERT C. R. PARK, B.Sc.

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The Author wishes to acknowledge the help of the National Coal Board in arranging the fieldwork, and providing access to the three collieries in this study.
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PART I

BACKGROUND OF THE STUDY
The coal industry in this country is — and always has been — very much in the public eye. The production problems during two World Wars, strikes in 1920, 1921, and 1926, unemployment in the thirties, the Nationalisation issue and recurring economic difficulties were all events causing a focusing of attention on the industry. Certain of the problems have changed; for instance the production problem has become one of over-production where for many years it was under-production. There are certain other problems, however, which have remained unchanged throughout the history of the industry — for instance the problems of high cost, and efficiency. Closely related to these two problems, there has been a concern with the problem of labour productivity; and behind this concern has been an idea, not always concealed, that the miner is not pulling his weight — that his productivity is lower than it ought to be. It was with the purpose of throwing some light on the problem of labour productivity that I began this study.

I graduated in July, 1958, from Edinburgh University with a B.Sc. degree in Mining Engineering after a four-year course. In accordance with the regulations for this degree I had obtained practical experience at a colliery during the vacations. I worked at a colliery in the West of Scotland for a total time of almost a year, becoming very friendly with many of the men during that time.

1. For many years the problem was under-production but one hundred years ago the industry was evidently facing similar problems to those which confront it today.

"To go on at full force, raising coal with the prospect of a contracted demand, seems to us very imprudent, for in the end, though wages should be greatly reduced, much of the coal accumulated will be sold at a serious loss. Wages must go down if trade becomes worse, but let not the trial be made more severe than necessary. 'Short time' would be to the advantage of employers, and we are quite sure it would be more satisfactory to the operatives, and, therefore we commend the suggestion to the serious consideration of those on whom rests the responsibility of providing for future and probable contingencies." (From the Colliery Guardian, June 15th, 1861)
One factor which helped in making friends was that several of my relatives had worked or were working at this colliery and I benefited from the favourable feelings which already existed towards my family. Although I was a mining student, and therefore a potential manager, the men did not appear to regard me as a representative of management. They told me numerous stories about their jobs and the "bad" managers and other officials they had had. Usually they concluded jokingly, "You'll be just as bad when you're a manager."

It was as if I was being given a look at what went on underground, before being shut out along with "them" - the management. This glimpse I got of the feelings of these men, of the way they looked at their work, and of the sort of grievances they voiced, aroused my interest in the human problems involved in coalmining. I began to feel that mining students were being trained only to understand and solve technical problems in an industry in which human problems are at least as important.

A short course on industrial organisation and industrial relations in the final year of the degree course included a brief study of the Hawthorne Experiments. This stimulated my interest and I felt I wanted to go more deeply into the problems which were being raised. Eventually I decided to do some research into Industrial Relations when my mining course was finished. This was as close as I could get at that time to defining the problems I wished to study. To become more familiar with the subject I spent a year in classes and reading. Through Roethlisber and Dickson, Whyte, Roy and others, I became interested in the problem of "a day's work" - and the question,

1. See Roethlisberger and Dickson, "Management and the Worker."
2. For instance; W.F. Whyte, "Human Relations in the Restaurant Industry," and "Money and Motivation" (with Roy, Dalton, and others.)

2.
"What is a fair day's work," Differing views on this latter question seemed to me to be behind many of the arguments I had heard while working underground.

It was these conflicting views on a day's work that I decided to study. The literature I read suggests that group forces are particularly important in determining a day's work and for this reason I chose as title for my thesis: "A Study of Some of the Social Factors Influencing Labour Productivity in Coal-Mines."

The next problem which had to be tackled was the research method to be used in carrying out the study. I decided to use Participant Observation; the reasons for this choice are discussed in the next section.

1. H. Behrend, article, "A Fair Day's Work."
II. CHOICE OF RESEARCH METHOD

Choice of Participant Observation

Many studies of productivity have used the statistical approach, and have concerned themselves with the problem of measurement. In this connection, productivity is generally considered as a ratio of output to input. For instance, in a survey of recent work, Easterfield says:

"'Productivity' may be defined simply as the ratio of a measure of output (of industry, plant, machine, etc.) to a measure of one or more of the inputs (labour, raw materials, machine, time, etc.) used to produce the output." 1

The corresponding measure for coal-miners is output per manshift; this provides us with a ratio of the input of time to the output of coal. This measure is often used in discussions of the productivity problem in coal-mines and many pronouncements criticising low productivity in the mines are based on this measure; so are comparisons between mines. However, output per manshift must not be equated with effort applied, for effort and time are not the only variables that affect output. Purely technical conditions, such as the geological formation of the seam and the degree of mechanisation are, in my opinion, more important variables affecting output per manshift, provided there is a reasonable level of willingness to work. In other words, output per manshift depends to a considerable extent on technical variables, and this makes it difficult to isolate the contribution of labour productivity to this index. 2


2. In criticisms of low productivity and of miners generally, idle time is often regarded as an indication of willingness to work. The evidence of this study does not support this view. It suggests, rather, that idle time depends on technical factors in the job situation outwith the control of the individual miner, and on union agreements on manpower. It proved necessary to go more deeply into these aspects of the problem; for this, see the chapters on 'The Influence of Technical Conditions on Productivity' and 'Task Negotiation'.

4.
For this reason the statistical approach did not appear worthwhile; nor did I see any other way of tackling the problem of the productivity of the individual miner quantitatively.

I had a number of discussions of other possible research methods for studying labour productivity with various members of the University staff. Weighing up the relative advantages and disadvantages of using questionnaires, interviews or participant observation, several points emerged.

There were two possible approaches. One was to formulate fairly precise questions and hypotheses, and to test these by questionnaire or interview. The other was to adopt a less structured method which would allow one to pick up the expected as well as unexpected information. This would be the approach used in unguided interviews or participant observation.¹

Since reading Whyte's "Human Relations in the Restaurant Industry";² and Roy's accounts of his work in a machine shop, I had myself become interested in participant observation as a research method. This method of study appealed to me strongly on the basis of my past experience in coal mines. Members of the Social Sciences Research Centre of the University said they thought participant observation could provide detailed factual information not obtainable by other means, and might give valuable insights into some of the human problems of work. These in turn might lead to the formulation of hypotheses, which could be tested by more precise research methods such as the interview, later on.

The adoption of an unstructured method of research seemed particularly appropriate because few studies of labour productivity in the mines have been made to provide hypotheses or precise questions to be answered; this research would be very much in the nature of a pilot study. In a structured pilot study there are two special dangers: one is to stress the similarities or

¹ Compare "Human Organisation Research", Adams and Pross (Bis); chapter on "Participant Observation", Becker and Geer, p. 263.
² Also W.F. Whyte, "Street Corner Society".
dissimilarities with industry and import ideas or hypotheses from there which may or may not be applicable; the other is that the researcher's own preconceptions (especially if he has had past experience as a naive observer) make him concentrate his attention on certain factors to the exclusion of other important ones. Of course, there is always a danger of being influenced by preconceived notions, but up to a point participative observation seems to minimise this danger. It aims to record everything that happens, irrespective of whether it appears important or unimportant to the observer. In other words, all possible information is gathered; it is sifted for meaning and relevance at a later stage.

Participant observation, however, is not without its disadvantages, as became abundantly clear in this study. Perhaps one of the gravest drawbacks is that it yields an unwieldy mass of information that is very difficult to organise - the use of an unstructured method produces unstructured data.

I was in a unique position to do participant observation in coal mines since I had a method of entry denied to the Social Scientist - I was a mining student. As such I could get more or less instant access to a colliery; I already had a working knowledge of conditions underground, and I had done various periods of preliminary training. This last point is an illustration of one of the more practical barriers to the Social Scientist who wishes to do participant observation. If he intends to study semi-skilled or skilled jobs some preliminary training is almost always necessary. Age can also be a handicap - training schemes frequently have an upper age limit for acceptance. The sex of the researcher may also be a disadvantage - a woman may want information about a job which only men do and vice versa.
A further point raised in discussion was that participant observation is a research method which has not been used to any great extent in this country. Lupton and Cunnison¹ and Baldamus² provide two of the very few studies using this method; and, to my knowledge, it has not been used in coal-mines before this present study. A consideration of the advantages and disadvantages of participant observation in coal mines was therefore made a secondary purpose of this present study.

**Gaining Entry**

Having decided on using participant observation, the next two problems which had to be tackled jointly were those of deciding how the fieldwork time should be allocated in terms of jobs and collieries, and of how best to gain entry to the coalface. It seemed desirable to study not one job, but all operations involved in coal-getting, because coal-mining involves a cycle of operations where each operation is important for productivity and any one operation not completed can upset the whole cycle. The plan therefore was to study the following five operations: coal-cutting, filling, brushing, packing and conveyor-shifting.³. Another question was whether to get entry to more than one colliery. It seemed advantageous to study at least two to get some measure of comparison.

The problem of entry really involved two things: permission to be there, and permission to do research. As already pointed out, I was in a favourable position to get permission to be in the mine, for I was entitled to apply for coalface training, a means of entry not open to the Social Scientist in the

³. A description of these five operations and their place in the Longwall cycle of operations will be found in Chapter IV 'Technical Background'.
normal course of events. My decision to do participant observation probably minimised the problem of getting permission to do research; for it involves less trouble to allow someone to train on the coalface than to interview on the face. It is doubtful that with my qualifications I would have got permission for interviewing, whereas I encountered surprisingly little difficulty in getting permission for participant observation while being engaged - and paid - officially as a trainee.

To get permission, I approached the Industrial Relations Department at the National Coal Board's headquarters in London. They raised no objections and passed me on to the Staff Training Officer of the Scottish Division who took me 'under his wing.' He sent me to the Area General Manager of the Area in which I proposed to work. He in turn gave his permission to carry out the research; the details were worked out with the Area Staff Training Officer.

A meeting with the Area Staff Training Officer determined the final plan for the fieldwork. I was given permission to go to two collieries, as a trainee following the normal coalface-training routines. These routines involve spending certain periods on each of the five coalface operations, as detailed in Appendix A. He agreed that only one month need be spent on the first operation done instead of three months as required by the Regulations.¹ This was to ensure the same amount of time on each job. I could not have spent three months on each operation and visited two collieries, as this would have meant two and a half years, which was more time than was available for the fieldwork.

The Area Staff Training Officer arranged for me to work at colliery A and B.² It was when I arrived at colliery A that I met my first real obstacles to the carrying out of my plans as described above. They arose from the question of who was to know about the research.

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¹ The minimum period which can be spent on one operation is one month - month here is four weeks or 20 working days.
² A brief description of these two collieries and colliery C is given in Chapter VI.
It seemed essential at the beginning of the study to maintain secrecy about my real purpose in carrying out face-training operations at collieries A and B, so that the situations I observed would be as normal as possible. The Area General Manager agreed to this and I met the manager of colliery A, under the impression that he was unaware of my intentions. The manager did not tell me at our meeting that in fact he knew why I wanted to do coalface training at his colliery. We talked for some time on general points such as the size of the colliery and its layout, without being able to decide anything specific. The manager said my first week could be spent travelling around the colliery and arranging my training plan, with the colliery training officer.

It was obvious that the training officer had not been told – for some reason unknown to me – about my plan to do one month on each of the five operations: filling, cutting, brushing, packing and conveyor-shifting. He wanted me to do three months on the first operation as required by the regulations. It would have been impossible, without explanations which might have jeopardised the research, to suggest to him that I did only one month. He did say, however, that if I had already done coal-filling training it would be easier to give me the remaining four operations – there was a waiting-list for coal-filling training. My plan had to be revised 'on the spot' to one month on four operations.¹

A similar, but less serious, situation arose at colliery B with the training officer there. I had been at colliery A for five months, and at the end of that time the Area Staff Training Officer arranged for me to spend a similar length of time at Colliery B. He also agreed to hold back my training records from colliery A so that it would not be known at colliery B that I had already done four of the operations. Thus there would be no awkward questions about the repetition. This time I knew in advance that the manager had been

1. I was able to do this because I had done filling training several years previously; however, I had hoped to repeat it as one of the five operations of the longwall cycle.
informed about my research, but unfortunately he was detained elsewhere the day we were supposed to meet and I saw the Training Officer instead. The latter had his own ideas about where I should train and suggested putting me in different districts of the mine for each operation. From a mining student’s point of view this would have been a good idea, as it would widen his experience; and since I was ostensibly a mining student I had to agree – temporarily – to this suggestion. Later I was able to modify the suggestion to partially suit my own plan.¹

These two incidents I have described show – in one case even before the study proper began – one of the disadvantages of the method of participant observation. What you want to study as a participant observer may have to be adapted to what the people immediately concerned will let you do. In other words, however carefully plans may be made and entry negotiated with higher authority, improvisation may be necessary when the actual entry takes place.

This is one reason, then, why an account of participant observation in operation is being given in the next section, before the observations.

The second reason has already been touched upon. Participant observation yields an unwieldy mass of information which is difficult to organise, and some of the points discussed in the next section are best made known before presenting the observations made during the study.

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¹. I was able to carry out three of the four operations in the same district.
III. PARTICIPANT OBSERVATION IN OPERATION

In their discussion of participant observation as a research method, Becker and Geer see the participant observer as one who "...gathers data by participating in the daily life of the group or organisation that he studies". This was how the role of observer was envisaged in this present study and how it continued throughout the study.

Parts of the original plan for the fieldwork had to be changed as the study progressed - one such change was described at the end of the last section and a variety of problems arose. Problems can arise at any stage in research, and in this study they arose before, during and after the fieldwork.

Those problems which arose both before and during the fieldwork are considered below under the respective headings - "Planning the Fieldwork" and "Recording the Material". After the fieldwork had been completed at collieries A and B, two further problems arose which are considered below under the respective headings - "Organising the Material" and "Gaps in the Evidence".

Planning the Fieldwork

In my initial planning of the fieldwork I had hoped to observe the five operations which make up the Longwall cycle of operations. Because of difficulties with the Colliery Training Officers when I arrived at the two collieries, this was not possible and the filling operation had to be dropped from the plan.

The importance of this change is that the discussion of the observations is based on only four of the five jobs of the Longwall cycle and is, in a way,

2. The change referred to concerned the dropping of one of the five operations from the fieldwork plan.
incomplete. On the other hand, I had already done the job which had to be left out and was able to draw on memory for comparisons. The brushers, packers, conveyor-shifters and machinists I observed in the present study seemed in no important way different from the fillers I had already worked with.

The need for a change of plan to meet unforeseen circumstances is an example of one of the main disadvantages of participant observation as a research method. The researcher, in a sense, 'at the mercy' of the people he is studying. As has already been pointed out, in spite of careful negotiation at a higher authority level on a plan for the fieldwork, the observer can find unexpected problems when the actual entry takes place. It is this point at which he becomes committed and where there can be no time for him to withdraw from an awkward situation to re-plan. That a change of plan was possible in this study shows one of the advantages of the method. The unstructured nature of participant observation allows a great deal of flexibility in dealing with unforeseen situations. The researcher is able to continue the research without losing the time which would be required for re-planning, or the ground which has been gained in obtaining permission to do the research.1

Recording the Material

Throughout the fieldwork, a diary was kept, in which the events of each day were recorded. At first it was thought this would be a simple process of writing down everything that happened during a shift when I returned home. It was impossible to make notes during a shift because the nature of the jobs done was such that I was in continual contact with the men with whom I was working. Memory had therefore to be relied upon in filling up the diary each day.

As the fieldwork progressed, however, some difficulty was experienced in keeping the diary. This difficulty was a problem which could not be ignored.

1. Gaining entry into industry is an important factor in Social Science research.
because of the importance of the diary to the whole study.

Two factors in the problem were time and energy. There was not a great deal of spare time in which to write up the diary when travelling time to and from the Collieries was taken into account, and I was always fairly tired after a hard shift underground. The fact that I knew the diary was important did not overcome my tiredness but rather produced a state of tension in which I began to worry about leaving things out of the diary. Discussions with my research supervisor helped considerably, and although the problem of tiredness was never overcome, the tension was much reduced by my being able to talk about it.

In order to preserve secrecy during the fieldwork, about my real purpose in carrying out the face-training operations, a cover story was adopted. The cover story was basically true, and this made it very much easier to maintain than might have been possible with a contrived explanation for my presence at both collieries.

Very few of the men showed any interest in me, or my 'past', beyond initial enquiries as to what I was doing. My reply to this was that I was a mining graduate doing practical work with a view to eventually taking the examination for the Colliery Manager's Certificate.

A little difficulty was experienced with one shotfirer at colliery B, who asked why I was not in the National Coal Board's Scheme of Directed Practical Training, which was open to me as a graduate in mining engineering. I was able, however, to pass this off by saying I might apply for training under this scheme when I finished my colliery-training.¹

Organising the Material

In addition to keeping the diary, I tried for a time to organise the material on a day-to-day basis. Classifying the observations under various headings - such as Conversations, Safety, Method of Work, Training - was envisaged as making the recording of events easier. The reverse proved to be

¹. Later, at colliery C I was in fact on this training scheme; see the paragraph on "Gaps in the Evidence" (this chapter).
the case; I felt my objectivity was endangered by even simple structuring of the observations, and classifying into topics had to be dropped almost immediately. In retrospect the fieldwork problems can be looked at in a more detached way. The resistance which I built up to classifying the data into topics may be seen as a result of factors such as tiredness due to the heavy nature of the fieldwork, lack of spare time, and inexperience. Another factor which may be important is the way in which memory works. In other words does the concentration involved in memorising events on a day-to-day basis, allow for simultaneous analysis however simple?

The fact that I was unable to organise the material at the time of collection created a problem later. I had a great mass of unduly information in chronological order and the question was that posed by Becker and Goer.¹

"What is the participant observer, with his file of "rich" but unsystematic data to do? He knows a good deal about the organisation he has studied, and he has a great deal of confidence in many of the conclusions he has drawn. But how does he present his conclusions and the evidence so as to evoke in other scientists the same confidence he himself feels?"

In a book just published, Baldamus discusses the difficulties of formulating a satisfactory framework for a theory of industrial organisation. In the course of his arguments he asserts that "...most investigations, however extensive and elaborate, simply produce detailed repetitions of established facts. But this is not altogether true, for now and then there are unexpected results. These accidental observations neither confirm nor contradict preconceived notions, but appear to assert themselves just because they are inexplicable in relation to established assumptions. Though it is difficult to prove, it is at least feasible...

that such observations form a potentially significant contribution towards a more penetrating interpretation. They certainly cannot be ignored.\footnote{W. Baldamus, \textit{Efficiency and Effort}, p.8.}

The implications of these arguments for this discussion are threefold. Much of what participant observation uncovers may and will be, as Baldamus puts it, "detailed repetitions of established facts" - the present study strongly supports this view. But the evidence may also contain some of these "unexpected" bits of information that do not fit in with the present assumptions and preconceptions and may even contradict them. For example, the evidence of the present study suggests that group factors are perhaps not as strong - at least in coal mines - as the literature leads you to believe. The "right" level of effort for instance may come about as much by \textit{habitually working at that level}, as by a conscious response to a group pressure to maintain what the group regards as the "right" level.

There may be other unexpected pieces of information which only the experienced theoretician may be able to pick out. This poses the problem as to which parts of his information an observer should or should not include in his report; for he may not be in a position to judge what information may or may not prove important to the theoretician.

Viewed against this background then, the present study can be seen as an attempt to outline some of the problems of labour productivity rather than providing any solutions. The material has been organised to show the points which must be considered if attempts to increase productivity are to be made.

\textbf{Gaps in the Evidence}

An important problem for the participant observer is his inability to control the evidence which he is collecting. He can obtain a great mass of evidence but if this evidence raises further questions he may not be able to...
attempt to answer these questions by his original method of study. Thus the possibility arises of there being gaps in the evidence.

This was the case in this present study where at least two problems stood out in connection with labour productivity. The first of these — namely, what did the supervisor do with his time? — could not be tackled while I was working with the men on the face and had to remain with them throughout the shift. The second problem — concerning task negotiation and its relationship with levels of productivity — also could not be tackled while I was on the coalface since negotiation on tasks did not take place on the coalface at collieries A and B.

These two problems appeared to be so important when the fieldwork had been completed and the evidence was being written up and analysed, that it was desirable to attempt to obtain information on supervision and negotiation.

Fortunately in this case the opportunity presented itself when I began work on the National Coal Board’s scheme of Directed Practical Training at colliery C in the East Midlands Division.

The evidence obtained at colliery C — over a period of some nine months — together with such evidence as was available from collieries A and B on these two problems is discussed at the end of Part II in the chapters on “Supervision” and “Task Negotiation”.

Some evidence from colliery C has also been included in the section on “The Influence of Technical Conditions on Productivity” to widen the scope of this section.

Introspection as Part of the Method.

It is extremely difficult to be sure about attitudes in a study such as this. Attitudes can only be inferred from behaviour observed and opinions expressed, or from introspection. The latter can only be tentative because different people may,
and often do, react differently; but as the example of one person as a case study, it is worth mentioning then.¹

By means of introspection during the fieldwork, I found that in many cases my feelings were similar to those of the men with whom I was working. For instance I shared their annoyance at being held up, and not being able to leave the colliery when we finished our work; and their annoyance with the deputy who refused a vet-line.

By means of introspection, also, I was able to assess to some extent my own involvement in the situations I was observing. As far as possible I avoided any involvement in arguments of any kind. Several incidents are described later which show the kind of difficulties to which the participant observer is exposed.² The alternative method of carrying out participant observation which is outlined at the end of this section would help in handling these difficulties.

The Fieldwork Time at Collieries A and B

A full description of the four operations done at collieries A and B is given in Part II. It is necessary here to give some details of the length of time during which observations were made, for a consideration of the importance might be attached to, for instance, the time-table of starting-times, "rest" times and finishing-times, and incidents such as the withdrawal of supports in a manner contrary to the regulations.

The time spent on each job is in Table 1. The first column of figures gives the total time during which I was attached to the corresponding team; the second column gives the actual number of days spent with the team. The difference is accounted for by holidays - official holidays or my own absences.

¹. Compare W. Baldamus, "Incentives and Work Analysis". The author makes use of introspection, and points out some of the dangers involved.

². See XIII Special Incidents - Relating to Money.
### TABLE I: Time spent on each job (in days)

<table>
<thead>
<tr>
<th>Job</th>
<th>Total Time</th>
<th>Days spent with team</th>
<th>Absences</th>
<th>Holidays</th>
<th>Special Jobs</th>
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<tbody>
<tr>
<td><strong>Colliery A</strong></td>
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<tr>
<td>Brushing</td>
<td>30</td>
<td>28</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Coalcutting</td>
<td>30</td>
<td>25</td>
<td>1</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Conveyor-Shifting</td>
<td>20</td>
<td>16</td>
<td>1</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Packing</td>
<td>20</td>
<td>19</td>
<td>1</td>
<td>-</td>
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<tr>
<td><strong>Colliery B</strong></td>
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<tr>
<td>Packing</td>
<td>20</td>
<td>18</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Brushing</td>
<td>20</td>
<td>18</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Conveyor-Shifting</td>
<td>25</td>
<td>23</td>
<td>-</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Coalcutting</td>
<td>25</td>
<td>23</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

1. Autumn Holiday.
2. New Year Holiday.
and special jobs where I was taken away from the team - for instance the Fall Incident. The jobs are given in the table in the order in which they were done between September 1959 and July 1960. A five-day week was then in operation; thus thirty days represents six weeks and similarly twenty days represents four weeks.

On several of the jobs it proved possible to continue observation of the previous job to a certain extent. Thus, as Colliery A it was possible to observe the coalcutting operation while on brushing and vice versa; the same was true of the conveyor shifting and packing operations. At Colliery B it was possible to observe the brushing operation while on packing and vice versa.

The total fieldwork time at collieries A and B was thirty-eight weeks, and an additional six weeks were spent in a factory in Edinburgh to obtain some comparison between the coalmining situation and the factory situation. The factory job has not been described in any detail in Part II, but reference will be made to it from time to time.

As can be seen from Appendix A, the minimum time that can be spent on one of the above coalface training operations, is twenty days. A longer period was tried initially but the extra time only confirmed the observations of the first twenty days. The diminishing returns did not appear to justify the extra time and the later jobs were done in the minimum twenty days. The last two jobs were extended only in order to finish the fieldwork at the beginning of Colliery B's annual two weeks holiday. This was a matter of convenience and of little significance for the study. It did, however, give an opportunity to observe the light-hearted atmosphere of the last few shifts before such a holiday.

1. See under XIII Special Incidents.
2. This could be done where the two jobs were on the same shift, in the same section.
3. The job done in the factory was transporting materials to and from a finishing department, in a team of four men.
A New Method of Participant Observation.

Some of the problems encountered during this study have been mentioned above - the unexpected changes in plan, the difficulties of keeping a diary and the organisation of the material to best present the findings. Could these problems have been avoided? The answer to this question would appear to be no, once the method of participant observation had been decided upon. However, if the points in my favour for carrying out participant observation in coal mines are considered again another solution presents itself. A scientist with an interest in the human problems of his subject as well as the technical problems may have a means of access to carry out research denied to the social scientist. But he lacks the theoretical framework against which his research must be considered. The experienced social scientist can provide this framework by working with the scientist.

The scientist would function as the observer gathering as Becker and Geer put it, "... data by participating in the daily life of the group or organisation that he studies." He would record all events, conversations etc. which he witnessed and would report to the social scientist. The recording might be done in the form of a diary, or by means of a tape-recorder, which would allow thoughts to be recorded faster than is possible by writing. The reporting might be done every day, which I feel would be an advantage, or every second day, and would be done orally. This reporting would provide not only an opportunity for obtaining information omitted from the diary but also for some analysis during the fieldwork which would help considerably in later organisation of the material. The burden of analysis would be on the social scientist rather

1. See above, the opening sentence of this chapter.
2. Discussions with my research supervisor and others during and after the fieldwork revealed a few points which had not been recorded in the diary. These points were sometimes important, but had been "lost" in my memory.
than the scientist, or in other words on the neutral investigator rather than
the participant observer. The latter would benefit from discussion on such
problems as the diary; and any tension produced by his personal involvement in
the situations he was studying might also be lessened by these discussions.
The relationship between the social scientist and scientist is envisaged as
being similar to that of an employer councillor and an interviewee. Graduate
engineers would be suitable for the role of observer, but, depending on the
field of the research, other types of graduates might be employed. This
approach could also be developed as a training method for research in the
social sciences.

A research method along the above lines would not be without its dangers.
There would be a possibility of personal differences arising between the
scientist and the social scientist; and some of the problems have not been
eliminated - for instance the need for sudden changes in plan. My own view
however is that the method would better equip the observer for handling the
problems of participant observation and the social scientist would benefit by
obtaining detailed factual information. The contributions of each would be
complementary. The material could be organised while it was being collected
and the results could be ready more quickly. Any additional information
necessary might be obtained earlier, making additional fieldwork time
unnecessary - the 'productivity' of the research might be increased. The
social scientist, as a neutral observer, would be in a position to assess the
participant observer's involvement, and see, objectively, the things which
upset him in any way. The participant observer could be sensitised, by the
social scientist, to watching for points he perhaps ignored or felt inclined
to brush aside as insignificant.

1. The social scientist might also watch for "gaps in the evidence" - see above.
Methods of coal-getting can be classified into two distinct types: Pillar and Stall working and Longwall working. Some forty years ago Pillar and Stall working was the predominant method, but at the present day, Longwall working is by far the most widely used method. The change was not sudden and dramatic but gradual; as the techniques of the Longwall method were improved, more and more coal was produced by this method and less by Pillar and Stall working.

The most important features of Pillar and Stall working are as follows:

The first stage is to tunnel roadways - so-called Stalls - in the seam. The roadways are driven at right angles to the main haulage road, and from these, other roadways are driven parallel to the main haulage road. A pattern of roadways as shown in Fig. 1 (see back cover) results. Small teams of two or three men work in each roadway, doing all the necessary jobs themselves. They cut the coal - if a machine is being used - drill the shot-holes, blast down the coal, load it for transport to the main haulage and put up any supports to the roof which are required; they also advance their own haulage system and do any packing or brushing required. The areas of coal left between the roadways are the Pillars; and when the system of Stalls has been completed, the teams extract the coal from the Pillars working back towards the main haulage as shown in "No. 2" section of Fig. 1. The dimensions of the pillars vary according to the depth of the seam from the surface, and its thickness. These are factors which have influenced the trend away from this method of working, particularly the seam-thickness factor. It is simpler and cheaper not to touch the roof above the seam, and if the seam is thick, this is possible; also machinery can be used to better advantage if there is height

1. Sometimes the Stalls are driven at an angle to the main haulage road giving a 'diamond' pattern; the principle of the method remains the same however; Stalls are first driven in the seam in a regular pattern, then the Pillars are extracted.

2. The meaning of these terms will be explained more fully later; the point at the moment is that the one team does all the necessary operations.

22.
for working. In this country, fewer thick seams have been available for Pillar and Stall working. Other factors such as the high cost of ventilation have influenced the trend away from the method too. The high productivity of the coal-mines of the United States is an indication of what can be done with Pillar and Stall working, in more favourable conditions than obtain in this country.

Contemporary with Pillar and Stall working and becoming increasingly important as thick seams were worked out, was Orthodox Longwall working. Some of the principles of this method are similar to Pillar and Stall - small teams work in roadways similar to the Stalls but the coal is extracted, as the roadways advance, on a wide front.

A roadway is first driven in the coalseam, from the main haulage road; parallel to this roadway, another is driven in the seam, also from the main haulage road. The distance between these two roadways - the 'main level' and 'top road' of Fig. 2(a) (see end dover) - is equal to the length of coalface which is required when the driving of the initial roadways has been completed. The length of the coalface is governed by previous experience of working the particular seam and depends on the depth, thickness and dip¹ of the seam and the type of strate above the seam. When the main level and the top road have been driven a short distance² from the main haulage road, a roadway is driven from the main level to the top road as shown in Fig. 2(b). A number of small roadways are then driven from this heading parallel to the main level and top road. Small teams of not more than three men work in these small roadways and teams of four or five work in the bigger roadways. The teams work with one man on each side of their roadway, shovelling coal to the third man who fills it into a hutch and takes it to the haulage in the

¹. Dip: angle of inclination to the horizontal of the seam.
². The distance depends on factors similar to those governing the length of face.
heading. All the jobs required to produce the coal are done by the team, as in Pillar and Stall working. Fig. 2(c) shows the layout of Orthodox Longwall working for full production; this is obtained much more quickly than with Pillar and Stall working. The layout shown in Fig. 2(c) is called a Single-unit and an exactly similar procedure as described above, on the opposite side of the main level gives a Double-unit as shown in Fig. 2(d).

The Orthodox Longwall method of working overcomes the disadvantage of Pillar and Stall working in thin seams since it allows for the heightening of roadways, and the handling of stone produced by the building of packs. Other advantages of the method are that coal is obtained more quickly, ventilation can be made more economical, and strata control is made easier.

The development of conveyors some thirty years ago, onto which coal could be hand-filled on the coalface, simplified the Orthodox Longwall method of production. The intermediate roadways were no longer required and with the development of machines which could undercut the whole length of the coalface, the Orthodox Longwall method became the Modern Longwall method of working as used at the present day.

In Modern Longwall working, two roadways are first driven from the main haulage road - the main level and top road - or, if a double-unit coalface is required, three roadways are driven - a bottom road is added as in the "North 1 Section" of Fig. 3 (see end cover). This would be the procedure if the section was to be the first in a particular part of the colliery; occasionally, a new section is parallel to an existing section and the top road of the existing section becomes the bottom road of the new section. Thus it may be necessary to drive only one new road for a single-unit coalface or two for a double-unit coalface. A pillar of coal is left unworked next to the main haulage road to protect it from excessive roof pressure; and the new coalface is driven from the roadways as shown in the "Development
Section" in Fig. 3. When this has been completed and equipped with a conveyor, supports and a coal-cutting machine, production can begin.

An advance is made into the coal seam along the entire length of the Longwall face and coal is extracted by means of a series of five operations taking place over a period of twenty-four hours. Teams of men each carry out one of the five operations and the haulage systems are manned by so-called oncost workers. A team does the same operation at the same point in the twenty-four hour period, every day. Thus the team which, in Pillar and Stall working and Orthodox Longwall working, carried out all the necessary operations to produce coal, has become, in Modern Longwall working, a specialist team carrying out one of a sequence of operations in a production cycle.

The Longwall cycle of operations

The twenty-four hour day is divided into three periods - referred to as shifts - of seven and a half hours each. The half hour between the shifts is allowed for "winding-time" - that is, to raise and lower men going on shift or coming off shift. The starting-times of the three shifts vary between different parts of the country but typical times would be as follows:

11.00 p.m. - 6.30 a.m. : Night shift
7.00 a.m. - 2.30 p.m. : Day shift
3.00 p.m. -10.30 p.m. : Backshift

The sequence of operations during this cycle of three shifts is almost always the same (variations of a local nature do occur); coal production is mainly carried out on dayshift but, in certain cases, can also be carried out on backshift or nightshift. For convenience in the following description of the five operations, dayshift will be taken as the production shift. Thus

1. Since this study was concluded the working shift has been reduced to 7 hours 15 minutes but this does not affect what follows, in principle.
2. Backshift is also called afternoonshift.
the preparatory shift will be nightshift, and the brushing shift will be backshift.  

The first shift in the Longwall cycle is the preparatory shift or cutting-shift; one operation takes place on this shift. The entire length of the coalface is cut by a coal-cutting machine operated by a team of two - sometimes three men. Normally the cut is made on the pavement as shown in Fig. 4(a) (see end cover) but may, according to local conditions, be made in the middle of the seam or next to the roof. The purpose of this cut is to make the shots fired by the following shift, more effective - it provides two "free faces" instead of one, towards which the force of the shot can be directed. Fig. 4(a) shows a section across the coalface at the end of the preparatory shift - in this case the nightshift. One man might be required to ensure the machine track is clear for the passage of the coalcutter and another man might be required to finish off the conveyor to ensure it is ready to start for the following shift, the filling-shift. One deputy would be in charge of these few men, with an overseer in charge of several districts in the mine; depending on the size of the colliery, only one overseer might be required on night-shift to supervise the preparatory work and have the responsibility of ensuring each Longwall coalface was ready for production on the next shift.

The second shift in the cycle is the filling-shift and again one operation takes place on this shift; many more men are required however. Most collieries produce most of their output of coal on day-shift; and all the functional officials and most of the engineers, electricians, etc. work a dayshift. At a colliery where some coal is produced on backshift or nightshift, the officials would be more 'spread out'.

The operation carried out on the second shift, is the blowing down of coal by means of explosives, the loading of this coal onto the face conveyor,

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1. As an illustration of the variations which occur - at colliery C. the sequence was filling - cutting - brushing as compared with filling - brushing cutting at collieries A. and B.
and the putting up of supports under the newly exposed roof. The fillers - sometimes called colliers, or strippers - are spaced out along the coalface, each with a part of the coalface to work. The amount of coal to be worked by each filler is the same - unless a concession is made for bad roof, bad pavement, etc. - and a typical "stent", or task, would be 30 ft. in a 3 ft. seam. Fig. 4(b) is a section across the coalface at the end of the dayshift to show the new supports and the advance made.

During the third shift - in this case the backshift - the remaining three operations are carried out. There are three main types of face-conveyor in use on Longwall faces: belt-conveyors, chain-conveyors and shaking-conveyors. They are all in sections so that a team of conveyor-shifters - three, four or five men - can dismantle the entire conveyor and reassemble it in the new conveyor track. Dismantling the conveyor can be done very quickly and when it has been completed the packers withdraw the supports in the old conveyor track and build the packs. A pack consists of three walls of large stones from the roof - or the coal seam if it contains a stone-band - and is filled in with smaller stones; the wall nearest the conveyor serves as the fourth wall of the next pack and so on. In building the walls, the packers use flat stones if possible and shovel smaller stones into any spaces as well as filling the pack, using a shovel. The pack must be built solidly to the roof to take the weight of the overlying strata away from the coalface. If no stone was available for packing, the equivalent operation would be the withdrawal of the supports (these are reused by the next filling-shift), allowing the roof to collapse behind the coalface.

Through time, the overlying strata comes down to fill the space left by the removal of the coal seam, whether packs have been built or not. Fig. 5 (see end cover) shows this happening, well behind the coalface. The supports on the coalface take the weight only of the immediate roof, for a time sufficient to allow extraction of the coal during a cycle. The continual advancement of
the coalface does not allow time for any great weight to be applied to the coalface itself. The advance per cycle of twenty-four hours and the other dimensions of the coalface are determined by the depth of the seam, its dip and the nature of its overlying strata; previous experience of working in the same coal seam is also taken into account.\(^1\) When the coalface is stopped for any length of time - for instance, a long holiday - extra supports are usually required to prevent the closing of the entire face.\(^2\)

The third operation carried out on the backshift, and the fifth operation of the cycle, is brushing - sometimes referred to as ripping.\(^3\) In this operation, the roadways providing access to the coalface are heightened and advanced as shown in Fig. 6 (see end cover). A portion of the roof is blown down, in the shape of the roadway; the debris is packed into the side of the road and a girder put up by the team. A brushing team consists of three to six men, depending on the size of the roadway.

Fig. 4(c) shows the coalface at the end of the backshift, ready for the complete cycle to begin again with the nightshift.

More modern developments in the Longwall cycle of operations have come about through the use of machines for filling coal and also simultaneously cutting and filling. The mining industry is now entering on a period of increased mechanisation with the aim of increased productivity. To make the technical changes effective it would seem to be necessary to make them acceptable; existing practices must be considered and it is for this reason that the most widespread existing method of working - the modern Longwall method - has been described in some detail.

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1. In the next chapter, the importance of technical conditions will be shown in more detail with particular reference to the output-per-manshift obtained from a district.
2. This does not apply to a coalface standing over a weekend.
3. At colliery C, the term ripping was used. The term brushing would appear to be peculiar to Scotland.
V. THE INFLUENCE OF TECHNICAL CONDITIONS ON PRODUCTIVITY

In the last chapter, the operations involved in obtaining coal were described and the important influence of technical conditions on the workings of a mine was briefly mentioned. This chapter takes this a stage further and discusses in some detail the influence of technical conditions - that is, both geological conditions and the method of production employed - on productivity at the coalface.

Technical conditions can affect productivity in two ways, at two different points in time. Firstly, when a new district is being planned, conditions in that part of the mine must be considered in laying down the tasks to be carried out. And, secondly, when a district is in full production, changing conditions may prevent tasks from being completed, necessitating extra work on succeeding shifts. Changing conditions may also make the tasks easier - thus the same work could be done by fewer men.

It might also be said that technical conditions affect two different levels of management and men. For senior officials of management and union are concerned with negotiating tasks and manpower in a new district; while the deputy and the men at the coalface are concerned with day-to-day changes in conditions which affect the tasks in existing districts.

The question of task negotiation is considered elsewhere, and the for moment our concern is with the influence of technical conditions on productivity. As the following discussion will show, this is the most important factor in productivity. It should be said in passing that the need for reference to other sections of this study underlines the difficulty of isolating factors affecting productivity. It is almost impossible to discuss any one factor, whether it is habitual methods of work, supervision or task-negotiation, in

1. See the end of Part II, chapter XVI "Task Negotiation".
2. See above, p.4. This conclusion was anticipated in the introduction to this study.
isolation.

Technical conditions in a new district

Since the study deals in the main with conventional hand-filling coalfaces at collieries A, B and C, the following discussion will be confined to this method. The principle can be applied to any Longwall face which is hand-filled.

Let us suppose a new district is being opened out as a single-unit Longwall face to be hand-filled on a three-shift cycle. The tasks to be carried out are negotiated between the management and the union and these depend on technical conditions, since each side in the negotiation considers the conditions in assessing the task. The manpower required for the working of the new district will depend on the size of the district and this in turn also depends on technical conditions. Other factors are involved in negotiation but they will be disregarded for the moment for simplicity.\(^1\)

The measure of productivity in coal-mines is output-per-shift. This is calculated as follows:

The saleable output obtained from a district can be obtained by weighing the coal produced every cycle. Since some coal is lost in the waste behind the face, and also from the conveyor belts as it is carried to loading points, and some stone from the roof or pavement may find its way on to the conveyor, this weight does not represent the actual coal produced by the labour on the face.

An alternative measure of the coal produced may be obtained from the volume of coal removed each twenty-four hour cycle.

Thus the output from any district will be:

\[
\text{Volume of coal removed} = \text{ Seam thickness} \times \text{ Length of face} \times \text{ Advance per cycle.}
\]

\(^1\) In the chapter on Task Negotiation the point is made that it is the manpower which is negotiated, the tasks being decided by the technical conditions. This is discussed in some detail in Chapter XVI.
This can be converted to a tonnage by multiplying by the density of the coal, thus:

\[ \text{Output per cycle} = \text{Height} \times \text{length} \times \text{advance} \times \text{density}. \]

Since the height of the seam and the advance are considered in the task and, with the density, are reasonably constant, we can say:

\[ \text{Output per cycle} = A \cdot L \] tons where \( A = \text{constant} \)

\[ L = \text{face length}. \]

To calculate the number of menshifts involved in producing this output per cycle we must know the number of men employed on the face. These will fall into two classes: those whose number is dependent on the face length and those whose number is not.

On a district we have the following classes of labour:

- (i) **Colliers** - the number of colliers is related to the face length \( = \frac{L}{A_1} \)
- (ii) **Packer** - the number of packers is related to the face length \( = \frac{L}{A_2} \)
- (iii) **Holoborers** - the number of holoborers is related to the face length \( = \frac{L}{A_3} \)
- (iv) **Brushers** - the number of brushers is independent of the face length and is fixed by the number of roadways leading to the face \( = n_1 \)
- (v) **Machineman** - the number of machineman is not directly related to face length up to certain limits \( = n_2 \)
- (vi) **Conveyor men** - the number of conveyor men is not directly related to the face length up to certain limits \( = n_3 \)
Thus in one cycle we have the following number of men:

\[
\text{Number of men} = \text{Brushers} + \text{Machinemen} + \text{Conveyor men} + \text{Colliers} + \text{Packers} + \text{Holeboreirs}.
\]

\[
= n_1 + n_2 + n_3 + \frac{L}{a_1} + \frac{L}{a_2} + \frac{L}{a_3}
\]

Where \(a_1\) etc. = constants dependent on the negotiated task and \(L = \text{face length}\).

This can be simplified to give the manshifts worked in one cycle, thus:

\[
\text{Manshifts} = \frac{N + B \cdot L}{N + B \cdot L}
\]

where \(B = \frac{1}{a_1} + \frac{1}{a_2} + \frac{1}{a_3} = \text{constant}\)

\(N = n_1 + n_2 + n_3 = \text{constant, up to certain limits}\).

Thus the output per manshift in the district will be:

\[
\text{Output per manshift} = \frac{\text{Output per cycle}}{\text{Manshifts per cycle}}
\]

\[
= \frac{A \cdot L}{N + B \cdot L}
\]

In this equation, \(A\), \(N\) and \(B\) are constants depending on the negotiated tasks and manpower. Since both the tasks and the face length depend on technical conditions it follows that productivity also depends on technical conditions. Once the tasks and the face length have been fixed, the productivity is also fixed.

In passing, it should be pointed out that this formula can be used to calculate the number of men for a given face length and productivity. That is, by considering the technical factors as given, and the productivity to be governed by economic considerations and required to be some value; say \(X\), then we have:

\[
\text{Manshifts per cycle} = \frac{\text{Tonnage per cycle (T)}}{\text{Required productivity (X)}}
\]

Thus we could calculate the length of the face to make it profitable and this might be used in task negotiation. In practice, the calculation would be more complex than indicated here because the manpower required affects the costs per
ton which influence the required productivity. And on a colliery basis, the productivity would be the overall productivity taking account of haulage workers etc., and not simply the face productivity.

In comparing different collieries then, if the tasks are comparable then face length is a critical factor in differences in productivity.

Taking a hypothetical example, we can calculate the effect of different face lengths on the productivity as follows:-

We will assume the following tasks have been negotiated for a seam thickness of 3 feet, and advance of 5 feet per cycle and a density of 30 cubic feet per ton. These figures are based on actual figures from colliery C.

(1) Colliers - 1 man per 10 yards of face.
(ii) Packers - 1 man per pack; 1 pack per 10 yards.
(iii) Hoelobora - 1 man per 100 yards of face.
(iv) Brushers - 10 men for two roadways.
(v) Machinemen - 3 men per machine, 1 machine up to 500 yards.
(vi) Conveyor-men - 3 men up to 300 yards of face.

(1) Face length: 100 yards

The output from this face length would be:

Output per cycle = \( \frac{100 \times 3 \times 5 \times 3}{30} \) tons

= 150 tons

The manshifts would be distributed thus:

<table>
<thead>
<tr>
<th>Day shift</th>
<th>Afternoon shift</th>
<th>Night shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colliers 10</td>
<td>Packers 10</td>
<td>Machinemen 3</td>
</tr>
<tr>
<td>Hoelobora 1</td>
<td>Brushers 10</td>
<td></td>
</tr>
<tr>
<td>Conveyor-men ( \frac{3}{2} )</td>
<td>( \frac{2}{3} )</td>
<td>( \frac{1}{3} )</td>
</tr>
</tbody>
</table>

Thus, manshifts per cycle = 37.

Therefore, output per manshift = \( \frac{150 \times 20}{37} \) cts.

= 83.1 cts.
(2) **Face length: 200 yards**

The output from this face length would be:

\[
\text{Output per cycle} = \frac{200 \times 3 \times 5 \times 5}{30} \text{ tons} = 300 \text{ tons.}
\]

The manshifts would be distributed thus:

<table>
<thead>
<tr>
<th>Day shift</th>
<th>Afternoon shift</th>
<th>Night shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colliers</td>
<td>Packers 20</td>
<td>Machinemen 3</td>
</tr>
<tr>
<td>Holeborers</td>
<td>Brushers 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conveyor-men 3</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>35</td>
<td>3</td>
</tr>
</tbody>
</table>

Thus, manshifts per cycle = 58.

Therefore, output per manshift = \(\frac{300 \times 20}{58}\) cuts.

\[= 103.4 \text{ cuts.}\]

(3) **Face length: 300 yards**

The output from this face length would be:

\[
\text{Output per cycle} = \frac{300 \times 3 \times 5 \times 5}{30} \text{ tons} = 450 \text{ tons.}
\]

The manshifts would be distributed thus:

<table>
<thead>
<tr>
<th>Day shift</th>
<th>Afternoon shift</th>
<th>Night shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colliers</td>
<td>Packers 30</td>
<td>Machinemen 3</td>
</tr>
<tr>
<td>Holeborers</td>
<td>Brushers 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conveyor-men 3</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>42</td>
<td>3</td>
</tr>
</tbody>
</table>

Thus, manshifts per cycle = 79.

Therefore, output per manshift = \(\frac{450 \times 20}{79}\) cuts.

\[= 113.9 \text{ cuts.}\]

These figures give theoretical maximum values for different face lengths, worked under colliery C conditions. They suggest a general principle: as the face length is increased, the productivity of a district is increased, since
certain of the tasks do not require increased manpower. As the proportion of the 'fixed' manpower decreases in relation to the proportion of the 'variable' manpower the gain in productivity decreases as the graph on the following page shows.

The face length, which is determined by the technical conditions, is a most important factor in productivity. In comparing two areas where the conditions are such that different face lengths can be worked, we would expect the productivity of the area with the longer face lengths to be higher, provided the tasks are comparable.

Furthermore, where geological conditions are such that shorter face lengths must be worked it is also very probable that a greater manpower will be required on the packing operation due to bad roof conditions. That is, although the task for each packer might be the same, one district may require more packers than another with better conditions. For instance, the values in the above examples gave an output-per-man-shift of 103.4 cwt. for a face length of 200 yards. Whereas at one colliery it may be possible to work longer faces than this it may be necessary to limit the face to this length because of the presence of adjoining districts. Another colliery may, because of technical conditions, have a face length of 200 yards as its maximum and require twice the number of packers, although the individual tasks are the same. Thus the output-per-man-shift at this second colliery would be 76.9 cwt. compared with 103.4 cwt.

Thus we would expect productivity to be higher in an area with favourable conditions, since fewer men would be required on jobs such as packing which did not produce coal but were necessary for the cycle of operations.

The tasks at the three collieries in this study were comparable but the total amount of work varied because of the different technical conditions. We find therefore that although the face lengths at collieries A and B were both of the order of 100 yards, colliery A required more packers per face due to the conditions, giving a lower face productivity. The length of the hand-filling faces at colliery C was of the order of 250 yards, giving a higher face productivity.
Graph showing increasing face productivity with increasing face length for tasks based on those on the hand-filled faces at foliery C.

II.B. This graph is based on the figures used in the numerical examples and is therefore hypothetical. It nevertheless indicates the general trend of increasing productivity with increasing face length and the lesser increases obtained as the proportion of variable manpower increases.
than both collieries A and B.

The economies of size detailed above can be extended to a consideration of a colliery as a unit comprising several districts. Depending on the layout of the colliery, the number of men behind the face is not necessarily increased for an increased output. Thus a large colliery can have a greater productivity than a small one, without any increase in tasks. Again this would appear to be the case at collieries A, B and C. Colliery C obtained the benefits of increased size.

Various factors govern the size of a colliery. Technical conditions are an important factor in planning a new colliery. And in an existing colliery it is not always possible to increase the output without changes in method which can be extremely expensive; for example installing new winding gear can cost upwards of one million pounds.

**Technical conditions in an existing district.**

So far in this section we have been considering the effect of technical conditions at a particular point of time. It has been demonstrated that once tasks have been determined for the given method of production with regard to the conditions, then the face length which can be worked is an important factor in productivity. To all intents and purposes the tasks are constant and the face length is the only variable. Once a district is in full production the position is reversed and the second effect of technical conditions may be felt. The tasks become a variable liable to be affected by day-to-day changes in conditions, while the face length is constant.

If conditions on the coal face change and become more favourable than when the tasks were originally determined, then the men are able to carry out their tasks in less than the available time. Since it may not be the practice to reduce the manpower under these conditions on a day-to-day basis, the effect of favourable conditions will only be felt if tasks are renegotiated.
Under the method of negotiation at colliery C it was possible to redeploy the manpower under more favourable conditions. This difference between collieries A and B and colliery C is discussed in some detail in chapter XVI.

If conditions on the coalface deteriorate, however, extra manpower may be required to complete for instance the filling on day shift or the packing on afternoon shift, to allow the succeeding shifts to carry out their tasks. This extra manpower will not produce any more coal but will reduce the output-per-manshift. The costs per ton will be increased since the extra manpower must be paid separately from the contract workers.

If we illustrate this using the example of the district with a face length of 100 yards (see example 1 page ) we have the following:

Suppose that conditions are such that three less colliers were required and three less packers. Then the output-per-manshift would become 96.7 cwt. If the men were actually removed from the face, an increase of 19.2 per cent. If in practice they are not removed the productivity remains the same at 61.1 cwt.

Suppose that conditions deteriorate and three more men are required on dayshift and afternoon shift, the output-per-manshift becomes 59.8 cwt. - a decrease of 13.9 per cent.

Taking the example of the district with a face length of 300 yards we have the following:

If the same favourable conditions prevail as in the above example, the output-per-manshift would become 123.1 cwt, if the manpower is reduced - an increase of 8.1 per cent. It remains at 115.9 cwt, if the manpower is not reduced.

If there is the same deterioration in face conditions the output-per-manshift becomes 105.9 cwt. - a decrease of 7.0 per cent.

Relating the principle behind these figures to collieries A, B and C, then the same change in conditions has a greater effect at collieries A and B both in the potential increase in productivity and the actual decrease.
In a general comparison between the Scottish Division and the East Midlands Division, it would be true to say that conditions vary more from day-to-day in Scotland; and are such that shorter faces must be worked in new districts. This, I would suggest accounts very largely for the higher productivity in the East Midlands and colliery C compared with the Scottish Division and collieries A and B.

In other words, without any increases in tasks or in effort, without any decreases in non-working time, and without any changes in the habitual methods of work, productivity could be higher at collieries A and B if technical conditions were more favourable. Productivity is lower at collieries A and B because technical conditions are less favourable and not necessarily because the Scottish miner works less hard than the East Midlands miner.

If increases are to be made in productivity then, particularly at collieries such as A and B, some attempt to improve the technical conditions would appear to be the desirable course of action. Geological conditions cannot be varied at will, therefore more flexible production methods are required, and more flexible deployment of manpower.

With regard to the first point, there has been an increase in mechanised mining in recent years which has increased productivity for the following reasons: By mechanically loading the coal from the face on to the conveyor, and simultaneously advancing the supports, production can be maintained over one, two or three shifts in a twenty-four hour period. A hand filled face can only produce on one shift in a cycle of three shifts. Fewer men are required on a mechanised face since they only operate the controls of the machine and advance the supports. A fixed task is not required since mechanised mining allows for continuous use of the machine throughout the shift. There is a maximum output, governed by the speed of the machine and payment can be made either on a "norm" basis or on a day-wage. The "norm" system is the one accepted in the East Midlands while the other is accepted in
Scotland. It will be suggested in the chapter on task negotiation that the difference in attitude this reveals is an important factor in task negotiation and hence on productivity when comparing the two divisions. Although present tasks are very similar, those on mechanised faces are not. The payment system adopted in Scotland retains the characteristics of present methods of payment and thus the potential increase in productivity by a change of production method is not fully realised. Geological conditions, however, are such as to restrict to a great extent the full application of present methods of mechanised mining in Scotland. There would, therefore, appear to be a need for greater flexibility in manpower deployment in Scotland, which is in contrast to the present position discussed at some length in chapter XVI.

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1. See Chapter XVI, "Task Negotiation".
PART II.

THE EVIDENCE.
VI. BRIEF DESCRIPTION OF THE THREE COLLIERIES IN THIS STUDY.

The research which forms the basis of this thesis was carried out at three collieries as explained in Part I. The collieries are called simply A, B, and C, in the text which follows.

Collieries A. and B. belong to a Group of five collieries in an Area of the Scottish Division of the National Coal Board. Several Groups make up this Area, and it is generally regarded as having good long-term prospects. This is in contrast to some other Scottish Areas which are nearing the exhaustion of their workable coal seams. In terms of output, numbers of men, geological conditions and methods of working, the collieries can be considered as representative of collieries to be found in many other parts of the Scottish coalfields.

Colliery C. belongs to a group of three in an Area of the East Midlands Division. This Area has several collieries—including colliery C.—which produce over one million tons of saleable coal per annum. As the table in Appendix B. shows this means that in terms of output, colliery C. is some four times larger than either colliery A. or colliery B.

The output-per-manshift at colliery C. was, in 1959 and 1960, some fifty per cent higher than at colliery A. and thirty-three per cent higher than at colliery B. About sixty per cent of colliery C.'s output was produced by conventional Longwall hand-filling coalfaces. The rest was produced by mechanised mining methods using Trepanner and Shearer machines. Virtually the entire output at both collieries A. and B. was produced by hand-filling coalfaces.

The manpower at colliery A. was 980 men compared with 1,000 men at colliery B. and 2,300 men at colliery C.

1. In the Scottish Division's Five Year Review, 1962-1966, both collieries A. and B. are placed in class A. — "The pits under this heading are those where reserves are quite adequate to last over the five year period and where generally there is potential to enable economic working to be pursued."
'Firedamp' - methane gas\(^1\) - was unknown at collieries A, and B, and they were 'naked-light' mines as opposed to 'safety-lamp' mines of which colliery C, was an example. Certain regulations concerning the use of explosives and electricity, which apply to the latter type of mine, did not apply to collieries A, and B, and smoking, which is prohibited in 'safety-lamp' mines, was allowed.\(^2\) The "smoking-time" mentioned later in the time-table for the job would not be found in a comparable time-table in 'safety-lamp' mines, but evidence from my previous experience suggests that some such rest pause would still occur. An expression common to both types of colliery is, "We'll have a smoke", meaning, "We'll have a rest", said at some time during the shift other than piece-time. With regard to smoking and also, for instance, the firing of shots, the differences between Collieries A, and B, and 'safety-lamp' mines such as Colliery C, would seem to be of detail rather than principle.

Colliery A worked three separate seams; two from a shaft - the Pit - and one from the Mine. The two seams worked in the Pit each had one underground district; one being a double-unit Longwall face\(^3\) in which the operations described in this study were carried out, and the other, a single-unit Longwall face. The Mine had three districts each with a single-unit Longwall face. All the coal production took place on the day-shift in both the Pit and the Mine, but they were virtually separate units with their own haulage systems and their own complement of men. The Pit and the Mine were connected only to provide a means of escape from one to the other, and for ventilation purposes. Since Blackdamp - air deficient in oxygen - was

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1. Methane gas (CH\(_4\)) is evolved from the decay of buried vegetation, and is produced by the same chemical processes as those which formed coal. In shallow seams it usually escapes to the surface but, in deeper seams remains trapped until released by mining operations.
2. Colliery A, has become a 'safety-lamp' mine since this study was concluded.
3. The term "district" applies to a coalface and the associated roadways.
4. The Modern Longwall system as described under IV. "Technical Background."
present in large quantities in old workings in Colliery A. Ventilation was affected by means of a forcing fan to keep the Blackdamp in the old workings where it was harmless. The sequence of operations was largely the same as that described under Technical Background. The coalfaces were cut and prepared on the nightshift, the coal was hand-filled into conveyors on the dayshift, and brushing, packing and conveyor shifting were carried out on the backshift.

Colliery B was similar to Colliery A, in working several seams from two mines - No.1 and No.2 - which were separate units with their own haulage systems and their own complement of men. Unlike Colliery A, the ventilation systems of the two mines were separate. No.1 mine consisted of two mines driven in parallel, one being the main haulage road, the other being the man-riding haulage road; the coal haulage road served as the intake airway, and the man-riding haulage road served as the return airway. No.2 mine had a similar layout of two parallel mines; and the two return airways were connected at the surface to an exhausting fan which thus served both No.1 and No.2. Two districts each a single-unit Longwall face, worked the same seam in No.1 mine - it was in one of these that three of the four operations carried out at Colliery A were repeated. No.2 mine worked three seams, and one of these seams contained one district - a double-unit Longwall face - in which the fourth operation was repeated. A large proportion of Colliery B's coal production took place on the dayshift, but one district produced on the backshift and one on night shift in No.2 mine since it could not handle all the coal produced by all the coal-faces, on one shift. One of the coalfaces in Colliery B had a mechanical loader to fill the coal on to the face-conveyors on the production shift but otherwise the sequence of operations was the same as at Colliery A, and as described under Technical Background.¹

¹ The principles of the five operations of the Longwall cycle have already been given under this heading. The details of the four operations as done at Collieries A and B are given in the next section.
Colliery C. had two shafts in both of which coal was wound. The entire output of about 5,000 tons of saleable coal per day was obtained from one seam. Whereas all the workings at Collieries A. and B. extended in only one direction, because of the dip of the seams, those at Colliery C. extended in all directions from the pit-bottom. Coal was conveyed entirely by conveyors to the pit-bottom and loaded into mine cars for transport in the cages to the surface.

The furthest inbye coalface at Colliery A. was about 1 mile from the pit-bottom; at Colliery B. the furthest coalface was about 2 miles. At Colliery C. the furthest coalface was about 4 miles requiring one and a half hours walking - there was a locomotive haulage for transporting the men inbye to their districts.

The three districts in which the study was carried out at Collieries A. and B. differed in respect of distance which had to be walked to reach them. At Colliery A. the coalface on which the four operations of brushing, cutting, packing, and conveyor-shifting were first done, was some twenty minutes walking from the bottom of the shaft. At Colliery B. in the district in No.1 mine in which packing, brushing and cutting were done, twenty to thirty minutes walking was necessary after a ten minute run in the man-riding haulage. To reach the other coalface in No. 2 mine, in which the conveyor-shifting operation was done, a fifteen minute walk was necessary after a five minute run in the man-riding haulage.

Three charts showing the management structure of the three collieries A, B, and C. are given on the next three pages.

The three charts are very similar, and with differences in detail - for instance the number of overseers and deputies - could be applied to almost any colliery in any Area of the National Coal Board.
N.B. Two deputies were required on each shift to handle the two districts in the Pit. Oncost workers and others have not been included - the largest proportion of oncost and spare men were on the dayshift, on the same 'level' as the fillers etc.

More detailed charts - from deputy downward, will be found at the end cover, Appendix D figs. 7 and 8.
Two deputies were required on each shift to handle the two districts in No. 1 Mine. Similarly each district in No. 2 Mine had a deputy on each shift. (This applies to the previous chart also).
N.B. Because of the greater number of officials at Colliery G, this chart has been simplified.
VII. DESCRIPTION OF THE OPERATIONS OBSERVED AT COLLIERIES A. AND B. ¹

Coalcutting.

The coalcutting team to which I was attached at Colliery A. consisted of two men:

Stan who was the leading man - the man in charge; ²

and Joe, who was also an experienced machineman ³ and had worked with Stan for ten years in various sections of Colliery A.

As leading man, Stan operated the controls of the machine while it was cutting; he was the "front-end man". Joe's part of the task was to place the supports, or gibs (see Fig. 4(a) 'end cover) under the cut coal where necessary, and to set the haulage trees by means of which the machine pulled its way along the coal-face; he was the "back-end man".

The Colliery B. coalcutting team consisted of three men:

Charlie, who was the leading man;

Alex, who looked after the cable and set the haulages as Joe did;

and Bob, who put the gibs under the cut coal.

Whereas Stan and Joe operated the controls of their machine, Joe occasionally taking over at piece-time so the machine did not have to be stopped, Charlie operated the controls of his machine and piece-time was taken when the task was finished.

Both teams used the same type of coalcutting machine, an Anderson Boyes 15 in; they both said this was one of the best machines with which

¹ The operations are given in the order in which they take place in the Longwall cycle of operations; the order in which they were carried out during the study is given in chapter III under "The Fieldwork Time.

² Detailed organisational charts are given in Figs. 7 and 8 in Appendix D, to show the relative positions of the men mentioned in the text. The names given to the men, in the text, are fictitious.

³ Machineman: man engaged on the coalcutting operation.

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they had worked. At one time, at both collieries, it had been necessary to have a man shovelling away the fine coal - or 'gum' - produced by the cutting action of the chain of the machine, to prevent the gum from being carried back under the cut by the chain as it revolved. The extra man was no longer required since a device was attached to both machines,\(^1\) to take his place. At Colliery B. a machine team had always been agreed as being three men, to include the extra man for shovelling; he was now no longer required but the team remained at three men,\(^2\) whereas at Colliery A. it was reduced to two.

The task done by the two teams differed. The Colliery A. team was required to cut a double-unit face with a total length of 700 ft, the seam being 30-36 ins. high. The pavement of this seam was very soft blae which became almost a mud due to water falling from the roof. To provide a more solid base for the face supports, and a better pavement for the fillers to shovel on, the machinemen cut in the blae beneath the coal rather than in the coal itself which would be the normal procedure. This 'cutting in the pavement' took longer than cutting in coal and on many shifts the machinemen worked overtime to finish their task.\(^3\)

The Colliery B. machine team had a task of about 400 ft. of coalface to cut in a single-unit. The pavement was hard and they were able to cut in the coal. The team said the conditions were almost perfect for cutting; it made up for some of the "bad" sections in which they had worked.

To allow the machine to travel freely along the machine track, it is normally necessary to have the track cleared of loose coal which falls from the face, and any coal on the face which restricts the width of the track,

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1. This device - a 'gummer' - is available on most machines at the present day.
2. See Chapter XIII, under The Extra Man incident for an example of disagreement over the status of the "third man".
3. This is discussed more fully in the next chapter, VIII The Allocation of Time.
removed by means of a pick. At both collieries, this job was done by "trackers", who were not part of the machine team and were paid independently. The Colliery A. machinemen, Stan and Joe, had three trackers to clean the face in front of the machine. They got on well with the trackers - there was the usual swearing backwards and forwards which seemed to help in doing the job. The Colliery B. machinemen had only one tracker; during the period of observation, Bob helped the tracker most of the shift and the team received extra payment for this. Normally, the team said, one tracker was able to clean the track without any help.

In my view, the Colliery B. team had a very much easier task, at the time when this study was being done, than the Colliery A. team. Care must be taken in comparing tasks, however, since as the Longwall face advances, conditions can change to a considerable degree in a short time.

Method of Work.

It is convenient to describe the method of work of both teams together, since this was very similar; differences in method will be pointed out as they occur.

On entering the coal-face, the first job was to plug in the trailing cable providing current for the machine's electric motor. At Colliery A, the team first coiled the cable in the main level and then pulled it, with the help of the trackers, to the machine in the top or bottom corner. The cable was thereafter trailed behind the machine while it was cutting. At Colliery B, a cable was plugged into the machine, in the corner, trailed

1. See Fig. 7, and cover.
2. Compare Chapter XIV: caution is necessary when discussing the effect of interpersonal relations on the carrying out of the task.
3. See Fig. 8, and cover.
4. The "corners" are those parts of the coalface next to the top or bottom roads; hence, "top corner" and "bottom corner".

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a short distance along the face behind the machine and then another cable already on the face was plugged into the machine; it was Alex’s job to pull this cable away from the front of the machine as it advanced along the face.

When the cable had been plugged into the machine in the corner, the motor was switched on, to check if the current was ‘in the cable’. At both collieries, as at most, the cables ran from switch-boxes in the main level or end roads. While the cables were being handled, these switches should have been in the ‘off’ position; but both teams handled the cables ‘live’ to save them going back to the box to switch on the current. At Colliery A, the switch-box had a habit of sticking on ‘two-phases’. The electrical supply to the machine was three-phase with three contacts in the switch-box. One of these regularly failed to operate and a hammer was used to hit the box, to release the contact.\(^1\) The deputy said he was ‘fed-up’ sending for electricians to mend the contacts — even when they came they never seemed to be able to do anything.

The next step was to turn the machine ready for cutting. Both teams cut the face in opposite directions on successive nights — thus one night they started cutting from the top corner, the next night from the bottom corner. When they finished cutting, they left the machine, and it required to be turned at the beginning of each shift to cut in the opposite direction. The Colliery A. team always had to do this themselves; but the Colliery B. team sometimes had their machine turned for them on the day-shift. In turning the machine, supports were shifted — using a hammer to withdraw them — and not always re-set. A support was set at an angle to the roof and the machine rope\(^2\) fixed to the bottom so that when the machine was switched on, it pulled itself round to face in the new direction.

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1. The box was quite worn in one spot through being hit; an old broken hammer was kept specially for the purpose of hitting the box.
2. The rope is coiled on a drum in the front end of the machine; this rope is led up the face, anchored by the haulage tree and when the machine is cutting, the drum revolves pulling the machine along the face.
In both teams, very little conversation was exchanged while turning the machine; each member of the team seemed to know exactly what to do in any situation.

After the machine had been turned, the picks on the cutting chain were turned. This was done by Stan and Joe, and Charlie and Alex, it was necessary since the chain turned in the opposite direction on successive nights. This was usually the time when some conversation took place; during the actual operation of cutting the noise of the machine made conversation impossible except at some distance from it. Both teams jibbed-in in the same way as follows: While the front-end man operated the controls, the jib was swung into the coalface with the cutting-chain revolving. As the jib cut its way into the coal, the back-end man shovelled away the fine coal thrown out by the chain. On both jobs, the back-end man lost his shovel at least once; it was pulled under the cut with tremendous force by the chain.1

After jibbing-in, the body of the machine lay parallel to the coal-face, with the jib at a right-angle to the machine, under the coal.
Cutting was carried out in a series of steps - "haulages" - along the face.
At both collieries the procedure was the same; the rope was run out from the machine, anchored by the haulage tree, and the machine pulled itself to the haulage tree, cutting as it travelled.2 The Colliery A. team took about seven haulages normally to reach the other end of the face; and the Colliery B. team took five.3

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1. See Section X, under "Jibbing-in" - this practice is contrary to the safety rules.
2. The machines used by both teams travelled at 4½ ft. per minute at their fastest.
3. This was only because the faces were different lengths.
When the end of the face was reached both teams disconnected their machines from the electrical supply, and left the face.

During the time the machine was cutting, very little work was done by any member of the teams. The machine-operator was constantly adjusting the speed of his machine along the coal face, clearing small pieces of coal away from the machine and keeping his eye on the coal face to make sure no coal fell on top of himself of the machine. Both teams told stories of operators killed or injured when falling coal trapped them against the machine which then crushed them against supports before it could be switched off.

The remaining members of the teams sat and smoked, helped the trackers and kept an eye on the operator in case of trouble such as has been mentioned above. A machine when cutting is not unlike a long-distance bus; the driver works continuously, at times harder than others as difficulties are encountered, and the conductor has little to do once the fares have been collected.

Both Stan and Charlie told me that cutting was an extremely skilled job requiring many years of experience. For instance, the placing of the picks in the pick-boxes on the cutting-chain, was critical in obtaining a good level cut. Experience was necessary, to know how to place the picks: if the coal was hard, it tended to force the jib into the pavement - by making the picks on the top of the chain longer than those on the bottom, and putting blunt picks in the bottom on occasions, the jib could be made to rise into the coal. If the coal was soft, the machinemen said, the reverse procedure kept the jib from rising. During cutting, if the machine started to rise of its own accord as it often did, both Stan and Charlie were able to level it again as it travelled, by placing pieces of wood under the machine in different places. Watching the machine advancing along the coal face, it was difficult to believe - until I tried
it for myself under Charlie's guidance - that it could be handled so
delicately.

It is generally recognised in the mining industry that coalcutting
is the most skilled task. A good machine can make the best of the
pavement, make the coal easier to obtain, and help roof control. Production
depends on the machine team and both the teams at Collieries A and B.
certainly knew this. They saw themselves as in a higher status position
than any other type of worker - including the fillers who actually produce
the coal.¹

The job is also potentially a very dangerous one. During cutting
the weight of the strata, above the seam, shifts on to the solid coal in
advance of the coalface - the pressure arch (Fig. 5, Appendix D) moves
forward. Supports are subject to sudden changes in load, and there is a
danger of falls of roof.

¹ Each team on each operation seemed to regard themselves as at least
the equal of any other team.
Brushing...

The brushing team to which I was attached for training at Colliery A, consisted of three men:

Bob, who was the leading man;¹

Ken, who was somewhat older than his mates, and was none too bright

and Tom, who was a keen follower of race-horses and was occasionally a bookie's-runner.

Although Bob was the leading man, Tom made most of the decisions about the task and Bob and Ken followed his advice. Each member of the team shared in the carrying out of the task and each had his regular position for, for instance shovelling. Tom and Ken worked together on one side of the roadway while Bob worked on the other side.

The Colliery B. brushing team consisted of five men, because the road was larger:

Joe, who was the leading man;

Ralph, who was the humorist of the team and was most friendly with David, who seemed the most experienced member of the team;

George, who was, more often than not, absent during the four weeks I was with the team;

and Peter, who was the youngest member of the team - about 24 years old, he had been recently transferred from a nearby colliery which had been closed.

To carry out the task, the team split into two groups; Joe and Peter worked on one side of the road, and David, Ralph and George on the other.

As with the Colliery A. brushing team, each man received an equal share of the total payment for the task. This five-man team differed from the others in the

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¹ Detailed organisational charts are given in Fig.7 and Fig.8 at the end cover, to show the relative positions of the men mentioned in the text.
study, in that there was some openly expressed disagreement between the members; the disagreement was largely about the way of carrying out the details of the task. For instance, there was no disagreement about the principle of setting supports but there were often arguments between Joe and David about the siting of these supports.

Both the brushing teams brushed their roadways in what might be described as the "standard" way; in other words, their method of work was similar to that of almost any brushing team at any colliery.

The Colliery A. team brushed the top road of the same section in which the Colliery A. machine team worked. The Colliery B. team, on the other hand, brushed the main level of the same section in which the Colliery B. machine team worked. A main level is normally higher and wider than an end road, and more stone is produced for packing the sides of the roadway; for this reason a main level brushing team has more men than an end road brushing team. The different dimensions of the respective roadways at Collieries A. and B. accounted for the difference in the numbers of the two teams.

It would possibly have been advantageous to study two teams of the same number in the same size of roadway; but as has been pointed out in Part I, this was something over which I had little control. On the other hand, the evidence gathered from observation of the two brushing teams suggests similarities in behaviour although the total size of the task itself was different in the two cases. The method of work of the two teams was almost the same and their allocation of time showed similar features. For instance, neither team made full use of the time available.

The difference in task of the two teams, then, was one of detail rather than principle. The task of the Colliery A. team was to brush a roadway 10 feet in height and 12 feet in width. Since the height of the seam was 3 1/2 feet, their carry was 6 1/2 feet; the daily advance was 4 1/2 feet.
and the stone was packed into each side of the roadway to build a 6 foot pack on one side - on which Bob worked - and a 14 foot pack on the other side - on which Tom and Ken worked. The rock above the actual coal seam was sandstone at the time of this study.

The task of the Colliery B. team was to brush a roadway 12 feet in height and 14 feet in width. Their carry was 8 feet and the advance per day was 4 feet. The packs which they built extended 12 feet to one side - on which Peter and Joe worked - and 16 feet to the other side of the roadway - the side on which Ralph, David and George worked.

At Colliery A, the top road in which the brushers worked was the return airway for the section. This meant the ventilating air was brought in the bottom road, along the coalface and out the top road. Since there were twenty-four packers on the backshift and two brushing teams - in the main level and bottom road - all firing shots during the shift, there were considerable quantities of fumes swept through the top road. For this reason the Colliery A. brushing team worked on the nightshift instead of the backshift; dayshift being the production shift, brushing and packing otherwise took place on the backshift.

The Colliery B. team worked on the backshift since dayshift was the producing shift in that section. The main level in which they worked was the intake airway for the section so they were not affected by the shot-firing fumes of the packers.

Method of Work.

It is again convenient to describe the method of work of both teams together, since this was very similar; differences in method will be pointed out as and when they occur.

The first part of the brushing operation was to prepare for the shot-firing necessary to blow down the rock. Both teams set "breakers"
which are extra supports set at the side of the road to cause the rock to
break-off as it is fired. At Colliery A, Bob and Tom set the breakers while
Ken went along the face to find the boring machine. When the breakers were
set, the team withdrew the supports from beneath the rock which was to be
removed, and placed pieces of conveyor belting on the pavement to give them
a smooth surface on which to shovel. The three men then bored the holes for
the explosive charges.

The Colliery B. brushing team were able to carry out the above jobs
simultaneously; while George and Joe were setting the breakers, David and
Ralph bored the shotholes. They used the same type of machine as the Colliery
A. team; however it was fixed to a standard which meant - in theory - the
boring machine drilled the holes without requiring any extraneous pressure
applied to it. During the time I was with this team, the rock was extremely
hard and a great deal of difficulty was experienced in boring the shotholes.

The Colliery A. team bored three holes whereas the Colliery B. team
bored five holes in their larger road. While the five holes were being bored,
Peter placed steel plates on the pavement to provide a smooth surface for
shovelling and to protect the level conveyor.

Both teams carried their own explosives with them in tins, when they
went underground. The Colliery A. team charged their shotholes themselves,
and fired the shots themselves unless the deputy was in the vicinity, in
which case he carried out the firing. On the backshift at Colliery B,
there was a shotfirer who carried out this part of the task for the brush¬
ing team.

After firing the shots, both teams began shovelling away the debris
into the sides of the road to build packs. These packs had a dual purpose:
they were a means of disposing of the debris; and they supported the sides
of the roadway.
The men always took up the same positions relative to each other when shovelling. Thus Tom shovelled to Ken who built the pack; David shovelled to Ralph who shovelled to George, and Peter shovelled to Joe.

Both teams worked hard while shovelling, stopping only once for a smoke. When the debris from the shot had been cleared away and the packs had been finished, the girder was put up.

The girder consisted of two identical parts which were bolted together at the top to form a semi-circle; they were made of steel and were I - shaped in cross-section. Both teams erected the girder in the same way. The halves were first positioned at the road-side, 4\(\frac{1}{2}\) feet from the previous girder, and then bolted together at the top. Some distance away from the face, along the roadway, three strings hung from the roof. These indicated the centre-line of the roadway; by sighting along the strings, the brushers centred their girder to ensure the roadway was kept straight.

After the girder was positioned, packing in the form of wooden 'trees' - supports - was placed behind it to hold it tight against the sides and roof of the roadway. This wooden packing performed two functions: it ensured the weight of the strata would be taken evenly and quickly by the girder; and the wood, by yielding to the weight more easily than the steel girder, provided a 'cushion' for the initial weight falling on the girder. Later weight tended to buckle the girders - if this became severe, a team of men removed the girders, heightened the roadway to its former state and erected new girders. This operation, known as 'backbrushing' or 'backripping' is carried out at all collieries from time to time to preserve the haulage roadways into the coalface. Well-built packs can render later backbrushing less necessary; as it can be a costly operation, it is best prevented by good initial support.

1. The building of the pack was the same as for the packing operation.
With the girder erected and packed, both teams tidied up. A support was placed against the freshly exposed brushing face to prevent any loose stone from falling on men as they entered the coalface. Both teams then locked up their shovels, picks and hammers before leaving the section.

Compared with the coalcutting operation brushing required perhaps more strength than skill. The most important part of the task was the placing of the shot holes, so that just enough rock would be removed and no more, and sufficiently broken up to be handled easily. Both teams said the placing of the shot holes was discovered by experience - once they had found the best positions they rarely changed from these. Shot holes - known as "plugs" - were sometimes bored and fired to bring down rock that was obstructing the placing of the girder, or to break up very large pieces of stone which had not been broken by the main round of shots.
Conveyor-shifting.

The conveyor-shifting team to which I was attached for training at Colliery A. consisted of three men on the backshift:

Len, who was the leading man;

Walter, who was very friendly with Len away from the colliery; they were "drinking friends";

and Bill, whose wife was expecting a baby; he was absent most of the time I was with the team.

To carry out the task, the team split into two; Len and Walter worked on the longer side of the double-unit coalface and Bill or his substitute if he was absent, worked on the shorter side with the trainee if the team had one. There were in fact five men in the team but the remaining two men worked on the nightshift. These two had very little contact with the three on the backshift since the latter always left the colliery early with "sick-lines" some time before the end of the backshift.

The Colliery B. conveyor team consisted of three men only:

John, who was too tall for working in the confined space of the coalface and was not too bright; he was the leading man;

Ted, who was a very friendly man; a keen bowler,

and Alan who was younger than the other two (24 years old) and very friendly with Ted away from the colliery.

Although John was leading man, Ted was the one who made most of the decisions necessary to carry out the task. The team worked together on the dismantling and rebuilding of the conveyor and the whole operation.

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1. This was the same district in which the four operations were carried out at Colliery A.

2. Section VIII. gives the details of this practice.
was carried out on one shift.¹

The Colliery A. conveyor team handled an endless belt conveyor and this was dismantled for them by the packers. Each packer dealt with the part of the conveyor beside his pack; he rolled up the sections of belt and laid out the structure of the conveyor in the new track ready for rebuilding. Laying out the structure was not part of the packers' task—they were paid extra for dismantling the conveyor, but as John said, "They might as well lay it out to suit us". This procedure worked very well, the team said, and there were certainly no disagreements between this team and the packers during the study.

The Colliery B. conveyor team handled a scraper-chain conveyor and started work earlier than the packers in their section, in order to dismantle the conveyor before the packers arrived in the coalface.

The task done by the two teams differed in details but, in principle, it was the same as carried out by most conveyor-shifting teams at most collieries.

The Colliery A. team's task was to rebuild the conveyor in the new track² and make sure it was ready for use on the production shift. Since the district was a double-unit Longwall production face, the face conveyor was in two parts—one on each side of the main level feeding on to the main level conveyor³. The total length of conveyor which the team handled was about 630 feet.

The Colliery B. team handled only one conveyor in their district, and this was some 500 feet long. The normal task for three men on a scraper-chain conveyor was 350 feet, the team said. They were paid extra money for the extra task they were carrying out. Like the Colliery A. team, they had

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1. This team worked in a different district from the other three Colliery B. teams in the study.
2. See Fig.4(c), end cover.
3. See Fig.3 bottom diagram, end cover.
to make sure the conveyor was ready for use on the production shift before they left the district; with regard to the Colliery A team it was the two men on nightshift who were responsible for this.

One of the packers in the Colliery B section usually went underground with the conveyor team. If one of the team was absent, he acted as a replacement. The team would otherwise have had to wait for two hours until the nightshift deputy arrived in the section, before obtaining an extra man. If no one was absent in the team, the packer went to his own pack, and left with the conveyor team in the morning.

**Method of Work.**

The conveyor-shifting operation was relatively simple compared with the coalcutting and brushing operations. It can be divided into two parts: dismantling the conveyor in the 'old' track; and building it in the new track.  

At Colliery A, most of the dismantling was done by the packers. The team, however, dismantled that part of the conveyor on each side of the main level. The driving engines for the two face conveyors were situated in the level and were pulled some distance out the roadway by the main level brushers. The two members of the team on nightshift connected the engines to the conveyors again ready for the dayshift. When the belt had been uncoupled and the engines removed, the backshift deputy gave the team a mark from which they proceeded to build the conveyor in the new track. As the packers rolled the belt out in sections in the new track, one member of the team went along the face in each direction away from the main level joining up the sections of belt. The other member of the team followed the man joining the belt, building the sections of the conveyor together again. When the first man reached the return drum - the "barrelend" - in the corner, he went back to the main level and rolled out the remaining sections of the

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1. See Fig. 4, end cover.
belt on the newly built structure. If the team had a trainee, it was possible to have two men on each side of the main level working in the above manner. When the team did not have a trainee, two men joined the belt on each side along the whole length of the conveyor while the third man built part of the conveyor on each side away from the main level and then continued building on the longer side. This left one man—usually Bill—to build the conveyor on the shorter side of the face by himself.

The Colliery B. team usually all worked together taking the scraper-chain off the conveyor and rolling it up in manageable lengths. Sometimes however, John did this while Alan and Ted dismantled the conveyor itself. As the sections were removed from the old track, they were placed in the machine track ready for use again. Unlike the belt conveyor which had only sides and intermediate rollers, the scraper-chain conveyor had top pans and bottom pans. These pans were the chutes in which the scraper-chain ran. The pans were 6 feet in length compared with the 7 feet sides on the belt conveyor. The team left the bottom pans in the 'old' track, until they were ready to start building. When all the top pans had been removed, the team pulled the "barrel-end", which in this case was in the main level, into the new track and began building away from the level. Alan connected up the bottom pans, grading them as he moved along the face to eliminate sudden changes in level; and building in as straight a line as was possible. Ted and John followed him, laying the top pans on the bottom pans and joining up the sections of scraper-chain as they put them on the conveyor.

When the Colliery A. team reached the corners they pulled over the "barrel-end" and connected them to the conveyor. Bill was usually finished in time to help Len and Walter with the last part of the conveyor on the longer side of the coalface. The team left the engines and the final joining

1. In both conveyors, the sections were jointed at the ends to form the conveyor structure on which the belt or scraper-chain ran.
of the belt to the two men on the nightshift.

When the Colliery B. team reached the top corner of the coalface, they pulled the engine over and connected it to the conveyor. After joining the chain they ran the conveyor for a few minutes to check that it was ready for the production shift, and then left the section.

The Colliery A. team did not appear to vary their method of work at all although they did vary the effort which they applied. The Colliery B. team however varied their method of work considerably. Sometimes they started at one end of the conveyor and sometimes at the other; on other occasions they began building the conveyor as they dismantled it. These variations in method did not appear to affect their starting and finishing times however as will be seen from the next section on allocation of time on the operations observed.

1. See Chapter IX.
Packing.

The packing operation in the Longwall cycle of operations is not normally carried out by a team but by individuals each carrying out an equal task; this was the case at Collieries A. and B. not only in the sections in which I worked but in all the sections of both collieries. The description of the packing operation as carried out by Robert and Harry 1 which follows is thus a description of the operation as carried out by any of the packers at the respective collieries. The times at which Robert and Harry started and finished their tasks differed from those of the other packers in details 2 but in all other respects the two men appeared to be typical of the packers in their respective sections.

Robert was my supervising workman at Colliery A. He had entered the mining industry comparatively recently, having fought in the Korean War as a National Serviceman; he started his working life as a boilermaker.

Harry, my supervisor at Colliery B, was older than Robert, and had been transferred some time previously from another colliery which had been closed as uneconomic. He trained racing greyhounds and, on Friday backshifts, liked to be finished early if possible to see them running at the local race-track. At Colliery A, Robert worked in the same "dummy-road" as Jack. This meant they fired their shots together but they did not work as a pair nor were they paid as such. A "dummy-road" was a roadway in the waste, parallel to the main level. It was brushed the same way as a normal roadway but no supports were erected in it. Robert and Jack bored holes and fired explosives in the same way as the brushers in a normal roadway and then built packs on each side of the "dummy-road" similar to the brushers' roadside packs.

1. See Figs. 7 and 9, end cover.
2. See Chapter VIII.
At Colliery B, Harry worked alone and there were no "dummy-roads" in the district. Instead holes were bored in the roof by the dayshift holeboring and these were fired by the packers to obtain stone. The man in the pack next to Harry went underground with him; and left the section with him. This man, Jim, and Harry were extremely friendly. When Harry was absent for two days, Jim acted as my supervisor.

There was a difference in tasks between the two collieries. At Colliery A, the packers were required to build a pack 13½ feet long and 4½ feet wide, at Colliery B, the packs were required to be 15 feet in length and 4½ feet wide.

In the section at Colliery A, there were twenty-four packers - ten on the shorter side of the double-unit face, and fourteen on the longer side. At Colliery B, there were eight packers on the single-unit face. The packers at both collieries were paid per half-foot of packing completed.

Method of Work.

At Colliery A, Robert began by dismantling the conveyor next to his pack. He rolled the belt up and pushed it into the machine track and placed the sides of the conveyor in the new conveyor track. When he had done this he began building his 'backend'. This was done by placing several large stones on the pavement at the required position, to form a wall from the end of his previous pack towards the coal face and then at right angles to the coal face in the shape of an L. Against this wall he shovelled small stones, and any coal lying about and gradually, by adding large stones and shovelling small stones, he built the 'backend' up to the roof (see diagram (1)) on the next page.

1. See Chapter XI - The Boring of Shotholes for a detailed description of the effects of boring these holes in the wrong place.
2. The width is in the line of advance; length is parallel to the coalface conveyor.
Diagram (i)
Beginning the pack

Diagram (ii)
Finishing the pack
Harry carried out the same procedure at Colliery B, but he filled his pack with coal as far as possible. When the coal in the seam was soft he was able to obtain a considerable amount of coal from the face.

When the 'backend' had been built to the roof, both Robert and Harry continued the wall along beside the conveyor. Large stones were used for the wall and small stones were shovelled into the pack. I was told by both my supervisors that the "secret" of building a pack was not to build the walls too high at a time too quickly; the walls had to be supported by filling the pack with small stones until they reached the roof. The walls were jammed tight against the roof with small flat stones and the small stones were shovelled into the pack to completely fill the interior.

When the pack reached its required length (as in diagram (ii)) the wall was turned at right angles again and built up to the roof to finish the pack.

Robert usually built his pack completely before boring his shotholes and firing his shots; this gave him stone to begin his pack the following day and saved him time in waiting for the boring-machine at the beginning of the shift.

Harry did not have holes to bore as these were bored for him on the dayshift; he usually fired his shots just before he finished his pack.

Both men withdrew the supports in the old conveyor track with their hammers. Robert withdrew his as he worked past them but Harry withdrew all of his before beginning his pack.

When Robert had fired his shots he left the district as his task was finished. Harry however had more supports to withdraw before he left. He was required to withdraw the supports in the old conveyor track between his own pack and Jim's. Jim withdrew the supports between his own pack and the next man's and so on along the coalface.
VIII. THE ALLOCATION OF TIME ON THE OPERATIONS OBSERVED AT COLLIERIES A AND B

Coalcutting

Both the coalcutting operations observed at collieries A and B, took place on the nightshift which is the normal shift for coalcutting at most collieries. At Colliery A, the nightshift began at 10.30 p.m. whereas at Colliery B the nightshift began at 11.00 p.m. But, allowing for this difference in the timing of the nightshift at the two collieries, there were many similarities in the behaviour of the two coalcutting teams with regard to the times at which they actually started work, the times at which they "rested" - to have a smoke, or to eat their 'piece' - and the times at which they finished their work. It was also evident, from conversation with, and observation of other coalcutting teams at both collieries, that the two teams which were studied were not unique in their habitual starting times, "rest" times and finishing times; each coalcutting team, and as I shall show each team studied appeared to have what is referred to later in this section as a "rest-timetable."

At Colliery A, the machine team, Stan and Joe, always went underground at 10.00 p.m. - the beginning of winding-time. They went straight into the district and sat in the main-level to have some of their 'piece' and a smoke. The practice of having a part of the 'piece' - sandwiches and tea to eat during the shift - at the beginning of the shift was widespread at both collieries. The practice had no official basis; the only time allowed for eating is twenty minutes in the middle of a shift. The machinemen began

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1. The operations are dealt with here in the same order as in the previous section; that is, in the order in which they occur in the Longwall cycle of operations.

2. This applies to the whole mining industry; the shift is 7½ hours with twenty minutes for meals. (The shift has been reduced to 7½ hours since this study was concluded)
to coil the trailing cable at about 11.00 p.m. every night. The coiling of this cable, preparatory to pulling it along the coalface to the machine, was the beginning of the actual operation; 11.00 p.m. was their normal starting-time, and any time after this they regarded as a "late-start."

At Colliery B, the machinemen went underground at 11.00 p.m. which was the official starting time for the nightshift. All the men on nightshift in No. 1 mine went underground at the same time in one train of bogies on the man-riding haulage. The team arrived in the district about 11.30 p.m. and had some of their piece and a smoke. At 12.15 a.m. they went into the coalface to start work. If they started later than 12.15 a.m. - and this seldom happened - they regarded this as a "late-start."

Thus both teams started their actual work at some time after the official starting time; and it was this time, not the official time, that they regarded as their normal starting time. It was not practicable to note exact times while 'on the job' but the times given in the Tables 1 and 2 below are fairly reliable estimates. However, the exact time is not so important as the fact that both teams consistently started later than the official time.

The Colliery B team continued with their task until they finished, before having their piece time. The team regarded 4.15 a.m. as their finishing time and allowed themselves until 5.00 a.m. before going for the haulage to the surface. On occasions they were later finishing; if they left the section at any time after 5.00 a.m. they were "late." Tables 1 and 2 show the respective machine team's starting and finishing times and "rest" times, compared with the official times.

The Colliery A machine team seemed to regard 5.00 a.m. as their finishing time and any time after this was "late." They were "late" thirteen times in the twenty-five days I spent with them; and on seven occasions they were "early" and checked out when they reached the surface.
Colliery A had an agreement covering overtime working which was not in force at Colliery B. If a man, or a team, stayed to finish the task at the deputy's request and then checked out one hour after the official finishing time for their shift, a half-shift was paid for the overtime work. At one time, I was told, everyone benefitted from this agreement and overtime was worked regularly. At the time of this study, however, overtime was only allowed in exceptional circumstances; machinemen were asked to "lie-on" - work overtime - because their task was so important to production.

Stan and Joe cut the pavement of their section and this took longer than cutting in the coal itself, and involved more work in handling the machine. Joe told me they were not paid any extra money for cutting pavement and so they "lay-on" to make up for this. It appeared as if Stan decided whether they would finish at 5.00 a.m., their 'normal' time, and if he did not think it was possible to do so, he took a little longer to qualify for the half-shift. It was extremely difficult to tell whether this slowness was deliberate since the technical conditions were such that slow cutting was necessary in any case. But on two occasions when we finished at 5.45 a.m., we sat in the section for an hour, and checked out at 7.00 a.m. to qualify for the half-shift.

Again, I would suggest, the exact times are not as important as the fact that both teams had a finishing time which was earlier than the official time - the end of the shift.

1. i.e. the payment was 3/4 hours instead of 1 hour at time-and-a-half.
Table 1: Actual starting and finishing times compared with official starting and finishing times.

Colliery A coalcutting team.

<table>
<thead>
<tr>
<th>Official time</th>
<th>Actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00 p.m.</td>
<td>10.00 p.m.</td>
</tr>
<tr>
<td>10.30 p.m.</td>
<td>10.20 p.m.</td>
</tr>
<tr>
<td>2.00 a.m.</td>
<td>2.00 a.m.</td>
</tr>
<tr>
<td>- 2.20 a.m.</td>
<td>-2.30 a.m.</td>
</tr>
<tr>
<td>6.00 a.m.</td>
<td>6.00 a.m.</td>
</tr>
</tbody>
</table>

Winding-time begins, backshift ascend.  
Team descend, go straight into district.  
Team arrive in district, have piece and smoke.  
Team begin task.  
Team have piece and smoke  
Team finish task, leave district.  
Team ascend, check out.  
Winding time begins for dayshift.

Total shift time: 7½ hours including piecetime: 20 minutes.

(a) Official time available for work: 7 hours 10 minutes  
(b) Actual time spent on work: 6 hours.

Difference between (a) and (b): 1 hour 10 minutes.

1. "Actual": i.e., the time which the team regarded as their normal time, and variations from which the team spoke of as "late" or "early".
Table 2: Actual starting and finishing times compared with official starting and finishing times.

Colliery B coalcutting team.

<table>
<thead>
<tr>
<th>Official time</th>
<th>Actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.30 p.m. Winding-time begins.</td>
<td>10.55 p.m.</td>
</tr>
<tr>
<td>11.00 p.m. Nightshift starting time.</td>
<td>11.30 p.m.</td>
</tr>
<tr>
<td></td>
<td>Team arrive in district, have piece and smoke.</td>
</tr>
<tr>
<td></td>
<td>Team begin task.</td>
</tr>
<tr>
<td>2.30 a.m. -2.50 a.m. Piecetime</td>
<td>4.15 a.m.</td>
</tr>
<tr>
<td></td>
<td>Team finish task, begin piece.</td>
</tr>
<tr>
<td></td>
<td>Team leave district.</td>
</tr>
<tr>
<td>6.30 a.m. Nightshift finishing time. Winding time begins for dayshift.</td>
<td>5.00 a.m.</td>
</tr>
<tr>
<td></td>
<td>Team ascend, check out.</td>
</tr>
<tr>
<td></td>
<td>5.30 a.m.</td>
</tr>
<tr>
<td></td>
<td>5.30 a.m.</td>
</tr>
</tbody>
</table>

Total shift time: 7½ hours including piecetime: 20 minutes.

(a) Official time available for work: 7 hours 10 minutes
(b) Actual time spent on work: 4 hours

Difference between (a) and (b): 3 hours 10 minutes.

1. "Actual": i.e. the time which the team regarded as their normal time, and variations from which the team spoke of as "late" or "Early".
Brushing

The Colliery A brushing operation was carried out on the nightshift - as was mentioned in Chapter VII. - because of the shotfiring fumes on the backshift. The Colliery B brushing operation was carried out on the backshift. The two teams, however, carried out their tasks in very similar ways and the way in which they allocated their time was also very similar. Neither team started work at the official starting time, or finished at the official finishing time as will be seen from Table 3 and Table 4. These tables show the times which the teams appeared to regard as their normal times; and variations from these times were spoken of as "late" or "early". As with the two coalcutting teams, the two brushing teams did not appear to be unique in having habitual starting times, "rest" times, and finishing times.

At Colliery A, the brushing team always went underground at 10.15 p.m. and sat in the pit-bottom until 10.30 p.m. chatting to other nightshift men. At 10.30 p.m. they left the pit-bottom to walk into the district, with the trackers.¹ When they arrived in the top road of the district, about 10.50 p.m., they had some of their piece - the 'universal' custom - and a smoke. Ken usually unlocked the shovels and picks from the pin on which they were kept when not in use; while he was doing this, Bob and Tom began to look for supports to set as 'breakers'. These preliminaries began about 11.15 and marked the beginning of the task. This was some forty-five minutes after the official starting time.

At Colliery B, the brushing team went underground at 2.55 p.m. - five minutes before starting time - and walked, from the bogies, straight into the district. They arrived in the main level about 3.40 p.m. and had some of their piece and a smoke. At 4.00 p.m., the team began the task, an hour after the official starting time. If they began the task before 4.00 p.m.

¹ These trackers were the men who cleaned the track for the Colliery A machine team; see Fig. 7. end cover.
they were "early"; and if they began later than 4.00 p.m., that was a "late start", they said. Neither team appeared to regard the official starting time as the time for starting their own job.

The Colliery A brushing team stopped for a smoke about 1.15 a.m. and then continued with shovelling away the debris from the shotfiring, until 2.30 a.m. when they stopped for a half hour for their piece. They tried to have all the shovelling finished by piecetime in order to erect the girder immediately afterwards. They regarded 5.00 a.m. as their finishing time and always had a chat in the pit-bottom with the other nightshift men until 6.00 a.m.

The Colliery B brushing team continued with their task until after the shotfiring was over. After studying the position, they had their piece before beginning the shovelling. Because of difficulties with the boring machine in the hard rock which prevailed at the time of the study, piecetime varied between 6.00 p.m. and 6.30 p.m. If the team had not begun shovelling by 6.45 p.m., they said they were "late." An hour was usually long enough to clear away all the stone into the packs and by 9.30 the team were ready to leave with the girder erected and packed. If they were "early" - which was very seldom during this period - they asked the deputy for a line to check out early but seldom received one. The team normally checked out at the backshift finishing time of 10.20 p.m.
## Table 3: Actual starting and finishing times compared with official starting and finishing times.

Colliery A brushing team.

<table>
<thead>
<tr>
<th>Official time</th>
<th>Actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10.00 p.m.</strong></td>
<td>Winding time begins, backshift ascend.</td>
</tr>
<tr>
<td><strong>10.30 p.m.</strong></td>
<td>Nightshift starting time.</td>
</tr>
<tr>
<td><strong>2.00 a.m.</strong> - <strong>2.20 a.m.</strong></td>
<td>Piecetime.</td>
</tr>
<tr>
<td><strong>6.00 a.m.</strong></td>
<td>Nightshift finishing time, winding time begins for dayshift.</td>
</tr>
</tbody>
</table>

Total shift time: 7½ hours including piecetime: 20 minutes.

(a) Official time available for work: 7 hours 10 minutes.

(b) Actual time spent on work: 5 hours 15 minutes.

Difference between (a) and (b): 1 hour 55 minutes.

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1. See footnote 1. for Table 1 and Table 2.
Table 4: Actual\(^4\) starting and finishing times compared with official starting and finishing times.

**Colliery B brushing team.**

<table>
<thead>
<tr>
<th>Official time</th>
<th>Actual time</th>
<th>Actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.30 p.m.</td>
<td>Winding time begins dayshift ascend</td>
<td>2.55 p.m.</td>
</tr>
<tr>
<td>3.00 p.m.</td>
<td>Backshift starting time.</td>
<td></td>
</tr>
<tr>
<td>6.00 p.m.</td>
<td>Piece time</td>
<td>6.15 p.m.</td>
</tr>
<tr>
<td>10.20 p.m.(^2)</td>
<td>Backshift finishing time winding-time begins for nightshift.</td>
<td>10.20 p.m.</td>
</tr>
</tbody>
</table>

Team descend, go straight into district.
Team arrive in district, have piece and smoke.
Team begin task.
Team have piece and smoke.
Team finish task, leave district.
Team ascend.
Team check out.

**Total shift time:** 7 hours 20 minutes including walking time: 30 minutes.  
including piecetime : 20 minutes.
(b) Actual time spent on work:
(a) Official time available for work: 6 hours 30 minutes.

5 hours.

**Difference between (a) and (b):** 1 hour 30 minutes.

1. See footnote 4. for Table 1 and Table 2.
2. All the backshift men at Colliery B were allowed to check out at 10.20 p.m. i.e. 10 minutes early.
Conveyor-shifting

The conveyor-shifting operation was carried out on the backshift at Colliery A; at Colliery B, since the backshift was the production shift in that particular section, it was carried out on the nightshift. As in the two operations described above, the two conveyor-shifting teams showed similar features in their allocation of time. They both had habitual starting and finishing times which differed from the official times; in particular, the Colliery A team carried out their task in less than half the shift time. Table 5 and Table 6 show the times which the respective teams regarded as their normal times. Both teams practised "early-lousing". This is discussed in more detail later in this chapter; the present account of the allocation of time is the evidence on which the discussion is based.

The Colliery A conveyor team went underground at 2.15 p.m. every day and went straight into their district. They had some of their piece and a smoke before going into the coalface. The first part of their task was to uncouple the belt to allow the packers to dismantle the conveyor; and they began this at 3.00 p.m. This was thirty minutes after the official starting time for the shift.

The Colliery B conveyor team went underground at 10.00 p.m. which was the official starting time for their early night shift. They went straight into their district and began their task immediately; they were the only team in the study - and one of the few teams at either colliery - who did not have some of their piece and a smoke before they began their task. The first part of the task was to uncouple the swaper-chain of the conveyor and they began this at about 10.20 p.m. twenty minutes after their official starting time. Both teams spoke of "late" starts with reference to their own starting times and not the official starting times.

During the task, the Colliery A team split - one man worked on the shorter side of the double-unit coalface, the other two men worked on the longer side.
The man on the shorter side usually finished first and had a smoke before going to help the other two members of the team; he usually managed to help with the last fifteen minutes of the task - positioning the barrel-end and coupling up the belt. The team finished their task about 6.15 p.m. - this was the time which they regarded as their normal finishing time. They then had their piece, before obtaining a "sick-line" from the deputy and leaving the district at 6.30 p.m. The team checked out at 7.00 p.m. which was three hours earlier than the official backshift finishing time. While I was with this team, I played cards with two other trainees whose team also finished early. The deputy gave us a "wet-line" every shift allowing us to check out at 9.30 p.m.

The Colliery B conveyor team worked continuously to dismantle the conveyor before the packers came into the coalface. They were "up to time" if they could do this - during the period of observation they were "late" at this stage of the task on only three occasions, which, they said, was unusual. By 2.30 a.m. they had the conveyor almost rebuilt and took a half-hour for their piecetime. They tried to leave themselves very little of the task to be done after piecetime and they left the district, with the conveyor ready for use on the production shift, at 3.45 a.m. They had a special signal for obtaining the bogies which were lowered only in special circumstances during the nightshift at Colliery B. They checked out at 4.00 a.m.; this was simply a case of leaving the checks in the time office as there was no-one on duty until 6.00 a.m.

1. See Chapter XI, under "Sick-lines" for details of this practice.
2. See Chapter XI, under "Wet-lines" for details of this practice.
Table 5: Actual starting and finishing times compared with official starting and finishing times.

Colliery A conveyor-shifting team.

<table>
<thead>
<tr>
<th>Official time</th>
<th>Actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 p.m.</td>
<td>Winding time begins, dayshift ascend.</td>
</tr>
<tr>
<td></td>
<td>Team descend, go straight into district. 2.15 p.m.</td>
</tr>
<tr>
<td>2.30 p.m.</td>
<td>Backshift starting time.</td>
</tr>
<tr>
<td></td>
<td>Team arrive in district, have piece and smoke. 2.35 p.m.</td>
</tr>
<tr>
<td>6.00 p.m.</td>
<td>Piecetime.</td>
</tr>
<tr>
<td>-6.20 p.m.</td>
<td>Team finish task, have piece and smoke. 6.15 p.m.</td>
</tr>
<tr>
<td></td>
<td>Team leave district. 6.30 p.m.</td>
</tr>
<tr>
<td>10.00 p.m.</td>
<td>Backshift finishing time, winding time begins for nightshift.</td>
</tr>
<tr>
<td></td>
<td>Team ascend, check out with &quot;sick-line&quot;. 7.00 p.m.</td>
</tr>
</tbody>
</table>

Total shift time: 7\(\frac{1}{2}\) hours including piecetime: 20 minutes.

(a) Official time available for work: 7 hours 10 minutes.

(b) Actual time spent on work: 3 hours 15 minutes.

Difference between (a) and (b): 3 hours 55 minutes.

1. See footnote 1. for Table 1 and Table 2.
Table 6: Actual starting and finishing times compared with official starting and finishing times.

Colliery B conveyor-shifting team.

<table>
<thead>
<tr>
<th>Official time</th>
<th>Actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00 p.m.</td>
<td>Early nightshift begins.</td>
</tr>
<tr>
<td>10.30 p.m.</td>
<td>Winding time begins, backshift ascend.</td>
</tr>
<tr>
<td>11.00 p.m.</td>
<td>Nightshift starting time.</td>
</tr>
<tr>
<td>5.30 a.m.</td>
<td>Early nightshift finishing time.</td>
</tr>
<tr>
<td>6.30 a.m.</td>
<td>Nightshift finishing time, winding time begins, work begins for dayshift.</td>
</tr>
</tbody>
</table>

Total shift time: 7½ hours including piecetime: 20 minutes.

(a) Official time available for

work: 7 hours 10 minutes.

(b) Actual time spent on

work: 5 hours.

Difference between (a) and (b): 2 hours 10 minutes.

1. See footnote 1. for Table 1 and Table 2.

2. This team worked on early nightshift beginning at 10.00 p.m.
Packing

Both the packing operations observed at Collieries A and B took place on the backshift. The Colliery A packing operation was carried out in the same district as the coalcutting, brushing and conveyor-shifting operations; while the Colliery B packing operation was carried out in the same district as the coalcutting and brushing operations. In both these districts at the respective collieries, production was carried out on the dayshift - thus the packing operations were in the normal sequence of operations of the Longwall production cycle. There were task differences between the two operations; in terms of length of pack, the Colliery B packers had the greater task. The timing of the backshift was also different at the two collieries. The two complements of packers nevertheless showed similar features in their allocation of time during the shift; and these features - notably the difference between their own starting and finishing times and the shift starting and finishing times - were also similar to those shown by the other teams in this study.

The actual times given in Table 7 and Table 8 refer to the supervising workmen with whom I trained; these times do not apply to every packer in the respective sections but each packer appeared to have his own habitual times which he regarded as normal.1 Where necessary in the following text, a distinction will be made between times which apply to all the packers in the respective sections and those which apply only to Robert and Harry, my supervisors.

At Colliery A, almost all the packers in the section went underground immediately winding time started at 2.00 p.m. Some went underground later - the same men, however, descended at the same time every day. Robert - my supervisor - was always among the first. He went straight into the district and began immediately - with a very short pause for some of his piece - by preparing for firing the shots. When the conveyor-shifters uncoupled the

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1. The implications of this difference for task-assessment are discussed more fully later.
belt, he dismantled the length of conveyor beside his pack and began building about 3.15 p.m. Most of the packers were also ready to start building their packs by this time. There was thus very little difference between the actual starting of most of the packers and the official starting time for the backshift.

Robert spoke of being "late" if he was not started some part of his task by 2.30 p.m.

At Colliery B, the packers descended just after the beginning of winding time on the first of two descents which the men-riding haulage made in the half hour between 2.30 p.m. and 3.00 p.m. They waited at the meeting-station until 2.50 p.m. and then all walked into the district, more or less together. When they arrived about 3.30 p.m. they had the customary - but not official - piece and smoke and they started work about 3.30 p.m. This was the time, half an hour after the official shift starting time, which the packers regarded as their normal starting time. A starting time after 3.30 p.m. was "late" - before 3.30 p.m. was "early."

Both Robert and Harry continued with their packs until the task was finished. Robert then left - at 5.00 p.m. By obtaining a "sick-line" from the deputy he was able to check out and was on his way home again some four hours after going underground, having spent no more than two and a half hours working on his task. All the packers in the district, at Colliery A, obtained "sick-lines" to leave early when their task was finished. Each appeared to have his regular finishing time.

At Colliery B, when Harry finished his task at about 6.30 p.m. he had his piece and a smoke until 7.00 p.m. The man on the next pack, Jim, usually joined him for this. After piece-time, Harry tidied up the supports he had withdrawn which was officially part of his task; and then carried out an extra task with Jim's help. By 7.45 p.m. Harry and Jim were ready to leave the district closely followed by most of the other packers. They walked slowly up the long slope to the bogies and ascended to the surface out 8.30 p.m. From then until 10.00 p.m. they sat in the canteen. They spent the last half-hour of the shift standing beside the time-office waiting to check out.
Table 7: Actual starting and finishing times compared with official starting and finishing times.

Colliery A packer - Robert.

<table>
<thead>
<tr>
<th>Official time</th>
<th>Actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 p.m.</td>
<td>2.00 p.m.</td>
</tr>
<tr>
<td>2.30 p.m.</td>
<td>2.30 p.m.</td>
</tr>
<tr>
<td>5.00 p.m.</td>
<td>5.00 p.m.</td>
</tr>
<tr>
<td>5.30 p.m.</td>
<td>5.30 p.m.</td>
</tr>
<tr>
<td>6.00 p.m.</td>
<td>6.00 p.m.</td>
</tr>
<tr>
<td>6.20 p.m.</td>
<td>6.20 p.m.</td>
</tr>
<tr>
<td>10.00 p.m.</td>
<td>10.00 p.m.</td>
</tr>
</tbody>
</table>

Winding time begins, dayshift ascend. Robert descends, goes straight into district. Begins task. Finishes task, leaves section. Ascends, checks out with "sick-line". Rest of packers leave with "sick-lines" over next three hours.

Backshift finishing time, winding time begins for nightshift.

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Total shift time: 7½ hours including piece time: 20 minutes.

(a) Official time available for work: 7 hours 10 minutes. (b) Actual time spent on work: 2 hours 30 minutes.

Difference between (a) and (b): 4 hours 40 minutes.

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1. See footnote 1. of Table 1 and Table 2.

2. Robert was my supervising workman on the packing operation at Colliery A.
Table 8: Actual starting and finishing times compared with official starting and finishing times.

*Colliery B packer - Harry*

<table>
<thead>
<tr>
<th>Official time</th>
<th>Actual time</th>
<th>Actual time</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.30 p.m.</td>
<td>Winding time begins dayshift ascend.</td>
<td>Harry descends, waits at meeting station. 2.35 p.m.</td>
</tr>
<tr>
<td>3.00 p.m.</td>
<td>Backshift starting time.</td>
<td>Leaves for district. 2.50 p.m.</td>
</tr>
<tr>
<td>6.00 p.m.</td>
<td>Piecetime.</td>
<td>Arrives in district, has piece and smoke. 3.20 p.m.</td>
</tr>
<tr>
<td>-6.20 p.m.</td>
<td></td>
<td>Begins task. 3.30 p.m.</td>
</tr>
<tr>
<td>10.30 p.m.</td>
<td>Backshift finishing time, winding time begins for night-shift.</td>
<td>Stops for smoke. 5.00 p.m.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Has piece and smoke. 6.30 p.m.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Finishes task. 7.00 p.m.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Finishes extra work leaves district. 7.45 p.m.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ascends, sits in canteen. 8.30 p.m.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Checks out. 10.20 p.m.</td>
</tr>
</tbody>
</table>

Total shift time: 7½ hours including walking time: 30 minutes. 
including piecetime: 20 minutes.

(a) Official time available for work: 6 hours 40 minutes.
(b) Actual time spent on work: 3 hours 45 minutes.

Difference between (a) and (b): 2 hours 55 minutes.

1. See footnote 1. of Table 1 and Table 2.
2. Harry was my supervising workman on the packing operation at Colliery B.
The Implications of the "Timetable"

We are now in a position to summarise and discuss the implications of findings with regard to allocation of time. Tables 9, 10 and 11 show in summary form the number of observations made, during the study, of late-starts, rest times and early finishes.

Table 9 shows the number of times I observed the respective teams starting later than the official time; the variation from the official time was different for each team ranging from zero to one and a quarter hours. The men themselves did not speak of their starting times as "late" with regard to the official starting time. To them, a "late" start was later than the "normal" starting time as given in Table 9. In other words, their 'image' of starting time did not coincide with the official 'image'. This was not an issue however at either Colliery, A. or B. Early finishing - or 'early lousing' as it was called - was an issue and most of the discussion below is concerned with this subject.

Table 10 shows the number of observations of rest times other than at the beginning and the end of the shift - these are covered by Tables 9 and 11. Each team had their piece at the same time each shift; and, as Table 10 shows, the same time was taken each day.

Table 11 shows the number of observations of early finishing. Each team consistently finished their task before the official finishing time. As with the starting time, they appeared to have an 'image' of finishing time which did not coincide with official finishing time. Strictly speaking early finishing and 'early lousing' are not the same thing - the latter term was used at both collieries to describe checking out before the official finishing time as distinct from finishing the task early and waiting either underground or in the canteen until the official finishing time.

'Early lousing'

It was clear that the practice of 'early lousing' was widespread on the backshift at Colliery A. The manager told me that he had orders from
<table>
<thead>
<tr>
<th>Time</th>
<th>Coalcutting</th>
<th>Brushing</th>
<th>Conveyor-shifting</th>
<th>Packing</th>
<th>3:00 p.m.*</th>
<th>9:00 p.m.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00 a.m.</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>5</td>
<td>20</td>
<td></td>
<td></td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>4:00 a.m.</td>
<td>-</td>
<td>23</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12:15 a.m.</td>
<td>-</td>
<td>27</td>
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<td></td>
<td>22</td>
<td></td>
</tr>
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<td>2:00 p.m.</td>
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<td>-</td>
<td></td>
<td></td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>23</td>
<td>23</td>
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<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10:00 p.m.</td>
<td>5</td>
<td>27</td>
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<td></td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>11:00 a.m.</td>
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<td>28</td>
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</tr>
<tr>
<td>2:30 p.m.</td>
<td>23</td>
<td>20</td>
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<td></td>
<td>16</td>
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</tr>
<tr>
<td>3:00 p.m.</td>
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<td>26</td>
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<td>20</td>
<td></td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>-</td>
<td>-</td>
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<td></td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>10:00 p.m.</td>
<td>23</td>
<td>23</td>
<td></td>
<td></td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

Table 94 Number of Observations of Late-starting
### Table 10

<table>
<thead>
<tr>
<th>Other Rests of at Least 10 mins</th>
<th>0-20</th>
<th>21-30</th>
<th>31-45</th>
<th>Actual Length in mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 mins</td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>21-30</td>
<td>21-30</td>
<td>21-30</td>
<td>21-30</td>
</tr>
<tr>
<td></td>
<td>21-30</td>
<td>21-30</td>
<td>21-30</td>
<td>21-30</td>
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<tr>
<td></td>
<td>21-30</td>
<td>21-30</td>
<td>21-30</td>
<td>21-30</td>
</tr>
<tr>
<td>Coalcutting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brushing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conveying</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Table 10 shows the number of observations of rest-times during the shift.*
<table>
<thead>
<tr>
<th>No.</th>
<th>Operation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Colliery</td>
<td>Remarks: inter-day &amp; inter-shift operations</td>
</tr>
<tr>
<td>2</td>
<td>Early-finish</td>
<td>Remarks: inter-day &amp; inter-shift operations</td>
</tr>
<tr>
<td>3</td>
<td>Actual finishing time earlier than official time</td>
<td>Number of observations of Early-finish</td>
</tr>
</tbody>
</table>
"higher-up" to stop it, but until the time I left Colliery A, he had not been able to find a way of doing this. There was indeed an element of 'legality' about the practice.

If a man becomes ill during his shift, he can obtain a line from his deputy stating this fact and this gives him permission to leave the section and return to the surface. He gives the line to the time-keeper and can leave the colliery and go home. Details of the procedure seem to vary from colliery to colliery. For instance, a line may or may not be required as long as the deputy is informed; a doctor may examine the man at the pithead; he may or may not sign the 'book'.

The man is normally paid according to the proportion of his task which he has completed, with a reduction for less working time. Thus if he has finished his task before leaving, he receives his rate for the task less part of his bonus - amounting to a few shillings.

The exact history of how 'early lousing' became such an issue at Colliery A is not known to me; it was already well established when I arrived there. Questioning of the men suggested they themselves were unsure as to how it came about. Continual observation over considerable periods of time might reveal how these practices arise but such a study, for various reasons, might not be a practical proposition. A few of the men were doubtful as to how long 'early lousing' would continue to be practised, if they finished their task every day in considerably less than seven and a half hours while supposedly sick. No one pretended any longer that they were sick when they asked for their "sick-lines." When a relief deputy was on duty, the procedure was only a little more formal. With the regular deputy, members of informal groups would take it in turns to get the "sick-lines" and the deputy handed them out without

1. This is the "sick-line" already mentioned. Details of "sick-lines", "wet-lines" and "clear-lines" are given in Chapter XI.

2. The 'book' contains details of any mishaps during the shift, e.g. sprains, strains or sickness and more serious accidents such as fractures, etc.
question. If a relief deputy was on, the men said they had a sore head or strained back and received their line as usual. The whole procedure had become quite automatic - nobody said 'awkward' things like, 'But how have you finished your work if your back is strained?'

The Colliery A men were prepared, they said, to lose the shilling or two per shift and did not see how the manager could stop them leaving early since they could not be refused a "sick-line."

While I was on the nightshift at Colliery A, the colliery Union delegate held a pit meeting on each shift one Tuesday. This was an informal affair in which we gathered round him in the baths before going underground. He told the men about increased tasks being introduced by the National Coal Board at a colliery in another part of the country. He said the same might happen at Colliery A if 'early lousing' continued. He asked the men to do what they could to eliminate the practice, and reminded them that the National Union of Mineworkers had condemned it. He got a very quiet reception, and his appeal seemed to make little impression. The men with whom I was working at that time - the machinemen - told me the backshift men were the worst offenders, and I later found this to be the case. Their attitude however was not that the practice was wrong but that the backshift men were being foolish in overdoing it and everybody would suffer in task increases, not just the backshift.

During my third week on the packing operation at Colliery A there was a rumour that the manager had called a meeting with the colliery Union officials to discuss the 'early lousing' problem. Some of the backshift men seemed apprehensive about the meeting although it was, in fact, a normal consultative committee meeting. One or two men again said they could not see how the manager could stop the "sick-lines"; but one man pointed out he would not have to stop "sick-lines" if the tasks were increased. My supervisor Robert said he only 'loused' early - "because everyone else does." It seems to me
this view has to be taken fairly seriously. An examination of the 'early-book' shows the same names cropping up at the same times almost every day. The manager pointed out to me that a father and son who worked together were first, or nearly first, every backshift they worked. In our section, the same packers' names appeared in the same order every day - with Robert's name among the first.

The outcome of the meeting, the shot-firer in our section told me, was that a workmen's inspector was to be sent into the section. The Union officials had, he said, argued that if the job could be done in very much less than the shift, it was being done in a dangerous fashion. This, the officials had said, was the cause of 'early lousing', and not inadequate tasks. In the previous section which had been worked in the same district of the colliery as the present section, the task for the packers had been 13½ feet of packing.

Bad conditions, Robert told me, had meant up to half a shift filling coal on the backshift and some allowance had been made for this in assessing the task. In the present section, conditions were better and more time was available to the packers for the same task. Some expansion of the time spent on the task probably took place but does not seem to have amounted to very much. Neglect of regulations occurred on numerous occasions; but it seems hardly reasonable for the Union to suggest neglect occurred in the present section but not in the previous section. Further, I observed regulations being broken, on jobs other than those in which 'early lousing' was practised; thus dangerous working cannot be regarded as the cause of 'early lousing'. It would be an acceptable explanation from the Union point of view however since it avoids the problem of task assessment and the question of inadequate tasks.

'Early lousing' was not so widespread at Colliery B as at Colliery A; neither did it take the same form. "Sick-lines" were asked for very

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1. A book containing the times, names, and reasons, of men leaving the colliery early. This was not the same as the book mentioned earlier.
occasionally and when I told some of the men about Colliery A they seemed to disapprove of the practice. "Wet-lines", and "clear-lines" were the methods used in 'early lousing' at Colliery B. If any water was present a man felt justified in asking for a "wet-line", and in return for carrying out extra work he might receive a "clear-line". As the "Line incident" shows, lines were not always forthcoming. The deputy would seem to be in a stronger position to refuse "wet-lines" and "clear-lines" than "sick-lines". On several occasions their deputy, Fred, refused the Colliery B brushing team a "wet-line" when there was a considerable amount of water in the roadway because, he said, the task was not being done "properly". However most of the men at Colliery B, in other sections, said their deputy - "was not bad about handing out lines."

It was easier at Colliery B to return to the surface when the task was finished since the man-riding haulage was independent of the coal haulage and I spent many hours in the canteen with the Colliery B packers. This evidently led to considerable frustration in my case; in reporting back to my research supervisor it was mentioned frequently by me at the time. I said it was ridiculous that we had to sit in the canteen - if we had finished our task, why could we not leave. Many of the men seemed to experience this same frustration although they said, "It's better being up here (in the canteen) than down there."

It would appear then that too loose tasks can raise problems as complex as those which arise out of tight tasks and the problems are not all on management's side.

Various sources indicate that 'early lousing' is most widely practised on the backshift. The timing of the backshift - generally 3.00 p.m. - 10.30 p.m. may be one of the main reasons for this. It is sometimes called the "eat,

1. See Chapter XI. for details of "wet-line" and "clear-line" procedure.
2. See Chapter XIII.
3. Both managers said this; also other Board and Union officials.
sleep, and work shift;" and it is the shift with probably the greatest 'incentive' for 'early lousing'. The dayshift men have their evenings free - the conventional leisure time in our society; the nightshift men have the early evening and as much of the day as they choose not to sleep; the backshift men have only the morning free.  

A further factor of perhaps some importance is that it is difficult to get home from the colliery on nightshift, if you finish early, through lack of transport. In this study, the nightshift men who 'loused' early were those who had cars or lived very near the colliery.

Both collieries, then, had their 'right' way 'early lousing'. This difference in procedure has implications for the transfer of men between collieries; they must conform to the procedures for 'early lousing'. I myself followed these procedures whole heartedly although I had been brought up to consider many of the things done dishonest.  

The 'Timetable'

The tables in this chapter, of the times which the men regarded as "normal", coupled with their remarks about being "late" and "early" in relation to these times rather than the official times indicate, I would suggest, that the men had a 'timetable' for their task. Variations from this timetable can be accounted for by factors outwith the men's control. Such factors would be, for instance: for the brushers, bad shots; for the machinemen, coal on the track or steels set too near the face; for the packers, a bad shot or waiting their turn for the boring machine and for the conveyor shifters, badly lined steels on the face or coal left in the new track.

1. At present no extra payments are made for nightshift or backshift work. The National Union of Mineworkers have however raised this question with the National Coal Board.

2. See also Chapter XIII, for three incidents illustrating different ideas of "right" and "wrong" between the men and myself.
The 'timetable' does not seem to be related directly to the sequence of operations required to carry out a task. The sequence of operations would appear to be varied to meet the above "abnormal" circumstances, while the timing of the main events in the shift - starting time, rest time for eating or smoking, and finishing time remains almost constant. There would seem to be two 'timetables' in fact; the shift is divided into work and "rest". There is a timetable for work which is variable to meet the circumstances, and is fitted into the 'timetable' for "rest". The use of the word "rest" is not wholly satisfactory, but how is the difference in time between the official time available for work and the actual working time to be labelled? Is it "lost" time? Is it "wasted" time? Again, from the men's remarks, it would seem that time is "lost" or "wasted" in relation to their "rest timetable" and for this reason the time discrepancy has been labelled "rest" time. This has implications for a shorter working week; a reduction in hours would first of all make official what is already widely practised in fact. And secondly, I think it is doubtful if the "rest" time could be eliminated by a reduction in hours. The basic problem is task assessment, and the discussion is continued also those lines in the next chapter, on the application of effort on the jobs studied.

Types of 'timetable'

Two types of timetable appear to be possible; a different one for each individual and one which becomes a group norm. The evidence suggests that both exist. In the first case the individuals, for instance the packers, have different 'timetables' each in accordance with the "right" practices. In the second case, a team evolves a 'timetable' which is based on their individual ideas of a 'timetable' - their frame of reference is the "right practice for that particular colliery.

I have mentioned the frustration on the backshift at Colliery B. This
frustration was more intense on the brushing operation, during the shift as well as in the canteen. This team's "rest timetable" varied more than that of any of the other teams in the study. They appeared to have no group norm. Their remarks were mostly about being late and their ideas of a "timetable" did not seem to take account of practical difficulties they were encountering. These difficulties were aggravated by the team's disorganisation and they were further disorganised by their inability to cope with the difficulties.

This team's behaviour showed that not all teams are successful as groups. A contributing factor may be the lack of a "timetable" evolved by the team. The relationship between the various factors in the situation is extremely complex. The technical factor, in the brusher's case a hard rock to bore, was aggravated by the team's disorganisation. The hard bore meant that the job would take longer away but the team seemed unwilling to recognise this; and when they did finish early they were, as they saw it, subject to the deputy's whims with regard to "lines" to "louse" early.

In conclusion I would suggest that a "timetable" whether an individual one or a group norm makes for a sense of security, and the job seems easier. If there is no "timetable" the effect is the opposite. By means of the "timetable" the miner achieves some control of his own situation.

1. The rock they were boring was extremely hard, and difficult to bore.
IX. The Application of Effort on the Operations Observed at Collieries A and B.

Coalcutting

Since both the coalcutting operations were very similar, it is convenient to describe them together as in Chapters VII. and VIII. Both teams started later than the official starting time and the period before the commencement of the task was spent in eating, smoking and chatting.

It is important here to repeat that the Colliery B team had three members. The third man however helped the tracker and did not take much part in the first part of the task. When the two men in each team began their task, there was a period of concentrated activity. In preparing the machine for jibbing-in, each member of the team carried out his accustomed part of the task quickly and quietly. The absence of conversation at this stage was quite pronounced in both teams. Each member of the team assisted in turning the machine and immediately this was accomplished they began changing the picks in the cutting-chain. Both teams spent a little over an hour on these preparations, and throughout that time they worked continuously. In my view they worked as hard as was possible on this part of the task; at no time during the period of study did the pace of this part of the task drop.

By contrast once the machine began cutting, there was very little for the second man to do. The "front-end" man, operating the controls of the machine, moved with the machine as it travelled along the face, adjusting the speed of the machine when necessary. He seemed to go as fast as technical conditions permitted.

While the front end man then was working with concentrated effort, and continuously, the second man was forced by the nature of the task to play a

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1. Ryan defines effort as, "an individual's experience of how hard he is working." It is in this sense that the term effort is used here. T.A. Ryan, "Fatigue and Effort in Relation to Standards of Performance and Systems of Payment," International Labour Review, Vol.65, No.1 January 1952, pages 45 - 46.
mainly passive role. He had to sit and watch in case any help was required -
that is, in case anything went wrong with the machine, or in case anything
happened to the machineman. The only routine task he had was setting the
haulages; this took only a few minutes every twenty minutes or so during the
four hours that both teams normally spent on the cutting of the face. The
lack of work appeared to be an irksome for the men as I found it myself -
"If you're here you might as well do something," was a frequent comment both
on this job and others. If we consider also the practice, common to the
mining and the factory situations which I studied, of appearing active when
management is present, it would appear that for both worker and management,
work is equated with activity. It may be that the worker who is obliged to
do nothing because of the nature of his task, will do other tasks - in this
case the second man helped the trackers occasionally - to satisfy himself, by
his activity, that he is working. This suggestion is not incompatible with
the "rest timetable" with its periods of non-working time - there it is the
worker himself who initiates the period of inactivity.

The particular day of the week seemed to affect this work activity
relationship. Thus on Mondays, periods of enforced inactivity, due to the
nature of the task, or due to breakdowns for instance, seemed to be more
bearable; on Fridays the reverse seemed true.

At the end of the task when the face had been cut, and the machine had
reached, the corner, there was another period of intense activity by everybody
in the team. Turning the machine into the corner took only a few minutes
and the task was finished. The Colliery B team had their piece after the
task was finished; the Colliery A team took their piece in turn normally,
to keep the machine moving.

When operating the controls of the machine myself, I found it required
all my concentration initially, with some small amount of physical effort.
As I became more proficient, I found less concentration was required and less physical effort. Operating the machine was similar to driving a car. While learning to drive one's attention is taken up by operating the pedals, gear-lever, and steering-wheel as well as by the external situations which arise such as the negotiating of bends and crossings, pedestrians on the road and so on. As one learns to operate the controls in response to the requirements of the external situations, less concentration is required - the tension of driving grows less too. For some people, driving has no interest even when they have become proficient; others derive great interest and satisfaction from it.

This, in my experience is true of machinemen - some I met, had been operating machines for twenty years, and were still full of enthusiasm.

It is interesting to note in connection with the coalcutting operation that the task tends to be irksome for the man who has least work to do - there is an imbalance in the work-load. This raises the question of whether there is a case for the members of the team changing places on occasions. In both the teams in the study, the same member of the team always operated the controls.1

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1. Except at piecemeal on the Colliery A job where the second man operated the controls for a very short time.
Brushing

The brushing teams at both collieries started some time after the official starting time; this first part of the shift was spent walking to the working place, eating, smoking and chatting. When the task was begun, there was, as with the machine teams, a period of great activity as each man carried out his part of the preparations for shot-firing. Both the boring of the holes and the setting of the "breakers" required some care and effort to ensure good shots. The Colliery B team took considerably longer than the Colliery A team for this part of the task due to the very hard rock they were boring. They had their piecetime when the preparations were finished and the shots fired, before beginning the shovelling. The Colliery A team had the greater part of their shovelling finished before they stopped for their piecetime.

Unlike the coalcutting operation, where the main part of the task - the cutting - was a period of comparative inactivity, the main part of the brushing task was a period of very intense activity as the debris from the shot was shovelled into the packs. As was mentioned earlier, the men shovelled to each other. The rate of shovelling was thus determined by the first man in the 'chain'. The men seemed to have evolved a habitual rhythm for the shovelling which enabled them to work for some considerable time - an hour at a stretch - without a pause. At first I could scarcely keep up with them, but gradually it became easier for me as I developed the 'push, pull, swing' rhythm of shovelling. It was even possible to 'day-dream' while shovelling and this, I found, seemed to make it almost pleasant. There was a 'pull' towards completing the shovelling part of the task, which seemed to make it easier to carry on for a long time; and when the debris was all cleared away there was a feeling amongst the men of, "Well that's that over for another day!" It would appear that there is a "best" rhythm for shovelling, and this

1. As with the previous operation, coalcutting, it is again convenient to describe the two teams together.
determines the length of time spent on this part of the task, not the amount of time officially available. The best rhythm was a fast one, and again one can say that the men were working very hard while they were shovelling.

When the shovelling part of the task was completed, the girder was erected. This seemed to require ingenuity rather than effort. The men of both teams went to great lengths to erect the girder without disturbing any more of the roof than had been removed by the shot. They sawed the wooden stilts on the legs of the girder and dug holes in the pavement to sink the legs into. At times, it seemed to me, it would have been less trouble to erect the girder in the proper fashion. This period of great activity led to the completion of the task when the girder had been packed tight with wooden trees.
Both the conveyor-shifting teams were comparatively punctual in starting their tasks. The Colliery B team did not have any piece at all but began their task immediately they arrived in the face.

The Colliery A team handled a belt conveyor and, since the packers in the district dismantled the conveyor, their task was to a great extent rebuilding the conveyor in the new track. They worked at this continuously with no breaks, until the task was finished. The building of the conveyor was similar to the shovelling in the brushing operation. There was a rhythm to it and the men seemed able to sustain a high rate of working for a considerable time.

The Colliery B team handled a chain conveyor, and dismantled it themselves. This involved considerable effort in the confined space of the coalface but again there was a strong 'pull' towards completing the dismantling, which seemed to make it easier. The team tried to have the conveyor dismantled when the packers arrived in the face, and I found I shared their satisfaction in doing this in spite of the effort involved. The entire team worked together rebuilding the conveyor, each doing part of the operation. Again there was a strong 'pull' towards finishing the task, and again the teams seemed to have evolved a habitual rhythm of effort which did not depend on the time officially available for their task.

The coalface on which the Colliery B conveyor team worked was being lengthened as the face advanced. This was done by driving the top-road of the face at a slight angle to the main level instead of parallel to it. The increase in length was slight, amounting to six feet every week or an increase of about 1 per cent. The face conveyor was also lengthened by this amount every week. There was thus a gradual increase in the task of the conveyor team.

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1. Again, the two teams are considered together.
During the period of this present study, the three-man team were handling 500 feet of conveyor; the agreed task for three men was 350 feet of conveyor and they were therefore carrying out almost fifty per cent more than the agreed task. And their working time was still less than the full shift. This extra task did not cause any friction, but one must remember that the team were paid extra for it.
Packing

The packers in the section in which I carried out the packing operation at Colliery A started their task very punctually and worked continuously and hard until they were finished. The first part of the task was to build the 'backend' and this, the packers said, was the biggest part of the task; finding stones to build the wall entailed a great deal of crawling back and forth. Most of the working time was taken up with shovelling debris into the pack, and what has already been said in connection with shovelling on the brushing operation applies in this case too.

The Colliery B packers started later than the official starting time and they too spent most of their working time shovelling. A feature of both tasks was the necessity to withdraw the supports as the packs were built. This should have been done using a Sylvester but the packers of both sections used their hammers for this.¹

Both the packers with whom I worked completed their task in much less than the shift showing the inadequacy of the tasks. But the question of how much packing would be an adequate task was complicated by the fact that not all the packers took the same time for the task. Each packer appeared to have his own habitual rhythm of work.

I felt we worked harder on Fridays although in most cases we did not finish any earlier; and the task seemed harder on Mondays - "Black Monday", one packer called it.

¹ This point is expanded in Chapter X, under the heading of Safety.
The Implications of the Evidence on Effort.

In Chapter VIII, I tried to show that the "rest timetable" introduced a specific structure into the way in which the jobs studied were done. In three cases there was some purpose in completing the task in less than the shift because it was possible to leave early; in the other five cases it was not possible to leave early. When then, in these five cases, was the job still done in less than the shift?

Although I worked only on the back shift and nightshift, for reasons explained in Part I, I was able to make some observation of the dayshift at both collieries. It was evident that many men on the dayshift were finishing their work before the official time; my undergraduate vacation experience, when most of my time was spent on dayshift, supports this view.

In the particular cases in this study the tables in Chapter VIII show that there were periods of non-working time, particularly at the beginning of the shift; and also at the end of the shift.

At Colliery B, Harry regularly sat in the canteen for an hour at the end of his shift; even those packers who were slower managed in for a cup of tea before checking out at 10.20 p.m. The machinemen at Colliery B never made full use of their privilege of checking out when they finished their task, but sometimes sat for nearly an hour having their piece and a smoke before leaving the section.

Again at Colliery B, the brushers had an hour at the beginning of their shift before they began their task. The Colliery A brushers also had periods of non-working time at the beginning and end of their shift. The Colliery B conveyor team had very little non-working time as had the packers and conveyor-shifters at Colliery A; in these three cases "early lousing" was practised.

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1. I.e. machinemen are included here. Although they were allowed to leave early, the nature of their job means they had less control of their time, their personal effort playing a smaller part in the completion of their task than in perhaps any other job underground.
It would be plausible, at first sight, for the men to decrease their effort so that the task fills the shift, but the evidence shows that this seldom happens. In non-mining situations too, there is similar evidence about the distribution of effort. Roy tells how the men in his machine-shop finished their quota early and enjoyed loafing under the foreman’s nose; and in the Hawthorn Experiments, mention is also made of workers finishing early. The men in the department of the factory, in which I worked, always finished their work early to put on their jackets and get into the queue for ‘clocking-out’ at 5.00 p.m.; and they had many periods of non-working time throughout the day.

These examples are not strictly comparable to the mining situation since they are concerned with piecework jobs; that is, with tasks performed repeatedly during the working day. While in industry the distinction is made between daywork and piecework, in coal-mining the distinction is made between day work and contract work. A typical contract is given in Appendix C. This shows that the worker, or team is paid for a defined task under “normal conditions”. Under the Longwall method of coal-getting it is necessary for tasks to be defined. This means that the worker or team is not paid ‘per unit’ as in true piecework, but that there is an upper limit to his earnings; and if the task is not complete his earnings are less. There is, in a sense, an upper limit in piecework, whether it be a group norm imposed by the employees or a quota imposed by the employer; but there is a difference in emphasis between the factory and the mining situation. Piecework in a factory most commonly involves a task with a short time necessary for its completion, performed repeatedly during the day. The stress is on the extra you can earn by producing more. Contract work in the mines is

2. Roethlisberger and Dickson, "Management and the Worker", page 536.
3. In a team, each man receives an equal share of the payment made to the team as laid down in the contract.
concerned with the carrying out of certain operations to complete a task for which the full working day is allowed. You cannot choose to earn extra but you can lose earnings if the task is not completed. There is, therefore, no real incentive to work harder than is necessary to fulfil the contract.

In all the jobs I did, I felt we were working harder on some days than others, but our finishing time was invariably the same as I have already pointed out. Our variation in effort appeared to take two forms - to meet changing circumstances; and to perform the various operations necessary to the task. Changing circumstances included such things as - work left from the previous shift which had to be done before the task proper could begin; a bad shot requiring extra holes to be bored; cut coal left on the face which had to be removed to allow the machine to pass; and doing part of the task quickly to allow other work to proceed. I would also include here, the increase in effort I felt we were making on Fridays and before holidays, at both collieries. In many cases we were not finished any earlier than normal but there was a feeling of having worked harder. An interesting example from Colliery A shows that a "supreme" effort can be made on occasions. An important football match was being televised in the evening, and by 5.30 p.m., all the men in the district had left for home; even those who were usually stragglers were early - and all the tasks were finished. The conveyor team at Colliery A told me they could remember only one occasion when they were still underground at the end of the backshift.

The variations in rhythm to carry out the parts of the total task, on the other hand, were quite regular. The packing and brushing operations for instance had periods of shovelling as described earlier which were done at a very fast rate every day. In different ways this was true of all the jobs

1. It can happen that the face advances more than the prescribed distance in a week, e.g. a 4\(\frac{1}{2}\) foot per day advance may accumulate to a 25 foot advance in a week, but this is accidental and not brought about by the contract teams choosing to exceed their task. Any extra advance is paid pro rata according to the rate for the task.
done — when we were working, we were working hard.

This has implications for task assessment and task negotiation. It means we could not necessarily have filled our "spare" time with work in the form of a task increase because we could not have maintained our habitual rhythm of work for the full shift. So the question is not just could we work longer, but could we work longer at this rate; or at what rate could we work longer? The given task was divided into operations, or sub-tasks, and my own experience and observations suggest that these sub-tasks have a strong completion urge. The shovelling on the brushing jobs was the most pronounced example of this. A rest was the "reward" for completing the sub-task. Thus an attempt to eliminate spare time would have to take account of the structure which the team or the individual has imposed on his task in the form of a "rest timetable" which incorporates a rhythm of effort.

Another question is, how hard were we expected to work? As hard as when we were shovelling — as hard as the packer who took six hours to complete his task or the one who took four hours?

Again another question is how hard were we prepared to work? Not only must task assessment consider how much the miner can do, but how much he can be expected to do, and how much he is prepared to do.

The packing task in our section at Colliery B was fifteen feet. The packers said that they seldom completed this; nothing we said to them and they did not lose any money. The men's attitude was, "You can't make it too small, but if they don't say anything we'll not bother". In effect, they said the work involved in putting in a full fifteen feet pack would have been

1. Compare Baldamus, "Incentives and Work Analysis" chapter on "Traction and Methods of Production."

2. Compare Court, op. cit., page 122, "A task requiring a great output of physical energy, like one needing much mental effort, is perhaps more easily met by spells of great activity with slack times in between than by an unvarying routine of work all the week through and all the year round. The miner was accustomed to some extent to take his own time within the limits of the work he had to do."
out of proportion to what they actually put in. They were having a great
deal of trouble with boreholes and poor shots at this time.¹

It seems to me that this illustrates another problem in task assessment.
Besides the difficulties of defining the task, there is the problem of defining
the conditions under which the task is to be carried out. In the example,
the packers did have varying amounts of spare time, but it does not necessarily
follow that they would have completed their task by making full use of their
shift. The conditions under which the task was agreed no longer obtained;
but technically the task was still adequate at less than fifteen feet² since
the face was in excellent condition.

Another example of the inadequacy of present methods of task assessment
was the task of the Colliery B conveyor team mentioned earlier. This team
were carrying out almost fifty per cent more than the agreed task for three
men - and in less than the shift.

The packing operation provides an example of the problems of task
assessment for the individual miner. The tables in Chapter VIII, showing
the 'normal' times for the packing operation apply to the supervising workmen
to whom I was attached for training; not all the packers in the respective
sections had the same 'normal' times as I have already pointed out. There
was as much as three hours between the first man away and the last man.
Thus some simple proportional increase in the task was not possible; and
who should be regarded as the 'base' value - or "average" man - if we accept
that all the packers must have an equal task? Doubling the task would
perhaps have suited Robert and Harry my supervisors, but not those men who took
longer. And this would presuppose a willingness or a capability for doubling
their effort. In the given situation, I would suggest that they would not
be prepared to do this even if able to physically.

¹ See below, Chapter XI.
² 13 ft. - 14 ft. was the most common length actually built.
The problem of task assessment differs for teamwork and individual work. In the case of a team, for example a crushing team, each member does a different part of the total task and the problem is to assess how many men are required for the given task. Here the problem is connected with the indivisibility of men. In individual work, for example packing or filling, each individual does the same task and the problem is what can an "average" man reasonably do? This problem of finding or defining the "average" man has been well recognised in connection with work study.

A basic problem then is the setting of a task that fills the shift, that is neither too easy nor too difficult; in other words too loose or too tight. In both Collieries A and B the problem was one of loose tasks on the jobs studied, and the discrepancies between working time and the length of the shift highlight the difficulties of task assessment.

Are loose tasks a bad thing anyway? A cyclical production method such as the Longwall method of coal-cutting is particularly vulnerable to delays through work being unfinished on one shift having to be completed before the next shift can begin. Tasks which are, if anything, loose might be an advantage in overcoming this difficulty.

In conclusion - the operations observed at both collieries showed discrepancies between the time the men spent on their tasks and the time officially available for work. To define a task which would require the full official time for its completion is extremely difficult. On the evidence, there is a possibility that there is a "best" pace for each of the operations which the individual or team evolves into his or their habitual pace. In other words to have a dual rhythm of effort - alternating periods of intense activity and rest - is perhaps the best and easiest way to carry out the task.

1. It is a similar problem to that of correct rate setting under payment - by results or piecework, in industry. The purely technical problems involved in mining e.g. strata control, are far more complex however.
It should be pointed out here that the latest types of cutting and filling machines can be employed to produce coal on every shift in the cycle. These machines can be operated by teams of men who carry out all the operations such as withdrawal of supports and conveyor-shifting while the machines themselves cut and load the coal from the face in one operation. Since each team can carry on production where the previous team left off, there is not the necessity for defining tasks that is inherent in the three-shift cycle. Since these machines also provide the best means of increasing productivity, their use would appear to be a very suitable means of overcoming some of the difficulties of task assessment at present - for instance the fitting of a required task to a given time.

If the three-shift cycle is to be maintained in its present form, we might ask if it is necessary to maintain the present rigid division of the three shifts to fit a twenty-four hour period. If the tasks which management require can be done in less than seven and a half hours might the cycle not be sixteen or eighteen hours? Or if a whole section can finish their tasks in half to two-thirds of a shift could that shift not be reduced accordingly? It would appear unreasonable for management to complain about early-finishing if the task they set the men has been completed. Many issues are raised by the above line of discussion; and not all the blame for the difficulties of task assessment should be laid at management's door. In a wider context than the present one, there is evidence of "going slow" when tasks are being set with the intention of deceiving management.

A meeting for the negotiation of a task is the point at which management and Union come together and - in effect - state their views on the assessment of the task. Unfortunately it was not possible to obtain information on task negotiation at Collieries A and B. Some information was obtained from Colliery C however and this is discussed in some detail at the end of Part II in Chapter XVI.
X. Regular Occurrences of Particular Significance for Safety.

In the coal mining industry there is a great concern for safety, as shown by the amount of legislation in the form of Acts of Parliament, and Regulations on specific topics such as Explosives, Electricity, Supports and Training.¹ Safety precautions are continually stressed to the newcomer in Preliminary Training.²

This present study revealed many contraventions of Regulations, which seemed to be an accepted part of working underground. The habitual methods of work which were employed on the operations studied, and the "rest timetables" have already been described; and insofar as breaking regulations appeared to be habitual also, some discussion of safety seems to be necessary in the present study.

It would be possible to make a long list of incidents concerned with breaches of the Mines and Quarries Act, 1954, and the Regulations made thereunder to show how the laws relating to safety were disregarded. For instance, supports were not always set in the (legally) correct place; areas of roof were left exposed where temporary supports should have been put up; explosives were carried in unlocked cans and handled by unauthorised persons; supports were withdrawn using a hammer instead of an approved device such as a slyvester; a switch-box was hit with a hammer; coal was shovelled into packs making them less effective than with stone and giving rise to a danger of spontaneous combustion - the list would be very long. Legally these incidents never occurred however. A successful prosecution must take place to establish a breach of the law and there were no prosecutions at all, of any of the men with whom I worked and who took part in the incidents described above.

¹ See "The Law Relating to Safety and Health," H.M.S.O.
² This training, lasting three weeks, is carried out at a central training establishment before the newcomer begins work underground at a colliery.
This does not alter the fact that these incidents took place. Why, then, when a man is liable to be killed, does he disregard rules made for his safety and protection? This is the question the following discussion will attempt to answer; it will also attempt to relate safety and labour productivity.

A few examples of regular contravention of regulations are given below leading to a consideration of decisions about danger.

**Withdrawal of Supports.**

The most frequent incident observed was the withdrawal of supports using a hammer instead of an approved device such as a sylvestor; and yet this is one of the most dangerous things a man can do underground. The men themselves told many stories about the danger in withdrawing supports. The 'classic' ones were of large areas of the face collapsing when one support was withdrawn, and of large stones falling and killing a man who was "careless" enough to kneel beside the prop he was withdrawing. Fatal accidents due to falls of ground make up almost half of the number of fatal accidents which occur annually.

The Mines and Quarries Act, 1954, states that:

"No person shall withdraw support from the roof or sides of any place in a mine otherwise than by a method or device by which he does so from a position of safety."

*(Section 54 (1).*

It states further that the withdrawal must be in accordance with rules made by the manager of the mine *(Section 54 (2).* These rules must be posted at the entrance to each section giving details of, for example, distances between supports erected in that section and the method to be adopted for their withdrawal.

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1. Fatal accidents in 1960: Falls of ground - 124
(Figures supplied by N.O.B.) Total underground - 285
N.B. I do not mean to imply that all accidents due to falls of ground are caused by wrongful withdrawal of supports; my intention is to show the danger from falls of ground in relation to the total danger.
Just before I began the conveyor-shifting operation at Colliery B, a packer was killed by a stone falling from the roof while he was withdrawing supports. When I began work in the district in which the packer was killed, I was able to observe a copy of the rules, previously mentioned, at the entrance to the section. These rules prescribed a sylvester as the approved device to comply with Section 54 (1) of the Act. This was in common with all the section in Colliery B; the sylvester was also the prescribed device at Colliery A.¹

A sylvester is a ratchet device which the operator anchors at one end, fixing a long chain from it to the support to be withdrawn. By moving a handle to-and-fro the chain is tightened and the support pulled out while the operator sits in safety several feet away.

The use of an approved device is required by law to be taught as part of packing-training, packers being most concerned with the withdrawal of supports. I was not taught the use of sylvesters while on packing-training and it did not appear to be the custom to teach their use to any trainees at Collieries A and B. In fact, we were taught the widely practised procedure of hitting the support with a hammer while kneeling beside it.

There were very few sylvesters on the coalface in any section in which I worked in the whole study, apart from the one in which the fatal accident took place; these were brought into this section after the accident. During my conveyor-training I was able to observe the occasions on which sylvesters were used in this section. The packers used them when the oversman or deputy was nearby, and when told to directly by the deputy. Otherwise they used the hammer as in all the other sections I worked in at both collieries. My own previous experience, and discussion, suggests that the sylvester is a device which is seldom, if ever, used.

¹ Most collieries prescribe sylvesters as the device for withdrawing supports.
It seems more than likely that the dead packer was using his hammer when he was killed, as the remaining packers were doing in spite of the accident. In this connection, it should be said that unless the observer witnesses the accident himself, he cannot be absolutely sure of the exact circumstances. A later accident in which a stone crushed a packer in the same section showed this. Little was said by the witnesses of the accident, to the other men; more especially, nothing was said about the injured man using a hammer. Injury through contravention of the law adversely affects the compensation paid and any claim made for damages. This is the most likely explanation for the witnesses' silence.

On the basis of my observations, the number of accidents resulting from the use of a hammer in withdrawing supports is a small proportion of the number of times a hammer is used.

Judgement of the danger involved in withdrawing a support appears to be based on previous experience and the theory, "It never happened to me before," although the miner sees it as being based on his skill and knowledge. He taps the roof and if it is solid, he attacks the support with vigour - if the roof is bad he swings the hammer at the support, holding the handle at one end and kneeling as far away as its length permits. This practice has become routine - it has become the "right" way to withdraw supports. In most instances there were no sylvesters available for use; where there was one to hand, a man used it if obliged to by the presence of an official. In those sections with no sylvesters, the officials said nothing to the men about using them and this seems to me part of the collusion between men and officials over contravention of the law. The men carry on with their habitual practice, and the officials turn a "blind-eye". To condemn both sides is easy but to solve the problem is extremely difficult. For it would appear that provided a man's judgement is correct - this is the point to which I will return at the end of this series of examples - using a hammer can be the quickest and easiest way of withdrawing a support.

116.
"Jibbing-in"

What has been said above applies to all the jobs done at both collieries A and B. The following example of dangerous practice applies to only the coal-cutting operation but was nevertheless of such regular occurrence as to be worth including here. The complete operation of coal-cutting has already been described - picking, jibbing-in, cutting and so on. While the whole operation is one of the most dangerous underground, jibbing-in is particularly so. When the jib of the machine is being pulled into the coal, there is a possibility of the chain striking stone in the pavement or some such obstruction, and throwing the whole 'back-end' of the machine out. Both the machine teams with whom I worked were in the habit of jibbing-in with one member of the team shovelling away the small coal - 'gum' - from the chain as the jib cut into the coal. Thus not only was there a danger of this man being dragged into the chain but also he was liable to be struck if the 'back-end' was thrown out from the coal.

The legal position in this case is not so clear cut as the previous example - but the danger remains and was known to the men. Stories were occasionally told of bodies mangled by the chain before the machine could be stopped. An accident of this nature occurred at another colliery while I was with the machine team at Colliery B. That night the deputy told us to "be sure and stop the machine," while shovelling away the gum; and we were to use the guard for the chain while we were cutting. This was something I had not seen used before on any machine. As in the case of the fatal accident in the previous example, the rules were observed for a short time. Collusion seems to break down when an accident occurs - each side begins observing the rules and blaming the other for the accident until collusion is established on a new basis. In this particular case the

1. The first time I was allowed to shovel at the 'back-end' I was told not to forget to let go if the shovel caught in the chain.
breakdown was not so severe as in the previous case where the accident took place "on-the-spot." And the new basis for the collusion is that section appeared to be observance of rules when men and officials were face-to-face.

As in the previous case of withdrawal of supports it had become the habitual practice to shovel at the 'back-end' while jibbing-in - it had become the "right" way.

**The Use of Explosives**

I have heard it said, both by miners and shotfirers, that if all the regulations to do with shotfiring procedure were observed, no coal would be produced and no work would be done because the whole shift would be spent in shotfiring. Never having seen the correct legal procedure carried out except at a training centre for shotfirers, I cannot comment on the truth of this statement; but my observations suggest that many rules are disregarded in the interests of getting the work done. I have observed shotfirers firing several shots simultaneously when only one should be fired at a time - firing shots when the explosive was not placed in a hole, but stuck to the rock (this is called a "lay-on") - not posting sentries as required by the Regulations - and making no inspections either before or after firing also as required by the Regulations. The shotfirer follows the habitual procedure based on previous experience and judgement of the danger - he carries out the "right" procedure.

**Decisions about danger**

The above examples and others too numerous to mention here, show there is a constant need in mining practice for making decisions about danger. This of course is true whether regulations are being broken or not; as I have tried to show, a man makes a decision about the danger of a situation even when he breaks regulations - in other words he is still "danger-conscious". The evidence suggests the miner does his task the easiest and best way, as he sees
it: what might be the wrong way from a safety-regulation's point-of-view, becomes, by routine, the "right"way. He assesses the danger in a task on the basis of past experience, and the man who cannot do this is seen as "no-good".

This could perhaps be explained as a group-pressure to conform to the expected pattern of behaviour. In my view, the more likely explanation is that a man sees everyone else doing something a certain way and simply copies them - the "right" way is perpetuated by example rather than by group-pressure. If a person is never taught a different way and has never thought of one, he will follow the established routines. No group-pressure would be required to achieve this. Proof of the existence of group-pressure needs to demonstrate that a man would behave otherwise if left to work on his own. A man also learns, by example, to assess danger but it is extremely unlikely he is aware of the really dangerous situation because he has never seen it, and not been instructed effectively about the danger. If he has, he is very lucky or dead. In other words, his previous experience cannot cover the whole range of possible occurrences. This raises the question of whether instructional films to illustrate the dangers of, for instance, the withdrawal of supports, could be made and used for instruction. That is, films showing not only the safe procedure but also what happens if the safe procedure is now followed.

A more intensive study than was possible in this present research, would be required to shed more light on the question of danger and the habitual practices which have been outlined above.

At Colliery A, on the brushing job, it was Tom who made all the decisions about what was dangerous. Ken stood telling him stones were ready to come down and in most cases was wrong. He saw all situations as dangerous whereas Tom appeared to be able to judge how great the danger was - he was cautious where caution was required. Ken was a nuisance to the team at times. He was more
experienced than Tom in terms of years but seemed much less intelligent. This suggests that perhaps intelligence is a factor which must be considered in decisions about danger. Was Ken not intelligent enough to appreciate real danger, or is it better to be as cautious as Ken all the time – can a miner be too intelligent? An enquiry into intelligence in miners and its influence on accidents would be interesting and possibly fruitful, because it might provide not only some basis for a selection procedure which is more or less non-existent at the present day but also some basis for training in the observation of rules for safety. My own view is, that in training safety is stressed in situations where there is little or no real danger, and when the newcomer begins his proper work underground he does not have the respect for safety regulations which training should provide. The shotfirer who goes to a training centre knows the procedure he will use in the pit is not the one he is being taught – he is in the position of a student learning certain subjects with only his examination as the end in view.

I have attempted to show that the apparent disregard of safety rules is as much a habitual practice as the "rest-timetable" and the "right" level of effort. It has become "right" to carry out certain tasks in a certain way, what the miner sees as the "right" way of carrying out a task is as much a problem of labour productivity as what he sees as his "right" level of effort, and "right" length of time to be spent actually working during the shift.

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120.
XI. SOME OTHER REGULAR OCCURRENCES OF PARTICULAR SIGNIFICANCE.

This section includes those incidents and occurrences which do not fall under the heading of Chapter X, and which seem to be of some significance for this study. The first is from the packing operation at Colliery B.

The Boring of Shotholes

The men who drilled the shotholes in the coalface for the production shift, also drilled one hole in the roof beside each pack. This hole was to allow the packers to fire a shot to obtain stone for their pack. The task for the packers was a fifteen foot pack built, and the supports withdrawn; and the packers were continually complaining to the deputy, Fred, that their shotholes were not long enough to give enough stone for a fifteen foot pack, and were too far from, or too near, the packs. The average length of a pack on the face appeared to be between thirteen and fourteen feet. My supervisor, Harry, told me that they did not lose any money for these short packs - "As long as 'they' don't say anything, I'll put in my thirteen feet," he said.

Could he have built a fifteen foot pack? It seemed he did not need to, since it had become the accepted practice to build short packs in this section. If the packers had been paid less for the short packs, this would not necessarily have made them build the full length. What they said, in effect, was that the extra foot or so would have involved them in much more than a simple proportional increase in their effort. This was because of the holes which were in fact too short, and badly placed. Harry told me they no longer complained so loudly to the deputy Fred or the holeborers if they saw them - it was "useless", nobody did anything about it.

The hole beside any particular pack was bored the previous day, in a rough line with the previous hole, allowing for the supports. This meant that after some two days, a hole might be 3 ft. - 6 ft. away from the pack to the holeborers, it made no difference in terms of effort, and they were paid per hole bored.
But the packer was very much affected by the position of the hole. If he was to keep his pack in line, then a hole 3 ft. away was useless to him because it was too near the pack unless he built short. A hole 6 ft. away was better but if the deputy required him to build his pack a few feet down the face, to keep the packs spaced out evenly, this was too far away.

There was usually enough loose stone in the waste to build most of the pack without firing a shot. Thus a short pack was comparatively easy to build whether the shothole was too near or too far away, even if the hole was too short to be effective. To build a full fifteen foot pack every shift would not necessarily entail the difficulties described above every shift; but building a short pack avoided these difficulties altogether.

The question of the siting of boreholes is of significance for this study because it shows the kind of factor which is outwith the miners' control and which can influence a habitual practice - in this case, short packs.

"Sick-lines"

In the chapter on allocation of time on the eight jobs done in the study, it has been shown that the brushers and packers at Colliery A consistently finished early and left with sick-lines. In our district, the beltmen finished about 6.15 p.m. every day, had their piece and left; the packers started leaving from as early as 5.30 p.m. onwards. I was left with the other trainees to play cards.

The practice of early-lousing, or finishing early, had been condemned by the Union delegate of Colliery A at a pithead meeting; this meeting and the subject of early-lousing has been discussed more fully in chapter VIII.

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1. A shot had to be fired for each pack, whether the stone was used or not.
2. Chapter VIII.
3. This applied to all the sections; early-lousing was widespread on the backshift at Colliery A.
here only the procedure of early-lousing is described.

All the backshift contract workers - the brushers, packers, and beltmens - at Colliery A, obtained a sick-line from the deputy when they had finished their task. This allowed them to check out when they reached the surface; but they first had to show the line to the onsetter - the man in charge of the cage in the pit-bottom - before they were able to ascend in the cage.

Groups of men, who left together at the same time each day, took it in turns to obtain the line for their group each day - this was true not only of our section but the others at Colliery A. Thus if A went today, B went tomorrow, C the next day and so on.

The line, written by the deputy on a scrap of paper, was as follows:

| Please let these men up the pit, as they state they are sick. |
| (Names of men)  (Deputy's name)                              |
| (date)                                                   |

Nobody was asked to prove they were sick; it was sufficient for a man to ask the deputy for "a line." Since the men had finished their task when they left, they received the full rate for it; but they did lose "a couple of bob," for the time they lost by finishing early and checking out. This, they said, "was worth it."

"Wet-lines"

When a miner is working in wet conditions he normally receives some kind of extra payment. At both Collieries A and B this payment took the form of "water-money" which amounted to 6d. - 1/6d. per shift, and a wet-line. This was similar to the sick-line in allowing the man to check out, but usually it specified the time at which he would be able to do so. Thus a wet-line for
an hour allowed you to check out one hour before the end of your shift. The line was simply a piece of paper on which the deputy wrote as follows:

<table>
<thead>
<tr>
<th>Please let this man up the pit as he is wet.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Name of man) (Deputy's name) (date)</td>
</tr>
</tbody>
</table>

The amount of water which had to be present before a line, or water-money was given, seemed to depend more on the extent of the collusion between men and deputy than any standard of depth or flow of water.

"Clear-lines"

A clear line was given at Colliery B as a payment for extra work. It took the form of a time concession similar to the wet-line and was either given for a specified finishing time - one hour or half an hour early for instance - or for an unspecified time. This allowed a man to check out whenever he finished the extra work. Clear-lines did not appear to be given by the deputies at Colliery A but then sick-lines were rarely given at Colliery B.

Absence from work

The mining industry has what almost amounts to a "tradition" of absence from work and this must be recognised in any attempt to control or decrease voluntary absence. At neither Colliery A nor Colliery B did the absentee appear to be condemned by the men themselves, although certain men were regarded as likely to be absent on the flimsiest of excuses. The table below shows the absences of the men with whom I worked under the two headings used in the mining industry. Involuntary absence is absence due to sickness or accident, and voluntary absence covers all other absences.

On evidence gained from conversations it would appear that many absences classified as voluntary should in fact be included under a third heading:
"permitted leave" which the Coal Board does not recognise at present. This could cover unavoidable absences on personal business; for instance, consulting the Inland Revenue or a lawyer, or house-hunting; also absence due to the sickness of another member of the family - for example one's wife. There may be a case for this permitted leave to involve only a partial loss of pay; or for the shift to be paid at some guaranteed minimum rate.
Table showing Voluntary and Involuntary Absences from work of men engaged on the operations studied.

<table>
<thead>
<tr>
<th>Colliery</th>
<th>Operation</th>
<th>Men engaged</th>
<th>No. of absences</th>
<th>Voluntary %</th>
<th>Involuntary %</th>
<th>Operation</th>
<th>No. of absences</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Colliery</td>
<td>16</td>
<td>2</td>
<td>Voluntary</td>
<td>Involuntary</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vertical lifting</td>
<td>25</td>
<td>12</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vertical lifting</td>
<td>75</td>
<td>17</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vertical lifting</td>
<td>23</td>
<td>5</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vertical lifting</td>
<td>18</td>
<td>2</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See Appendix D, Figs. 7 and 6.
XII. TRAINING.

This chapter is devoted to a consideration of coalface training as it was given at Collieries A and B. Such evidence as I was able to obtain at Colliery C on training did not contradict any evidence for collieries A and B, and the conclusions reached on training may be regarded as having some general application.

As well as obtaining evidence from the training situation in which I was placed, it was possible to obtain further evidence from other trainees with whom I was occasionally in contact.

The five training operations of filling, brushing, conveyor-shifting, packing and cutting, are fully detailed in Appendix A with extracts from the relevant sections of the Mines and Quarries Act, 1954.

As has been mentioned previously, it was only possible to do the last four of these operations; these were carried out at Colliery A and then repeated at Colliery B. In a sense I was also in a training situation at Colliery C, but since this was a management training scheme it need not concern us here.

It will however be briefly discussed at the end of the chapter. Some of the problems associated with this scheme of Directed Practical Training are similar to those in the industrial training scheme under consideration in this study.

The type of training which is given in the coalface training situation is akin to "on-the-job" training in industry generally. The trainee is placed in the care of a skilled man who imparts his knowledge to the trainee whilst carrying out his normal tasks. In practice, at Collieries A and B this resulted in the trainee being left to pick things up as he went along.

On the brushing operation at both collieries, there was no attempt to explain the operation to me unless I questioned part of the procedure. Another trainee on a brushing team - an eighteen year old oncost worker - said of the team he was working with, "They don't even speak to me, except..."
to tell me to shovel - they hardly notice I'm there!"

The packers and conveyor-shifters at both collieries treated me as an extra and - as did the brushers - and expected that I did my share of the work. It was left to me to find out how to do the job. My packing supervisor at Colliery B, Harry, did give me the money he received as a payment for training me, but he was the only person who did so. This shows, incidently that not all miners will seek all the extra money they can get, contrary to popular belief.

Again, other trainees said the same things about these other jobs. On the other hand the machinemen in both the cutting teams told me a great deal about their job. The situation was ambiguous however; the difficulty being that they received no guidance on when and whether trainees were to operate the machine controls. Thus the Colliery A team did not allow me to operate the controls at all, whilst the Colliery B team allowed me to take full control of the machine for the last three weeks I was with them. It is perhaps significant that the operation I enjoyed most was the coal cutting at Colliery B.

I questioned one of the men on this team about training and said the men seemed to expect a lot of work from their trainees; trainees were supposed to receive instruction and do an increasing share of the task but this seldom happened. He agreed that the training system seemed to be "chaotic" but he pointed out that the supervising workmen were not given any guidance as to how training was to be carried out. This agreed with what other men with whom I worked had told me about the position of supervising workmen.  

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1. This amounted to 10/- per week.

2. A supervising workman is required to be "...skilled in the performance of the work in which instruction and supervision are being given;" - Coal Mines (Training) Regulations, 1956, section 14 part (v)
Supervising workmen are chosen for their skill and regular attendance, but this does not necessarily mean they will be good instructors capable of imparting their skill to a trainee. In the absence of any guidance then it is hardly surprising that in very many cases the trainee is left to 'fend for himself'.

The implications of this are twofold: firstly, there is a danger of the training being less than adequate since the initiative in the training situation is transferred from the supervising workmen to the trainee - what the trainee learns is up to himself; and secondly, the result of the training is to perpetuate the existing habitual practices - in the absence of any formal training by the supervisor, the trainee copies what the supervisor does without necessarily knowing why it is being done.

Here is a possible explanation for the apparent lack of group pressures in this study. A trainee entering the coalface work situation learns by copying, and what he learns are the habitual practices. It is not then necessary for group pressure to be exerted or the trainee to conform at a later stage since he has not learned to do the job in a way different to that in which it is normally carried out. Pressure is only required if the individual attempts some other method unacceptable to the group.

A further point is that the habitual method of work is the easiest and best from the men's point of view. There is no inducement therefore to change the method anyway. It may well be that in some cases the 'official' way may be easier but if the men believe their habitual way to be easier they will not change.

This second implication of training as carried out in practice will be discussed again in Chapter XIV. For the moment we may conclude that training of supervising workmen is as necessary as the training of coalface workers. The problems of present methods of training are causing the National Coal Board some concern and changes may well take place in the near future.
There is concern also with the management training scheme - Directed Practical Training. A problem in this scheme, which is similar to the problems already discussed, is the one of initiative. Much of the trainee's time is spent in functional departments simply watching the people work. The people he is placed with have no guidance as to what to do with the trainee. Some of the jobs given to trainees could be done by clerks and lead to a great deal of frustration for the trainee. The trainee is told on the one hand to look for things to do, and on the other not given anything with which he can make a worthwhile contribution to a department.

A syllabus is laid out for a Directed Practical Trainee to follow and in many cases this is followed so rigidly that although a trainee has several years practical experience, he must complete the full three-year course because his experience does not come under a heading on the syllabus.

One complaint heard from trainees is that they do not "belong". In their concern for the worker as a trainee, the Board must not overlook the problem of the manager as a trainee.
In this chapter, incidents which occurred only once in the study are described. The incidents can be very broadly divided into those relating to safety and those relating to money.

Relating to Safety: Stone-dust sampling.

Before beginning the four operations done at Colliery A, I spent a week with the "linesmen". These two men went into every section of the colliery about once per week to check the string, in the main levels and top and bottom roads, used by the brushers in centering the girders as they put them up. One of these two men was doing day-release classes in mining with a view to obtaining a qualification, the other was assisting on the job, to take over at some future date. An extra job done by this pair was the taking of stone-dust samples and I had the opportunity of seeing them do this during the week.

The purpose of stone-dusting is to 'dilute' coal-dust deposited on the floor, roof, and sides of a roadway. Coal-dust is carried, by the ventilating air current, from the coalface where large quantities of it are produced during the coalcutting shift and the filling shift. An explosion underground would raise this coal-dust in the body of the air, where flame from the explosion would be liable to ignite it; certain quantities of coal-dust, in suspension in air, are extremely explosive. Many explosions in the past have been made much more severe by further explosions of coal-dust. In a sample of dust, then, taken from the floor, roof and sides of a roadway, in a manner prescribed by regulations, a minimum quantity of incombustible matter must be present, depending on the volatile matter content of the coal.1 The samples taken, are

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1. See "The Coal Mines (Precautions against Inflammable Dust) Regulations, 1956".

The dust used to 'dilute' the coal dust is finely powdered limestone.
analysed in National Coal Board Area Laboratories. During a vacation, before beginning the mining course at University, I had spent some time in a laboratory doing this type of work. It was a standard joke amongst the assistants in the laboratory that stone-dust sample tins were filled from the bags of stone-dust used underground for scattering on the road-ways - the results were always too good, we said. In the present study, I found the reason for it. The method of sampling was to look for a patch of clean, dry stone-dust on the roadway, not mixed with coal-dust. Some of this was put in the sample tin along with "good" sample from another section which was kept in the tin with the mesh through which the sample was supposed to be put. This method of sampling, I was told, was used by the man who had previously been on the job; the two men knew it was not according to the regulations but, they said, there would be trouble - they did not specify who for - if the results changed.

This incident cannot be explained in terms of group pressures - the men being forced to conform to expected behaviour for acceptance. They were independent workers - they were not part of any formal group within the colliery. Neither were they members of any informal work group - the nature of the job did not allow for this. The incident can be explained in terms of a habitual practice becoming the "right" practice and this seems to be more likely. When a practice becomes habitual it might be regarded as having 'momentum', and 'inertia' does not allow for this 'momentum' to be readily changed. What the two men were really saying, I would suggest, is, "Why should I trouble to change to the correct method, it's always been done this way?"

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1. Both 'momentum' and 'inertia' are used here in the sense in which they are used in Mechanics.
The Line Incident.

This incident took place while I was on the packing operation at Colliery B. At piecetime, during my first backshift with Harry, both he and Jim told me we received a line from the deputy, allowing us to check out at 9.20 p.m. instead of 10.20 p.m.; this, they said, was given for putting up the top-belt.

The conveyor in our district was of the type known as a bottom-load belt, and required no intermediate structure. The bottom belt ran on coal spillage as shown in the diagram on the next page; this spillage acted in much the same way as the rollers on a conventional conveyor belt. The top belt was held up by means of 'pokers' or rods, tied to the supports as shown; these pokers were spaced out with two to each packer but there seemed to be no fixed interval between them. If one was lost, the remaining pokers were spaced out a bit further until a replacement was obtained—which was seldom very soon. While it was possible to put in a peak with the top-belt up, it was easier for the packer to have it down so that he could work at the front of his peak, next to the coalface.

The conveyor-shifters in our district, began work at 1.00 p.m. This was two hours before us and gave them a chance to have the belt dismantled when we arrived in the section. They rebuilt the conveyor in the new track and made sure it was running straight before they left the district. They did not put the pokers in for the top belt—it had become the practice for the packers to do this when they had finished their own task. It was for doing this that the concession of one hour was given; putting in the pokers took each packer about ten minutes. The diagram shows a section across the face after the packs have been completed and the pokers put under the top belt. The belt was continuous, with the engine in the main level

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1. Harry was my supervisor on this operation and has been mentioned previously in VII. Description of the Tasks Observed, as have the other men referred to in this section.
SECTION ACROSS COALFACE AT END OF BACKSHIFT WITH TOP BELT UP TO TOP BELT TO PROP BELT WITH WIRE.
and a return drive — the barrel-end — at the top road.

On the Monday and Tuesday of my first week with Harry on the packing operation, we received our line for one hour from the deputy, Fred, as did all the other packers. On the Wednesday we finished very early and Harry and I left the face with Jim at 6.45 p.m. When we asked Fred for our line he said we were far too early, and he would send it up later with one of the other packers. When we reached the bogies, the chain-runner (man in charge) told us the manager was on the surface. The latter was evidently very angry, having arrived at the pit about 6.00 p.m. and found men in the canteen who had finished their task and had returned to the surface.

We decided to wait for a while in case the manager was still around, and finally went up about half-an-hour later at 8.00 p.m. As we passed the time-office on our way to the canteen, Harry asked about the manager. The time-clerk said the manager had been extremely annoyed to find backshift men in the canteen so early. Harry and Jim agreed that these men had overdone it. Chatting in the canteen they said, "You might as well sit up here, as down there", but — "there was a limit," they said, although they did not define what the limit would be.

The following night we finished at 8.00 p.m. and as usual asked Fred for our line. He said no lines were to be issued, on the manager's orders. Harry protested but Fred was quite firm. On the way to the bogies, Harry said if he had known earlier that there were no lines being given he would not have put the belt up. At this stage I was puzzled at the sudden stopping of the lines — if there was an agreement it did not seem possible for the manager to break it without some notice to the men. In the canteen later we were all annoyed to hear that the men who had caused the trouble were still getting their lines for being wet; wet-lines had not been stopped.
On Friday night, Harry had a greyhound running at a local track and wanted to get away early to see it. We worked without stopping until the pack was in and the supports withdrawn and then Harry asked Fred for a sick-line as he "was not feeling very well". Fred told him to report to the time-keeper if he was sick. As long as he (Fred) was told by a man that he was sick, he was not required to give the man a line. Harry was off like one of his own greyhounds. Fred told Jim and I we would get a line that night but there was no guarantee of further lines the following week. In the canteen, Jim told me, "This line business comes up every so often".

The following Monday during the shift, we heard the beltmen arguing with the backshift oversman about their own line: it seemed no more lines were being given for extra work. When we had finished our work, Harry and Jim both left the belt down, and told Fred on the way to the bogies, that they were not going to put it up again, if they were not going to receive a concession of one hour. Fred said there would be no more lines. In the canteen, Harry said there was a rumour we were not to be allowed in the baths or the canteen until after we checked out. From the comments about this, a boycott of the canteen seemed likely if the rumour turned out to be true. The packer in No. 3 pack, Oris, said this was the "hammer" coming down but surely the manager would not pay men to put the pokers in; "It's better to give us a line for doing it", he continued. I asked Jim about the agreement and he said it was with the backshift oversman, not the manager.

Harry said the way to fix "them" was by not doing any extra work at all, such as not placing the withdrawn steels at the pack ends for re-use.

On the next shift, Tuesday, some of the packers put the belt up but again Harry and Jim did not. There were no lines for any of the packers and we sat in the canteen until 10.20 p.m. drinking tea.

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1. Compare sick-line procedure at Colliery A, where lines were issued regularly on the backshift.
The following day, matters came to a head. We began in our usual way and had about 2 ft. of our pack built when the No. 3 packer, Cris, and the rest of the packers came down the face. Cris said they had been told by Fred, the deputy, that the beltmen were going to put the top belt on the pokers before they left the coalface, from now on. There seemed to be some confusion about Fred's exact words, some of the men said Fred told them to withdraw their supports with the belt up, which they considered unsafe if the waste closed the belt might prevent them from getting out quickly. Others said Fred had told them to drop the top belt if they wanted to; but they would be responsible for putting it up again, without any payment or concession. All the packers were agreed that the matter had to be cleared up, and they wanted a meeting with Fred.

Hurry told me to wait beside the pack while they had their meeting in the main level with Fred. I waited a few minutes then went to the level and chatted to the big-road brushers and tried to listen to what was happening. No one objected to my presence, if indeed they even noticed me.

Everyone was trying to speak at the same time. Cris had taken the role of spokesman and kept saying, "We might as well go home", but the rest of the packers were vigorously trying to put their point of view. One of the brushers was laughing and telling the packers they were afraid to go home.

The argument put forward by the packers seemed to be that they were not prepared to withdraw their supports with the belt up; and if they took it down they wanted payment of some kind for putting it back up again. Fred said they would have to withdraw their supports, since it was part of their task. There was a great deal of confusion and the above is only the

1. 'Big-road' was the usual underground term for the main level, at both collieries.
gist of what was said. Fred seemed to me to be telling the packers to leave the belt up but would not say so specifically because he was unsure of the regulations on this point. Cris made no move to go home but it seemed to me at the time that if he had put on his jacket, the rest would have followed him.

After about twenty minutes of confused argument the packers did decide to go home having reached no agreement with Fred, who said he would send for the oversman to talk to the men. The packers went back into the face and sat at Cris's pack talking. Some of them were saying they were not sure whether withdrawing the supports was part of their task or an extra, and what would be the effect of refusing to do that part of the job - in fact, were they entitled to refuse?

Harry said it was a pity to lose money for a pack already started, and said we would put in half of it and claim it if the packers went home. He told me that if a man went home i.e. went on strike, he lost the whole bonus shift not just the fifth for that particular day. Harry was not keen to lose money and although he was prepared, he said, to abide by whatever decision was made, he did not agree with the packers' argument - he was prepared to withdraw his supports whether the belt was up or down. In the first few days I spent with him, we did in fact draw the supports in the stretch of extra work we did, with the belt up.

We had barely started again when our friend Jim came to tell us that the decision had been changed to putting in the packs but leaving the supports if the belt was up - by this time it had been put up by the beltmens. Harry said this was stupid but we carried on, finished our pack and had our piece about 7.00 p.m. I went up to Cris's pack after piecetime - he was

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1. All the brushers and packers with whom I worked made the point that getting 'a backend up' was as hard work as five or six feet of packing although the backend represented only about one foot of the total pack.
talking to Fred in a more friendly manner than earlier in the shift, tempers having cooled down. Gris was telling Fred that the extra work in putting up the belt did not matter, it was only five minutes work, but if they "gave in" they would be "stood-on" in the future.

The oversman came down the face and said the men at the top of the run claimed Fred had told them to withdraw their supports with the belt up. Fred denied this and Gris supported him. The oversman said the belt must be down when the supports were withdrawn - he had never had a serious accident on his shift and did not want one now. If the packers were not prepared to put the belt back up again, he said, they could discuss the matter with the undermanager who had said he would meet the men next day. The packers agreed to withdraw their supports and leave the belt down, until they met the undermanager. Harry was annoyed, since he had wanted to do this all the time; however something, we were sure, was going to happen the next day at the meeting.

I sat with Harry and some of the other packers in the baths next day while two of the packers and a union official spoke to the undermanager. A trainee is supposed to stay with his supervisor at all times, but in practice many trainees, including myself, made their own way to the section; this occasion seemed a suitable one for following the correct procedure. I asked Harry why they were seeing the undermanager and not the manager, and he said that the manager's door was the last one they knocked on.

Gris, who had seemed to act as spokesman the previous day in the dispute with Fred, had already gone underground, Harry said; but he made no comment

1. The oversman had phoned the undermanager after hearing from Fred that there was a dispute.

2. The correct procedure is as Harry pointed out; the dispute is referred to each official up the line from deputy to manager. At some collieries the procedure is informal, and the men go straight to the manager.
about Oris'3 behaviour which - to me - seemed strange. It was 3.00 p.m.
official starting time, when the men came out of the under-manager's office
and Jim said there must have been quite a struggle going on.

When the representatives did come out, they said the under-manager
would not budge - the position was as before. That is, the packers were
responsible for putting the belt up after they withdrew their supports.
The undermanager had said he would take money from the beltmen who were
supposed to put the belt up before they finished their task, and give it to
the packers, but the men said "No" to this. The union official told the
packers not to go home - "That would be cutting your own throats"; they
were to await developments.

We told Fred what had happened and said the belt was being left
meantime.

By the following Monday, with no official pressure judging from remarks
made, all the packers were telling the beltmen to leave the belt down and
were putting it up themselves at the end of the shift, as before. No
payment or concession was being given - the incident was already history.

This dispute was an isolated event in the present study in that it
occurred only once; and there were no similar incidents during the nine
months of the study. I was told by Jim, that the line "business" cropped
up every so often, but it was not practicable for me to wait for the
"business" to occur again. A few points can be made from this one event
however which seem to be of significance for the present study of labour
productivity.

I have already mentioned the collusion which seems to exist between
the men and officials on questions of safe procedure and in the withdrawal
of supports in particular: The evidence also seems to indicate this
collusion extends to the payment of 'extra' or payment for work outwith the contract task. The 'extras' are arranged between the men and the deputy or overseers as in this particular incident. This unofficial basis for the extra payment in the form of a time concession weakens the men's bargaining position; that this dispute died away relatively quickly suggests the men were not unaware of this. But it also seems likely from their conversation about previous experience of the "business" that they can expect collusion to resume at some time in the comparatively near future. It is an accepted part of work underground - accepted at least by men and deputies, and as such is a factor in labour productivity.

Relating to money: The "3d Offtake".

Certain amounts of money are deducted each week from a man's wages to cover National Insurance contributions, Income Tax, Union dues and so on; the deductions were referred to as "offtakes" at collieries A. and B. The first pay-line I received while on the fieldwork was during the brushing operation at colliery A. Amongst the usual offtakes, there was one for 3d for "tools". When I asked the team about this, they said I should not be paying for "tools" as I did not have any to mend - this was what the 3d was for. When I said it did not really matter, and 3d was not very much to lose anyway, they told me to see the wages clerk about the matter. "They" had no right to take money from me that I was not required to pay, Tom said - "You might as well have the 3d as the N.C.B."

The Extra Shift.

Again on the brushing operation at Colliery A, I was paid a full week's wages for a week when I was absent one day. I told the wages clerk who seemed most surprised - as I thought, because he had made a mistake. A more likely explanation of his surprise was my honesty because the brushing team all said I was a fool to have told him. I should have kept the money, they said; if "they" made a mistake that was their lookout. It seems
unlikely that many men who are overpaid do anything about handing back the money; but this is not seen as dishonest.

This incident, like the last one, illustrates not only established values or right and wrong underground, but that these values may clash with the values of the observer, raising difficulties. While it was valuable, from the research point of view, to tell the men what had happened to see their reactions, it exposed me to a certain amount of scorn. It is conceivable that, in some situations, this could lead to a great deal of personal involvement on the part of the observer.

The Check Incidents.

Two incidents involving checks at Colliery B. show similar established values to those at Colliery A. as outlined in the two incidents above.

The check is a small metal token with a number stamped on it. Each man at a colliery has a number - as in industry generally; and the equivalent practice to 'clocking-in' in a factory, is to collect the numbered check from the time-office. The checks for all the men at a colliery are usually placed on a board - this was the case at Collieries A. and B. - so that at the end of a shift, blank spaces denote men who are still underground; and the check cannot be handed in before the end of a shift unless a time concession for water or extra work has been given by a deputy. At Colliery A. it was necessary for a man to have a line from his deputy stating that a concession had been given, before he was allowed to ascend in the cage earlier than the official finishing time; the question of putting a check in early without permission, seldom arose. But at Colliery B, it was possible to ascend to the surface at any time during the shift because of the separate haulage systems for men and coal. While on the backshift at Colliery B, with the packers and brushers, I spent about an hour in the canteen, at the end of many shifts.

On one occasion, while with Harry on the packing operation, I wanted to leave early on a Friday. I was about to hand in my check, and thereby lose money, when a miner standing beside the time-office told me to keep the check and say, on Monday, that I had forgotten to hand it in. I did this, and my explanation was accepted; when I told Harry about the incident he did not regard it as dishonest in any way. It seemed to be an accepted practice - not to be used too frequently however.

On a later occasion, with the brushers at Colliery B, I again wanted to leave early on a Friday. This time one of the brushers offered to hand in my check for me at the official finishing time. Again, this was not regarded as a dishonest practice by the men. It did not seem to be a case of "...it's alright if you can get away with it," but rather, "...it's alright".

The extent to which I had by this time acquired the same values as the men with whom I was working, is shown by my lack of worry or concern over the second check incident compared with the first; both incidents involved values at variance with my own, which might be regarded as 'conventional'.

The Late Night.

On my first shift with the machine team at Colliery B, I was late. I arrived at the colliery about a half-hour after the shift started and did not arrive on the coalface until about an hour after the machine team. I was very annoyed at being late; I would have stayed off but I had not chosen to do so before I left home. Other men mentioned this annoyance at being late, too. They preferred to choose the shifts when they would be absent and did not like to have absence forced upon them through lateness. There was always the possibility, if one was late, that the overseaman would not allow you to go underground.
The Fall

On the Monday of the fourth week with Harry on the packing operation at Colliery B, our section did not produce for two days because of a fall of roof on the main haulage road for the section. This roadway had been showing signs of weight for some time and had been closed twice before through falls. A stretch of the roadway – about thirty feet in length – had collapsed on this occasion, fortunately during the weekend when there was nobody near who might have been injured. Previous to the fall, this part of the roadway had been only four feet high; the girders had been bent almost double by the tremendous weight of the roof. Another roadway beneath this haulage road was thought to be responsible for the excessive weight, having taken support away from our roadway.

Everyone in the section was given a job in clearing up the debris from the fall. Work was carried on from both sides of the fall on each shift for two days before the roadway was clear again and safe for working.

There was very little for me to do during this period and I spent most of my time talking to a man from a nearby colliery which had been closed some months previously as being uneconomic. I had met another man from this colliery, at Colliery A, and they had talked longingly of their "high" wages and "good" conditions. Most of them had complained about their "low" wages and "poor" conditions at Colliery A, to which they had been transferred. This particular man told me that the Colliery B. men were "stupid" in working hard at this fall. At his colliery, he said, his mates would have regarded such an incident as a week's rest.

I found myself becoming annoyed with his criticism of 'my' colliery; I later discovered that one team at Colliery B. refused to work with him because of his continual complaints. But his was not an isolated case – other men had said much the same sort of things, even if less strongly or provocatively. One of the difficulties for these transferred men was
undoubtedly a drop in wages. Earnings had been exceptionally high at the closed colliery; thus, even if a man was fortunate enough to be placed in contract work at collieries A. or B, his earnings dropped. But there were not enough contract jobs for all the transferred men, particularly on backshift and nightshift. Those who were placed on spare lists and oncost work suffered an even larger drop in their earnings.

The problem of transferring men from one colliery to another is extremely complex, with earnings as an important factor for the men themselves. It would also seem that the momentum of the habitual routines - about which mention has already been made\(^1\) persists for some time after transfer. In other words, adjustment to the new habitual practices can take some time and may cause problems for the transferred men.

This incident, along with the differences in early-lousing\(^2\) seems to indicate some difference in values between collieries, but also some similarity in the existence and strength of these values.

**The Extra Man incident.**

In Chapter VII. under Coalcutting, mention has already been made of the three-man team on this operation at Colliery B. The agreement for a three-man team was of long standing and dated from a time when a man was required to shovel away the gum produced by the cutting chain.

An argument between the nightshift oversman, Mike and Charlie, the leading man in the machine team, showed some disagreement as to the status of this extra man. Mike argued that the extra man, the third man in the machine team, did not require to be a fully trained machineman; Charlie argued to the contrary.

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1. Compare Chapter XIII Stone-dust sampling.
2. Compare Chapter VIII Early-Lousing
The disagreement occurred on a nightshift when Alex was absent.
He was absent for two or three days periodically, and the team regarded a spare machineman, Bill, as Alex's substitute on these occasions. On the first shift of one of these spells of absence Bill was sent with Charlie and Bob as usual; but on the second night, Bill was told by the overman Mike to go to a new developing section to cut the face for part-production the next day. Mike also said that he would go with Bill as "back-end man", since there was a shortage of spare machine-men. Bill seemed quite willing to go where he was told, but Charlie told him he had to come with us - since Alex was absent we needed Bill to replace him.

Charlie carried on two arguments: one with Bill telling him he had to come with us, which was annoying Bill very much; and one with the deputy, saying that Bill should be sent with us to a production section which was "...surely more important than a developing section!"

After a few minutes of this argument, Bill turned on his heel and left saying he was not going to be told what to do by Charlie. Charlie immediately told the deputy that he was "...fed-up being messed about", and left too. The remaining member of the team, Bob, said there was no point in his staying by himself and followed Charlie. I waited at the meeting-station with the deputy, and about ten minutes later, the three men came back.

Charlie had spoken to Mike on the phone - Bill was to go with us and Charlie was satisfied.

However, Bill spent a great deal of time for the rest of the shift, telling me what a "rotten man" Charlie was. I agreed with Bill at that time - that Charlie had been unreasonable; my own view, of which I said nothing to Bill, was that Charlie had been childish.

In retrospect, the incident appears to indicate a dislike of being "messed about". Bill's bitterness towards Charlie might, I would suggest, be due to Charlie's being on the same 'side' as Bill. In other words,
being "messed about" was one thing, if it was by the deputy, but if it was by a fellow-worker this was more serious. Bill told me he was prepared to go to any cutting job - he was paid as a machineman whether he was operating a machine or not; he would have liked to operate a machine again, he said; he was "getting rusty" on the spare list.

At piecetime, Charlie referred to the incident again and blamed Mike for the trouble - he should not have considered sending Bill to any other job while Alex was absent. Bill said nothing, and Bob agreed with Charlie, as he usually did.

**The Cigarette Incident.**

The incident of the cigarettes was a very small one but it does show that complex explanations are not always required for every dispute.

Charlie, the leading man on the machine team at Colliery B. stopped the machine one night and said he would not cut any further until the deputy had wooden lids sent into the face, for use in packing the machine - that is, keeping it level. Alex told me later that Charlie had lost his temper because he had no cigarettes with him; this had happened before, Alex said.

**The "Fifteenths" Incident.**

Towards the end of my first week with the Colliery A. brushing team, Tom told Bob and Ken that he had heard the nightshift oversman was complaining to the deputy, that the team was receiving too many extra payments or "fifteenths". The "fifteenths" are, so-called because there are fifteen half-hours in a 7½ hour shift, and extra work was paid, at both collieries, as so many half hours at a certain rate. The team were paid six "fifteenths" or three hours, because they went along the face for the boring-machine which they required for their task; the packers used this machine on the backshift and always left it halfway along the face. It was this particular extra payment, evidently, about which the oversman was complaining; he had told the deputy, Tom said, that the extra payment should be reduced now that
the team had an extra man with them (i.e. myself).

The team were annoyed at this statement by the oversman, but they said he was a "xxx" anyway, and this kind of thing was only to be expected of him. Tom pointed out to Bob and Ken how necessary this payment was in fact. They had a great deal of trouble getting hold of the boring-machine which was usually buried beneath coal; and its cable was always tied in knots round the face supports, Tom said. According to my observations, the boring-machine never took longer than a quarter hour to obtain - and Ken not Tom was the one who always did the work attached to obtaining it. The team shared the extra payment equally as they shared any extras they received.

Several weeks later, I heard that the extra fifteenths had been reduced. Although Tom was complaining loudly, no action was taken by the team and the matter was quickly dropped.

The "Water" Incident.

This incident took place over several days on the brushing operation at Colliery B. One aspect of the incident concerned payment of extra money for working in wet conditions; the incident also provides some evidence, I would suggest, that relations between the team and the deputy tend to be 'bad' where the amount of collusion is least.

The coal seam in which the Colliery B. brushing team worked was almost level but was variable in thickness. At one point on the packing operation, which I did prior to brushing in this section, the seam was \( \frac{3}{2} \) feet high at the main level and 2 feet high at the top road; and during the brushing operation the seam slowly increased in thickness. Associated with this increase in thickness, was a dipping of the seam in the main level, followed by a gentle rise. The rock overlying the seam was a porous sandstone, and a great deal of water had collected in this sandstone in the dip in the main level. When the team brushed through this dip it was like making a hole in the bottom of a reservoir from underneath - water came from the roof like
a steady shower of rain. We gradually left this water behind as the coalface advanced; but while we were in the middle of the dip two things happened which the team regarded as making matters worse.

The dayshift began digging pavement in the roadhead area – that is making the level of the pavement such that the water collected in a large pool in the area on which we laid our plates to shovel. The team protested to the deputy, Fred, about this water and eventually several shifts later when the worst of the water was behind us, a small pump was installed.

The second thing to happen was that the team were told to heighten their roadway because it was too low. They had found a hard band in the sandstone and just managed to erect their girder beneath this. They bored their shot holes so that the shots, when fired, would 'reflect' from this hard band leaving an almost perfect roof exposed. Fred said the team had to burst through this hard band, but Joe argued against this saying the water would become even worse. The team had to obey the order, however, and as Joe had said, the flow of water from the roof increased. Before long we were kneeling in several inches of water, trying to balance on stones as we shovelled.

We gradually left the water behind as the face advanced but a small pump had to be installed to deal with it. This would have been unnecessary if Fred had not been so determined to enforce the full task at that particular moment. The team were paid "water money" while they were working in the water but Fred refused to give a "wet-line". This added to the team's feeling against Fred. From the technical point of view it would have been better to leave the situation as it was until the dip in the main level had been passed.
XIV. INTERPERSONAL RELATIONS AND TOPICS OF CONVERSATION.

The study produced disappointingly little evidence with regard to social factors affecting productivity. There was in fact a notable absence of the sort of social interaction so frequently described in the literature on this subject. It is often said that group pressures are responsible for levels of output and effort - each member of a group conforming to the 'standards' expected by the group of its members. In this study I found evidence of group pressures in the factory situation but not in the mining situation. The factory department where I worked was very similar to the Bank Wiring Observation Room with regard to the practices described by Roethlisberger and Dickson¹ - including for instance the carrying forward of work from day to day; there was also a 'ratebuster' who was very unpopular with the other men.

The lack of evidence from the mining situation does not, I would suggest, deny the importance of group pressures but it does indicate that they may or may not exist and that caution is necessary. The most noticeable feature of the evidence gained in this study is the habitual nature of many of the practices described. My own view is that the 'inertia' of the group members is responsible for maintaining their "right" pace of work and not group pressure. There is a feeling of "We do it this way because it's always been done this way."

As mentioned in the chapter on Training, the fact that training is carried out on-the-job in a way which places the initiative with the trainee may account to some extent for the apparent lack of group pressure. There is no need for a group to exert pressure on someone who learns the task by copying the group. It may be that pressure would be exerted on a complete newcomer with prior knowledge, for instance a transferred miner but more evidence would be required on this point to express a more positive view.

1. Roethlisberger and Dickson, "Management and the Worker".
An additional factor here is the physical limit to the formation of a group. We are not dealing with a roomful of workers but a coalface with men scattered along its length. This physical limitation may apply equally in other industries and raises the question of whether group pressures are as widespread as the literature on industrial situations suggests.

The lack of evidence of group pressure in the mining situation also, raises the question of whether there were strong interpersonal relations, or only superficial ones. Much of the contact between persons would appear to be of the type Miller defines as "Situational Interactions." These include "...those interpersonal contacts 'determined' by the regular flow of work, which are so routinized that no verbal or gestural communication takes place. Implicit in this label is the idea that the situation dictates the timing and nature of some interpersonal contacts, rather than either of the parties originating for the other."¹

A little later, Miller says, "It may be that much of the co-operative behaviour occurring in stable groups in all societies consists of routinized responses to the dictates of recurring situations."² The evidence from the mines in present study supports this view. For example, there was an initial period of intense activity on the coalcutting operation during which each member of the team knew exactly what was required without any conversation being exchanged about the task. While one member of the team operated the controls to turn the machine the second member would remove any supports in the machine's path. They co-operated in a habitual way in response to the needs of the situation - the constantly recurring necessity for turning the machine.

While interactions were of this type - with restricted conversations and long periods of silence - the members of the various teams with which I worked appeared to get on well together. There were no openly expressed disagreements except in one case - the Colliery B brushing team. These were never serious however and were, in my view, largely due to the bad conditions - water and hard rock - which prevailed during the period which I spent with them.

In all the teams, there was a great deal of swearing between members but this appeared to be an accepted part of working underground. Conversation between members of a team\(^1\) was very limited on all the eight jobs studied. Sport, particularly the gambling side, was perhaps the main topic of conversation. Incidents to do with safety - accidents and near-accidents - were also discussed. On many occasions, the same story was repeated several times whether anyone was listening or not.

The widespread interest in gambling was also found in the factory job. It would seem that gambling is a dual means of escape from the work situation; it provides excitement at the time; and the prospect of permanent escape if one is really lucky.

**Relations between different teams.**

There was little evidence of conflict of the type described by Trist and Bamforth\(^2\) between teams on the same shift or successive shifts in the present study. At Collieries A and B, relations appeared to be good. In the case of the conveyor-shifters who depended on the packers to dismantle the conveyor, there was very little friction. Indeed, both groups - packers and conveyor-shifters - seemed to co-operate in order that both might finish early and "early louse", that is, leave with "sick-lines".

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1. For convenience this includes the packers who were not in fact a team.
2. Trist and Bamforth, "Social and Psychological Consequences of the Longwall Method of Coal-getting."
Relations between the teams and the deputy.

At Colliery A, the coalcutting and brushing operations which I studied were carried out on the nightshift in the same section. Relations were good between the machinemen, the brushers and the nightshift deputy. The packing and conveyor-shifting operations were carried out on the backshift in the same section as the above operations, and relations were also good between the packers, the conveyor-shifters and the backshift deputy. At Colliery B, packing, brushing and coalcutting were observed in one district and conveyor-shifting was observed in a second district. Relations on the conveyor-shifting operation were good between the conveyorman and their deputy, and the machineman and their deputy. Relations were not so good between the packers and brushers and the backshift deputy who supervised them. 1

I would suggest that relations were best where collusion was greatest and vice versa. This has important implication since it means that relations were best where the deputy was not strictly enforcing safety regulations.

Compared with the factory situation, supervision on the operations observed in this study was minimal. This raises the questions - what does the deputy do with his time? - has he too many men to supervise? The table on the following page shows the numbers of men that the deputies in this study supervised.

From this table it can be seen that the backshift deputy at Colliery A had more than four times the number of men to supervise that the nightshift deputy had; and at Colliery B the backshift deputy had more than three times the number of men that the nightshift deputy had in the same section.

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1. Compare, for instance, "The Water Incident" and "The Line Incident" in Chapter XIII.
Between the teams and the deputy, conversation was limited because the team was only in contact with the deputy for short periods during the shift. The deputies with fewer men to supervise seemed to spend more time chatting with the men as they moved around the section and, overall, each deputy appeared to spend about the same amount of time in travelling. The rest of their time as far as I could tell, was taken up with odd jobs and supervising any oncost workers sent into their section for special jobs such as moving switch boxes.

The deputy's position is ambiguous. He is responsible for safety in his section and also for supervision. On all the eight jobs studied, the tasks required by management were fulfilled and on all these same eight jobs I observed safety regulations being broken. This raises the question - can the deputy carry out his duties with regard to safety and at the same time ensure that the work required by management is completed.

The deputies concerned in this study had unequal numbers of men under their control as detailed in the table on the next page, but the fact that regulations were broken on all the eight jobs studied suggests that the problem is not simply one of how many men can a deputy supervise; a whole series of questions are raised.

The evidence required to answer these questions was unfortunately not obtainable while the study was being carried out at Collieries A and B. For although there was ample evidence of the small amount of time the deputy spent with the men on the coalface, I was not in a position to find out what the deputy was doing during the rest of his shift. This is the kind of evidence referred to in Chapter III. under the heading - "Gaps in the Evidence."

The opportunity for studying supervision fortunately arose at Colliery C. The next Chapter is therefore devoted to a consideration of supervision.
Table showing number of men supervised by the deputies in this study.

<table>
<thead>
<tr>
<th>Colliery A</th>
<th>Nightshift Deputy</th>
<th>Number of men</th>
<th>8</th>
<th>These two deputies supervised in the same district</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colliery A</td>
<td>Backshift Deputy</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colliery B</td>
<td>Nightshift Deputy</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colliery B</td>
<td>Nightshift Deputy</td>
<td>4</td>
<td></td>
<td>These two deputies supervised in the same district</td>
</tr>
<tr>
<td>Colliery B</td>
<td>Backshift Deputy</td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
XV. Supervision.

Before discussing supervision, and in particular supervision at colliery C, it is necessary to say something about the statutory responsibility of the officials in the line of command, as applied to any colliery.

The duties of officials of a mine are laid down in the *Mines and Quarries Act, 1954*, and in the *Coal and Other Mines (Managers and Officials) (Regulations, 1956)*. The 1954 Act replaces the 1911 Act which also defined the duties of officials of the mine.

The line of command at a colliery is very clearly defined and is as follows: 1

Manager

Under-Manager (at least one; seldom more than two)

Overman (Generally one per district; may be as many as twenty in total).

Deputy (Three per district; may be as many as sixty in total).

At very large collieries producing over one million tons of coal per annum, the National Coal Board have made a practice of appointing an Agent/Manager and a Deputy Manager. The Agent/Manager's responsibility remains the same as the Manager's, and the Deputy Manager's responsibility is that of an Under-Manager with respect to the Act.

The Manager

There is only one manager at a colliery. Under section 4(1) of the *Mines and Quarries Act, 1954*, he must be qualified by examination and hold a First Class Certificate of Competency.

His duties are laid down in section 2(2) of the Act as follows:

1. Compare this with the organisational charts for collieries A, B and C in chapter VI.
The Manager of a mine shall have the management and control of the mine, exercisable subject to any instructions given to him by or on behalf of the owner thereof, and shall also - (a) have the duty of securing the discharge by all others of obligations imposed on them with respect to the mine by or by virtue of the following provisions of this Act; and (b) have such duties with respect to the appointment of persons to carry out inspections of the mine and to be in charge of, or to supervise or conduct, operations thereat, and such other duties, and such powers, as are imposed or conferred on him by or by virtue of the following provisions of this Act."

The term "owner" in this context refers to the National Coal Board. The "...following provisions of this Act;" refers to those sections of the Act which begin - "It shall be the duty of the Manager of every mine..."

The Manager thus has his responsibilities defined by Act of Parliament; and while he can delegate responsibility to certain authorised persons, he is ultimately responsible himself since he must ensure that authorised persons carry out their obligations.

The entire burden is not placed on the Manager however. The Act does lay down that instructions given by officials must be obeyed. Section 2(1) of the Coal and Other Mines (General Duties and Conduct) Regulations, 1956, states:

"...every person employed at a mine shall obey any instruction relating to safety, health or welfare given to him by any person upon whom duties are laid by any regulation, being an
instruction given by that person for the
purpose of the performance of those duties."

In the examination for the First Class Certificate of Competency, the one
subject that all candidates must take is Mining Legislation. Some candidates with
certain qualifications such as a degree in mining engineering are exempt from
several subjects, but all candidates must have a knowledge of the Mines and Quarries
Act, 1954, and also of previous legislation and its history.

Thus the Manager must show a knowledge of the Act before appointment; and he
must be constantly aware of the provisions of the Act while carrying out his duties.
In this respect he differs from a factory manager or indeed managers in most other
situations. It is true they must observe, for instance, the Factories Act, but
they do not necessarily require to be technically qualified by examination
specifically for the position of Manager. And their legal responsibilities do not
extend to every aspect of their job.

Regulations are broken frequently, although prosecutions do not always take
place. 1 But these infringements would appear to be habitual rather than deliberate,
and are a consequence of lack of knowledge both of the Act and possible results of
unsafe practices. In the main, these practices concern only the men on the coal
face and their deputy — the manager does not necessarily know about them, although
this is no defence.

In this study, the manager of colliery C in particular took very stern measures
when unsafe practices came to his attention, either through his own observation or
through an "informer".

At Colliery C, the Agent/Manager’s day began at 7.45 a.m. when he arrived at
the colliery. He immediately met the Deputy Manager to receive a report on the
previous day’s performance — some of which he would already know—and the manner

1. See Chapter X above.
in which the men were deployed for that morning. They discussed any special work to be done and ranged widely over the affairs of the pit. The Agent/Manager usually telephoned the Under Manager for a further discussion about 8.15 a.m., and then dealt with a large amount of correspondence. He reported briefly to the Group Manager about 8.30; on two or three days of the week the latter usually came to the pit for an underground visit or to discuss developments.

The Agent/Manager read and signed the overmen's reports between conducting his other business from 7.45 a.m. until 8.30 a.m., and he also read and signed the summary of the deputies' reports for the previous twenty-four hours. At 9.00 a.m. the Chief Electrical and Chief Mechanical Engineers reported on the previous day's breakdowns and any proposed work or maintenance.

From 9.00 a.m. until he left at about 5.00 p.m. the Agent/Manager met representatives of manufacturing firms, discussed policy with the Group Manager, met an Inspector, went underground to visit one district, met union officials, met Area officials, held meetings and, generally, never stopped. Lunch was always a hurried business between discussions - or more frequently during discussions.

The Under-manager.

There must be at least one under-manager at a mine; a large colliery may have two in charge of different parts of the mine.

The Under-manager must be qualified by examination and hold a First Class or Second Class Certificate of Competency.

His position is defined in the Mines and Quarries Act, 1954, in section 6(4) as follows:

"6 (4) It shall be the duty of an under-manager of a mine, to the extent of his jurisdiction,

1. The Agent/Manager made two to three visits per week.
to supervise all operations carried on
tether and, to the best of his ability,
to execute and enforce with respect to
the mine the provisions of this Act,
orders made thereunder and regulations."

The Under-manager carries out the day-to-day working of the mine as
directed by the Manager. He is responsible normally for the deployment of the
available manpower and for fixing rates for special jobs outwith the normal
coalface contracts.

Whereas the Manager may go underground only two or three days in a week,
the Under-manager spends every day underground; he is, in fact, the 'underground
manager'. He reports several times during the shift to the Manager, particularly
if any breakdowns occur. The actual routine of reporting may vary from one
colliery to another. Some evidence was gathered on this point at colliery C
only; therefore what follows may differ in detail from the routine, at other
collories.

The Under-manager's day at colliery C began at 5.30 a.m. His first job
was to read the reports of the overmen on the previous day's performance and talk
with the nightshift officials about any work which might not be finished, or any
special problems which had arisen and required a decision from himself or the
Manager.

The dayshift men began descending the shafts at 5.45 a.m. and by that time
the Under-manager had decided which special jobs must be done if men were
available. The actual deployment of the men in the pit-bottom was done by the
Senior Overman. About 6.00 a.m. the Senior Overman and the Under-manager
consulted each other about the laying out of the pit according to the number of
men who had presented themselves for work. For example, on Monday mornings
absenteeism was very high and it might be necessary to withdraw men from one district to fully man-up another.

By 6.30 a.m. the Under-manager was underground; and at that time man-riding finished in the shafts and the dayshift had begun officially.

In his underground office the Under-manager began signing the statutory reports of the deputies for the previous twenty-four hours. As he signed these reports he noted points for immediate attention such as lack of supplies. By the time he finished the reports he was completely up-to-date on the state of the pit and each district in it. On his arrival, at about 7.30 a.m., the Deputy Manager telephoned the underground office and the Under-manager gave him a complete report on the state of the pit and how the men were deployed. This took about half-an-hour normally. At 8.00 a.m., while the Deputy Manager was reporting to the Agent/Manager, the Under-manager dealt with the dozens of small problems which required his decision - how was such-and-such a job to be done? - could extra men be made available for this? - was some other job to be done to-day or tomorrow? - and so on. Some of the decisions had to be referred to the Agent/Manager when he telephoned the Under-manager at about 8.15 a.m.

By 8.30 a.m. the Under-manager was usually on his way to one of the underground districts of the mine. There were nine districts at colliery C, and he tried to visit each one in rotation. This took about two weeks because of the distances involved. If one particular district was in difficulties, he might go there two or three times in a week.

The Under-manager informed the telephone exchange of his whereabouts at frequent intervals throughout the day. If any district was having difficulties the overman told the exchange who then told the Under-manager as soon as possible. By 1.00 p.m. when he returned to the surface, the Under-manager had a fairly complete picture of the pit's performance and the output which could be expected
at the end of the dayshift. He consulted with the afternoon shift Senior Overman about the setting out of the men, and any special jobs which had to be done.

By 2.30 p.m. when the afternoon shift began, he was comparatively free to deal with wage queries if it was Thursday or Friday; to see the Union Secretary if it was Monday or Tuesday; or to attend meetings such as the Consultative Committee meeting, or the Production Control meeting where the previous week's performance was discussed, and priorities decided upon.

The Under-manager's day finished between 4.30 p.m. and 5.00 p.m. At 10.30 p.m. he was in contact with the pit again to check the afternoon shift's performance and give any necessary instructions to the nightshift Senior Overman. This late night telephoning was done because the colliery was without an Assistant Under-manager for the afternoon shift. Even so, it seemed the regular practice for the Under-manager to work a twelve-hour day.

This raises the question of whether there should be more officials at under-manager level at a colliery of the size of colliery C. Collieries A and B had each one Manager and one Under-manager while colliery C, with five times the daily output had - when fully staffed - four senior officials. Considering the distances involved underground at colliery C there would appear to be a case for two under-managers on dayshift and afternoon shift. The Act allows for this, provided their responsibilities are clearly defined - it would be wrong to have overlapping responsibilities between two under-managers on the same shift. This problem of work-load on senior management is well known to the National Coal Board and some change may be seen in the not too distant future.

With differences in detail, the above account represents a typical working day for colliery C's Under-manager. He is a key figure in dealing with day-to-day variations in conditions which may affect output and hence productivity. His decisions are mainly "reassuring" but nevertheless necessary.
But it must be emphasised here that, provided tasks are completed within the shift-time, better supervision by the Under-manager and other officials cannot increase productivity. At the three collieries in this study, better supervision would have had little effect on productivity. This point will be raised again at the end of this section.

The Overman.

There is normally an overman for each district during the production shift; on non-production shifts one overman may have several districts. Each shift also normally has a Senior Overman. The practice of appointing overmen varies—the collieries of the same size may have different numbers of overmen. The principle however is always the same—the overman is placed between the under-manager and the deputy. The Act requires that an under-manager be appointed and also that deputys be appointed but an overman is not required under the Act. Provision is made for their appointment however in section 7 of the Coal and Other Mines (Managers and Officials) Regulations, 1956, which lays down their qualifications.

The main advantage of having overmen in charge of one or more districts is that this cuts down the number of people reporting to the Under-manager. There is a danger that information does not reach the Under-manager but in practice I found this did not happen to any appreciable extent.

Section 8 of the above Regulations specifies the duties of the Overman as follows:

"§ 8 (1) Every underground official superior to the deputies but inferior to...the under-manager shall to the extent of his jurisdiction have the duty of securing compliance with all requirements imposed by or under the Act and the safe performance of all operations."
(2) Every such official shall —

(a) during each shift of his confer with the deputy assigned to each district and with each other official then performing duties in or responsible for any part of the mine, being a district or part to which his jurisdiction extends.

(b) at the end of each shift of his give to any person succeeding to any of his duties all information he has obtained which is relevant to safety; and

(c) within twenty-four hours of the end of each shift of his examine and counter-sign any report made by such a deputy in relation to that shift by virtue of regulation twenty-five of these regulations."

In his day-to-day work, the Overman deals with the routine of production in his district or districts. He ensures that supplies are available when required and handles breakdowns. When any breakdown occurs which is liable to impede production, he informs the Under-manager and obtains the services of the mechanics or the electricians as the case may be. At the end of his shift he reports verbally to the Under-manager or the Senior Overman as well as the Overman following on.

At the beginning of his shift, the Overman deploys the manpower in his district and informs the Senior Overman if he requires men to replace absentees.

There is a danger that the Overman merely duplicates the work of the Deputy. But he might be used to resolve the difficulty of the Deputy's position referred to earlier in this study. The Deputy must concentrate on safety in his district;
thus the overseer might concentrate on production. Unsafe practices did exist at
colleries and this would appear to be the case at many, if not all,
colleries. Some such idea as the above, if pursued as deliberate policy,
might go some way towards eliminating these unsafe practices.

The Deputy.

While the overseer deals with routine in a district, it is the Deputy who is
responsible under the Act for the district. There are nineteen sections in the
Coal and Other Mines (Managers and Officials) Regulations, 1956, which concern
the Deputy from a total of twenty-seven dealing with appointed officials.

Section 9 of these Regulations deals with the general duties of the Deputy
and in particular states:

"(1) In every mine competent persons appointed
by the manager as deputies shall each during
his shift in the district assigned to him -
(a) have the immediate charge of the workmen
for the time being in that district and of
all operations carried on by them therein;
and (b) make such inspections and carry out
such other duties with regard to the presence
of gas, ventilation, support of roof and sides and
general safety (including the health of persons
working in that district) as are required by
the Act or by regulations (including these
regulations).

(2) ...every deputy to whom a district is assigned
shall devote his whole time during his shift
to the duties specified in the last preceding
paragraph." 1

1. The omission is a saving which allows the Deputy to fire shots; and also
covers special circumstances and small mines.
The limits of the district in the Deputy's charge are defined in the regulations and also the number and nature of inspections which he must carry out and make a written report upon.

Although it would appear from the evidence from collieries A and B that the Deputy spent little or no time with the men on the face, he is only required to visit the men every four hours which he almost always did.

Since the Deputy is the official most closely concerned with supervision on the coal-face, the above leads into a discussion of supervision at the three collieries.

**Supervision at Collieries A, B and C.**

At first sight, the suggestion that better supervision would give rise to better results in terms of increased productivity at collieries A and B appears plausible, considering the amount of non-working time and the unsafe practices observed during the study together with the apparent lack of supervision. On all the jobs studied, the deputy was very seldom with the team and was not supervising the work of any team to more than a very slight degree. However, the evidence from colliery C on supervision suggests that lack of supervision does not mean lack of effort on the part of the supervisor. In other words, the fact that the deputy is not with the men throughout the shift does not mean he is doing nothing when he is elsewhere.

It has already been pointed out several times that all the teams carried out their full task. Thus closer supervision would not have had any more effect than the existing supervision. It might perhaps have eliminated the unsafe practices, but would not have increased the tasks, which were predetermined.

The problem is not one of minimizing idle time by stronger or closer supervision, but of obtaining a more flexible approach to the required tasks and the numbers of men to be employed. The evidence of this study suggests that "idle" time is a result of the operations which are carried out. Part of
the "idle" time is very necessary rest time. The "idle" time which results from loose tasks cannot be eliminated by closer supervision since the method of work does not allow for an increase of task or the redeployment of men by the supervisor.

The method of production employed is thus an important factor in the supervision-productivity relationship. With regard to manpower deployment, the supervisor's hands are also tied by the management-union negotiations and this will be touched upon in the next chapter.

If conditions underground are such that some form of continuous mining is possible then supervision might be closely related to productivity. But where a colliery is committed to conventional Longwall working, then if the predetermined tasks are completed, stronger supervision cannot influence productivity. Supervision might be important at collieries where tasks are not completed, but even here supervision might not be the important factor. Non-completion of tasks is more likely to be due to technical factors which give rise to the tasks being too tight.

At Colliery C, supervision on the hand-filling faces was no better than at collieries A and B. Unsafe practices and non-working time existed; the tasks as required by management were invariably completed.

Some men however occasionally did not finish their tasks at colliery C. On these occasions the deputies were able to do something - namely to pay only a day-wage to those men instead of the contract rate for the job. When the men queried their loss in wages with the Under-manager, they were told "You did not do a fair day's work!" This practice of paying a day-wage for an incomplete task was unknown at collieries A and B, since incomplete tasks were unknown. It is extremely doubtful if it could have been introduced at collieries A and B, in my opinion, even if it had been necessary. The resentment would have been greater and more dangerous than that aroused by the deputy who did not pay for extras to which the men thought they were entitled.

1. See above, chapter XIII.
If supervision had been better, it is possible that these few tasks at colliery C would have been completed. Thus some improvement in productivity might have resulted from better supervision at colliery C — the colliery which already had the highest productivity of the three in this study.

Better supervision cannot account for the existing differences in productivity of the three collieries in this study.

This does not mean that there is no relationship whatsoever between supervision and productivity. As has been already suggested, in continuous mining where tasks need not be predetermined, supervision may influence the level of productivity obtained. The present trend in the mining industry is towards a greater degree of mechanisation. This involves a considerable change in methods of working. The inertia of habitual practices and attitudes may act to resist this change, and thus influence the level of productivity to be obtained from mechanised continuous mining.

Supervision can affect the nature of habitual practices, and attitudes. Thus there may be an indirect relationship between supervision and productivity.
XVI. Task Negotiation.

During the fieldwork which was carried out at collieries A and B there was no opportunity to obtain any evidence on task negotiation.\(^1\) The evidence on the application of effort, the implications of which are discussed in chapter IX, indicated however that a consideration of the procedure involved in task negotiation was necessary in a study of labour productivity. Further fieldwork carried out at colliery C in the East Midlands provided an opportunity to obtain information on task negotiation, and this is now discussed with a comparison between East Midlands and Scotland. This comparison, it is suggested, shows the importance of the result of task negotiation for levels of productivity.

The tasks for individuals and teams in both Scotland and the East Midlands Division - and throughout Great Britain - are based on agreements made between management and union at colliery level. Since it is the technical conditions which determine the size of the tasks, both sides sit down to negotiate knowing the quantity of work which requires to be done. Initially negotiation takes the form of discussion on the manpower required to perform the necessary operations. It would be more correct therefore to speak of "manpower negotiation" rather than "task negotiation". This "manpower negotiation" is not done with a specific productivity in view but by considering the total amount of work divided by the individual or team tasks. The method of determining the manpower to give a required productivity was shown in Chapter V.

Two stages of negotiation can be distinguished. The first stage takes place when a new seam is developed for the first time. This takes the form of the "manpower negotiation" mentioned above. Since new seams are not being continually developed at any one colliery this stage of negotiation takes place on rare occasions compared with the second stage which might be termed "rate negotiation".

\(^1\) Compare Chapter III, "Participant Observation in Operation"; the section on "Gaps in the Evidence".
This second stage takes place virtually annually when the union seek increased rates for performing the same tasks.

In the initial "manpower negotiation", which is by far the most important, both sides base their arguments on previous experience from other seams and on results during an initial trial period. Method study is now being used in the East Midlands to assess the manpower on mechanised faces and this will be explained in more detail later.

What has been said so far applies to both Scotland and the East Midlands. If we examine the first stage of negotiation in a little more detail, an important difference is apparent.

In the section on "Technical Conditions" the effect of different lengths of working face on productivity was demonstrated. To simplify the calculations involved, it was assumed that the tasks and manpower had been already negotiated. In a similar way, the difference in approach to "manpower negotiation" can be shown by describing how the actual manpower would be determined in such cases.

The first step in the negotiation is to call a meeting between the colliery management - who generally have members of Area management with them in such meetings - and the colliery union officials. The latter may be led by an area official of the union and will include representatives of the workmen from the underground district in question when the detailed negotiation begins.

Since this type of "manpower negotiation" involves a new seam, the initiative does not come from one side or the other, but rather from both. The "rate negotiation" mentioned previously as a second stage invariably takes place at the union's request.1

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1. N.B. During the "manpower negotiation", a rate for the job is fixed. The second stage of "rate negotiation" referred to here is for subsequent increases in the initial rates.
At the first meeting no binding decisions are taken - the meeting is
more an exploration of each side's position. It may be decided to allow the
face to proceed on a trial period without prejudice to either side. On some
occasions it may be possible to settle details after a few meetings without a
trial period but this would be the exception rather than the rule.

The manpower to be employed on the face during the trial period will be
broadly agreed after a series of meetings during this first stage. After the
trial, the serious "manpower negotiation" will take place at a further series of
meetings.

In assessing the manpower required, both sides in the negotiation know
the size of the underground district and therefore the size of the tasks to be
performed. Technical conditions determine the size of the district, and we will
assume conditions are such that the district in question is of the following size:

(i) The district is a single-unit with a coal-face length of 200 yards.
(ii) The main level or conveyor road is 14 feet wide by 12 feet high.
(iii) The top road or end-road is also 14 feet wide by 12 feet high.
(iv) The roof is such that there must be props 15 feet long at 15
feet intervals along the face.
(v) The coal is to be undercut to a depth of 5 feet and holes will be
required, for shot firing, at 5 feet intervals.
(vi) The conveyor is a bottom-loading belt.

On the basis of this information, the "manpower negotiation" takes place.
And each side states its views on the assessment of the task.¹

At this point the procedure in Scotland differs from that in East Midlands.

Scotland. The meeting would now consider each operation necessary during
the cycle and determine the manpower required to perform each operation during the
shift. Both sides draw on previous experience in these discussions and may cite

1. Compare the last paragraph of chapter IX.
agreements at other collieries working the same seam—to support, or counter, arguments as the case may be.

Eventually they may agree on a manpower such as follows:

(i) Filling - in this case the individual task must be negotiated. If 10 yards was agreed upon, 20 men would be required to fill-off the entire face. Although the men are expected to work together, and are paid as a team, this does not happen in practice to the extent that emphasis is placed on the individual task of 10 yards rather than the team task of 200 yards.

(ii) Packing - in this case the task is already fixed. If it was agreed this task required one man the total number of packers required would be 17.1 The packers are not paid as a team and the emphasis is again on the individual task.

(iii) Brushing - in this case the task is already fixed. If it was agreed that 5 men were required for a roadway of the given dimensions then two teams of five men each would be necessary for the district. Each member of the team receives an equal share of the team's total earnings and shares equally in the work.

(iv) Conveyor - shifting - in this case the task is fixed. If it was agreed that two men carry out this task, they would share the earnings for the job equally.

(v) Cutting - again the task is fixed. A machine requires at least two men to operate it, irrespective of the length of coalface to be cut. For this particular face it might be agreed that a third man was necessary, making a team of three.

1. Not 20 men, since the packs will not be throughout the entire face. At each end, packs are put on by the brushers. The packing length will be of the order of 170 yards, hence 17 men.
There would also be trackers and holeboreders to be agreed upon - the above represent the five main classes of labour on the face.

For each of these operations a rate is negotiated; again, this is based on previous experience and practice elsewhere.

Thus, the agreement finally arrived at specifies that a certain number of men will perform a certain task for a certain rate of wages.¹

East Midlands: The emphasis in the greater part of the East Midlands is on the team task rather than the individual task. Therefore while the management and the union may arrive at the same manpower as detailed above, they then describe this as the 'standard manshifts' for the completion of the task. In other words, the agreed number of men will be required per shift to complete the total task; that is, 20 fillers will complete the filling off, 17 packers will complete the packing and so on.

Thus, the agreement finally arrived at specifies a 'standard' number of manshifts for the completion of the total task for a certain rate of wages. This is called a 'web-rate' agreement.²

The result of these two different approaches to "manpower negotiation" is altogether different.

In Scotland, the task becomes almost permanent and in good conditions and bad every man has his own particular job to do. If he is absent he must be replaced. In very bad conditions, extra men may be employed on the face or extra money paid to the men already on the face.

In East Midlands, a man may be used on any part of the face. If a man is absent he may not be replaced if conditions are good. This is because payment is for the completion of the total task for a standard number of manshifts.

1. See Appendix C for a copy of a contract for a team of brushers.

2. This is so called because it is the total task which is considered; that is, the number of men to be employed to complete one "web" or advance in a cycle of twenty-four hours.
There is therefore an incentive to take fewer men when conditions are good; this can work in practice as follows:

If the agreed standard shift rate is 60/- for the packing operation with 15 standard men-shifts, the total amount of money paid to the packers is £45 x 5 per week or £225. Suppose only 13 packers are employed because of favourable conditions. Then the actual men-shifts for a week will be 65. The shift rate now becomes £225 ÷ 65, that is - 69/3 per shift. Thus each packer receives 9/3 per shift more when 13 packers complete the task instead of 15 packers.

Another important result of the "web-rate" method of payment is that payment for extra work is spread over a team of men and not paid to each man individually. Indeed, in practice, the payment of "extras" as they are known in Scotland is almost unknown in East Midlands.

That relevance then does the above discussion have for the problems of labour productivity.

The point has already been made that what is really implied in task negotiation is manpower negotiation. The East Midlands method of negotiation appears to be more flexible than the method in Scotland; and because it is more flexible the question of frequency of negotiation is not such a vital one. The "web-rate" system allows for variations in conditions to be met with variations in manpower "on-the-spot".

The more flexible approach in the East Midlands would appear to be related to a more favourable climate in management-union relations than obtains in Scotland.

In considering only conventional hand-filling Longwall coal faces, it has already been suggested that more favourable technical conditions largely account for the higher productivity of East Midlands. If the overall

1. It should be emphasised that this may not happen in every case but the point is that the payment system allows for it in East Midlands.
productivity is compared— for all forms of mining — then a greater degree of mechanisation accounts for the difference between East Midlands and Scotland.

Now mechanised mining — that is, mining where the coal is simultaneously cut and loaded on to a conveyor by machine— involves considerable changes in methods of working. Perhaps the most important change is that production can take place on any shift, indeed on all three shifts, if required. When power-loading is combined with a system of supports which can be advanced by hydraulic power the potential increase in productivity over conventional working is very great. Carried to its ultimate stage, mechanised mining provides the possibility of production with no men on the coalface at all.

If we examine the agreements negotiated for power-loading, in Scotland and the East Midlands, we find a parallel to the difference in approach already detailed above. Again, the East Midlands approach is more flexible. One example of this is the acceptance of method study, as a basis for the establishment of a 'norm'. In Scotland the union will not accept method study on the coalface. This alone does not indicate a more flexible approach to 'manpower negotiation'; it is rather a result of the more favourable management-union relationship in East Midlands.

Before considering the power-loading agreements in some detail, one final point arises out of the hand-filling agreements discussed above. Under the Scottish system the possibility of tasks becoming loose or of there being disagreement over the payment of "extras" is inherent in the final agreement. The emphasis is on tasks and each man on the face having his own particular 'stint' or place of work. If conditions change such that the required work can be done in considerably less than the shift time, there is no redeployment of manpower or renegotiation. Because of the geological structure of the Scottish coalfields it is perhaps more likely that conditions will deteriorate. In this event the practice is to pay "extras". The system is, in my opinion, too inflexible to deal with changes in conditions and therefore loose tasks and disagreements over the payment of extra money for extra work are always a possibility.
At colliery C on the hand-filling faces there was some evidence of loose tasks. But on many occasions these faces were not given their full complement of men, because the management knew that the work would still be completed. This practice is allowed for under the 'wee rate' system. The men carry out a larger share of the total work and are paid accordingly. Strictly speaking, if the men can do this consistently then the task must be loose. But the management benefit by having trained facesen free for other jobs. And non-working time can be virtually eliminated. Thus although the tasks may still become loose, there is provision in the system for taking up the slack.

Power-loading in Scotland: From the technical point of view there is no difference between a mechanised face in Scotland and one in East Midlands. The same types of power-loading machines are found in both divisions. Because of the different conditions in different seams there is no one machine - at the present time - which is suitable for universal application. Similarly, there is no powered support system which can be used in any kind of conditions. There are many different types of machine in use, therefore, and many systems of support in use throughout the whole of Great Britain.

All mechanised systems of production now in use and likely to be in greater use in the future, have one thing in common. The machine cuts coal and fills it on to an armoured conveyor, travelling continuously along the face. The conveyor is pushed forward as required by hydraulic power and the supports are advanced continuously as fresh roof is exposed. Cutting and filling can take place irrespective of shift - there is no question of a cycle of shifts. The roadways are advanced with the face, brushing taking place on one or two of the three shifts. Normal procedure is for one team to load continuously throughout their shift, other teams following them on succeeding shifts. One team may

1. A few of the early power-loaders required a cyclic system, but these machines are being used less and less at the present time.
spend a week on day shift and then a week on afternoon shift. Apart from noting the shift system has been, by and large, preserved these details need not concern us.

As in conventional hand-filling, conditions determine the size of the district and further the type of power-loader to be used. The task is then only limited by the speed of the machine, and the available working time - in theory.

In Scotland the idea of a fixed task has been preserved in the Longwell Power Loading Agreement, 1955. The agreement states that all members of the power-loading team shall be paid a day wage with a bonus for completing an agreed minimum task. This task is negotiated between colliery management and union officials. The manpower required for this task is also negotiated at colliery level.

The final agreement for a particular district therefore is basically the same as for a hand-filling face: a certain number of men will perform a certain task for a certain rate of wages.

Method study on the coalface is not accepted by the National Union of Mineworkers in Scotland. There is therefore no question of carrying out a study on a power-loading face with a view to establishing a theoretical optimum of performance with a certain number of men. This in itself is not so important, in my view, as the point made above - that the Scottish agreement is basically the same as for a hand-filling face. There is no incentive to complete more than the agreed minimum task - an upper limit has been placed on productivity.

Here we have an important non-technical factor in productivity, namely, the relationship between management and union at the level of task negotiation. This relationship is not a social factor in the sense of the Hawthorne

1. See Appendix E.
Investigations where the human problems were considered at a face-to-face work group level; but it is a social factor in the sense that interpersonal relationships at trade union negotiation level are involved in determining tasks, manpower and hence productivity.

Power-loading in the East Midlands: The Nottinghamshire Power Loading Agreement, 1957 specifies that method study shall be used in establishing norms of performance as a basis for negotiation. The manpower is also negotiated, at colliery level.

Before the management and union meet, the Method Study department of the particular Area in which the colliery is situated carry out a time study on the coalface under discussion. Then a district is newly mechanised a settling-in period is allowed. During this period the time study can, if necessary, be made since it is made to establish a theoretical optimum performance.

The time study measures (i) the time spent in getting to and from the coalface, (ii) the time spent in preparing to start work, (iii) the time spent in preparing the machine at each end of the face for a return run. The sum of these times deducted from the shift time is taken as the available working time.

By timing the machine while actually cutting on the face, a 'normal' cutting speed is determined. This is an average of several observations of the machine cutting. This cutting speed multiplied by the available working time gives a figure which is taken as the optimum performance of the machine on that particular coalface.

Evidence suggests that this figure is freely accepted by both sides. Although both sides at the colliery are free to negotiate on the basis of this

1. See Appendix F.
optimum performance, in practice the norm is agreed as 75 per cent of the optimum performance. There is some variation on this percentage but generally the negotiation would appear to be straightforward. Discussions on the manpower to be employed on the power-loading team are more lengthy. When a figure is finally agreed upon, this becomes the standard manshifts for the agreed norm. Thus the agreement, in its effect, is very similar to the "web-rate" system on hand-filling faces. In practice the agreement is extremely flexible in dealing with variations in conditions.

An example will illustrate the effects of the two agreements.

For simplicity we will assume that the agreed minimum task and the manpower are the same in Scotland and East Midlands.

Let us suppose that the agreed minimum task in the Scottish example is 250 yards of coal cut and loaded, with a team of 25 men. Then under the 1955 agreement, if this task is completed each man will receive 59/2 plus 6/- per shift. If this task is not completed the men will receive only 59/2 per shift. Where the task is not completed through circumstances outwith their control the men receive 59/2 plus 6/-. Where the men load more than 250 yards of coal, the rate paid remains 65/2 per shift. This represents the limit of their earnings (excluding payment of "extras").

In East Midlands, the same example gives the following earnings worked out in the following manner:

(i) Agreed norm = 250 yards.
(ii) Agreed manpower = 25 men.
(iii) Agreed norm per manshift = 10 yards = (iv)
(iv) Rate per shift = 60/- (figure for 1957).
(v) Rate per yard = 6/- = (v)

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1. The actual tonnage depends on the yardage cut, the height of the seam and the depth of cut. This volume multiplied by the coal density gives the actual tonnage produced.
If the team cut 250 yards they would earn 60/- per shift. Suppose they cut 300 yards with 25 men their earnings would be:

Total earnings = 300 x 6/- = £30

\[\therefore\text{ earnings per manshift } = \frac{30}{25} = 72/-\]

If the team had consisted of only 24 men the rate would become $\frac{30}{24} = 75/-$ per shift.

In actual practice these rates are worked out on a weekly basis along the above lines. Any performance below the norm is not included in the calculation, but is paid for separately at the basic rate of 60/- per shift.

The above account of task negotiation is highly relevant to the problems of labour productivity. In the wider context of the two Divisions - East Midlands and Scotland - the more flexible approach of the East Midlands to 'manpower negotiation' would appear to be better suited to the changing conditions which occur in mining. The 'web-rate' type of agreement with a standard number of manshifts rather than a fixed number of men gives management the opportunity of obtaining higher productivity levels when conditions are favourable, without the necessity for renegotiating manpower or reassessing tasks.

In conclusion it is important to note that it is Scotland which has the more varied and rapidly varying conditions and would appear to have more need for this type of agreement than the East Midlands. Also, although social factors at the level of the face-to-face work group did not appear to be as important for productivity as technical factors, social factors at the trade union negotiation level are important. The effect of 'good' relations in East Midlands is seen in favourable agreements with regard to manpower deployment and the effect of 'bad' relations in Scotland is seen in more restrictive agreements and a less flexible approach to manpower problems.
Part III

Summary of the Evidence

and

Discussion of its Implications.
17th. Summary of the Evidence.

1. As was pointed out in chapter III when discussing participant observation in operation, this research method results in a great mass of unwieldy information and it may be helpful for the reader if the evidence given so far is summarised before discussing its wider implications.

At collieries A and B observation was carried out on the coalface as a trainee. At colliery C observation was carried out in a more general way moving round the colliery as a management trainee. Some additional evidence was obtained in a factory situation.

2. The bulk of the evidence detailed in Part II is from collieries A and B. These collieries were typical of Scottish collieries with good prospects in terms of output, numbers of men, geological conditions, and methods of working. Both collieries were gas-free at the time of the study; this meant some differences in detail only between these and collieries where gas is present.

3. Both collieries A and B, and to a certain extent colliery C, used the conventional Longwall method of winning coal. This involves a cycle of three shifts, five operations necessary for production took place on the coal face; coal-cutting, filling, brushing, packing and conveyor-shifting. With the exception of filling, these operations were studied at both collieries A and B, making a total of eight jobs carried out over a period of nine months.

4. At all three collieries the coal-cutting, brushing and conveyor-shifting operations were carried out by small teams of men; the packing and filling operations were carried out by a number of men performing equal tasks independently of each other.

Each of the eight jobs studied was carried out by the same men each day. An absentee's place was taken temporarily by a man trained in that operation. These temporary replacements were organised on a 'spare-list' and filled vacancies on a rota system.

The men engaged on the eight jobs studied followed the same method of work every day. Their habitual routine varied only to meet changing circumstances outwith
their control such as bad shots or machine breakdowns.

5. On the jobs performed by a team of men, each man carried out the same part of the total task each day; each member of the team received an equal share of the wages paid to the team. The men who worked on individual tasks were paid individually.

Each one of the four operations was carried out by the men in a very similar way at each colliery - differences were in detail and not in principle. This would be true for each operation with regard to collieries other than collieries A and B. The evidence for colliery C, in a different division, supports this view.

6. In the period during which this study was made, the length of the shift was seven and a half hours with an official twenty-minute break, thus the time available for work at collieries A and B was seven hours and ten minutes. On two of the eight jobs, a further period of thirty minutes was allowed for travelling to the coal face.

On each one of the eight jobs studied, the men spent almost the same amount of time on their task each day. This ranged from two and a half hours on the packing job at colliery A, to six hours on the coal cutting job at colliery B.

7. At both collieries the men habitually started later than the official starting time for their shift. The variation from the official starting time was different for each job, ranging from zero to one and a quarter hours.

On each job the men had a regular starting time which they spoke of as their "normal" starting time. It was variations from this time which the men regarded as 'late' or 'early'. In other words, their 'image' of starting time did not coincide with the official 'image'.

The practice of late-starting was not an issue at either colliery A or B. This was perhaps because it was not so obvious as early-finishing - which was an issue - and it was therefore easier for management to condone it.
8. On six of the eight jobs, the men took longer than the official break of twenty minutes. On five of these six jobs they regularly took a half-hour break during the task and on the sixth job a break of forty-five minutes was taken after the task had been completed. Of the two jobs remaining, on one a break of fifteen minutes was taken after the task had been completed, and on the other no break was taken at all.

9. At both collieries, the men habitually finished their work earlier than the official finishing time. They spoke of their "normal" finishing time, and they regarded variations from this time as "late" or "early". Thus, as with the starting time, their 'image' of finishing time did not coincide with the official 'image'. The "normal" finishing time differed between the eight jobs and ranged from five hours early on the colliery A packing job to one hour early on the colliery B brushing job.

On the six jobs studied which were performed by a team of men, each man in the team finished at the same time. On the two jobs performed by individuals - the two packing jobs - the other men engaged on the same jobs had different "normal" finishing times which were not so early as those of the two men whose jobs were studied.

10. On three of the eight jobs the men left the colliery when they had finished their task; this was known as "early lousing". On the remaining five jobs the men sat in the pit bottom or the canteen until the official finishing time for their shift.

At colliery A the men on the two backshift jobs studied practiced "early lousing". "Early lousing" was in face widespread on the backshift throughout the colliery, and was regarded by the management as a serious problem. At colliery B, "early lousing" was practised on one of the jobs studied. It was not so widespread as at colliery A and was not carried out in the same manner.

1. This job was the one which was regularly completed in two and a half hours.
early finishing was widespread at both collieries on all three shifts.

11. At colliery A the backshift men left the colliery early by saying they were sick. Any man working underground was allowed to leave if he became sick during his shift, and he was paid according to the proportion of his task completed. Leaving early had become such an established procedure at colliery A that the men did not pretend they were sick; they merely asked for a "sick-line" to allow them to leave - the deputy handed over the sick-line without question.

12. At colliery B the men who practised "early lousing" received permission to leave the colliery early through doing extra work or by working in wet conditions. "Sick-lines" were used only very occasionally.

13. The men who did not "louse" early appeared to experience frustration at having to sit and wait for the official finishing time. It would appear that in early-finishing, not all the problems are on management's side.

14. The evidence of the allocation of time on the eight jobs studied, suggests that the men had a "time table" for their task, which incorporated their rest time and their working time. This appeared to give them a sense of security and allowed them to achieve some control over their own situation.

Two types of "time table" appear to exist; a different one for each individual worker; and for a team, one evolved from the individual's "time table". Lack of such a time table was perhaps one reason for the disorganisation of the team performing one of the eight jobs.

15. On five of the eight jobs studied, "early lousing" was not practised, but early finishing was. This raises the question - why did the men finish early when they had to sit and wait for the official finishing time before they could leave the colliery.

Because the Longwall method of production requires that tasks be defined, the men cannot choose to do more when their task is completed. Thus, unlike piecework in the factory situation where the emphasis is on the extra money to be gained by extra production, contract work in the mines on the operations of the three shift cycle is concerned with completing a set task in a given time. The miner
cannot choose to earn more by continuing his task to fill the available time - he can only lose money by not completing his task. There is no incentive to work harder than is necessary to fulfil the contract.

16. The evidence on the application of effort on the eight jobs shows that the men worked very hard when they were working. It is likely that they would not have maintained such a level of effort for the full shift to do more work. There was a dual rhythm on all eight jobs, of rest and intense activity. Could the activity be spread evenly throughout the shift?

It would appear that to the men work is equated with activity. When the job dictated a period of inactivity - for instance while the machine was cutting - the men seemed to feel dissatisfied because they were not working although they were in fact and might have been required to carry out some task at any time. Then the man himself initiated the period of inactivity, there was no feeling of dissatisfaction.

The evidence suggests that perhaps the best and easiest way of carrying out the eight jobs was to have a dual rhythm of rest and intense activity. Thus the "time table" might be regarded as a rationalisation by the miner to obtain some control over a situation where his pace of work is dictated by the situation and not by himself.

In other words, the habitual nature of the miner's behaviour is the resultant of continually recurring situational factors.

17. A great many breaches of safety regulations were observed on all the eight jobs at both collieries A and B. These ranged from the withdrawal of supports using a hammer instead of the prescribed safety device, to hitting a switch-box with a hammer to make it work properly, and shovelling coal into packs.

The wrong way of doing things, from a safety regulations point-of-view, becomes, by routine, the accepted way. This could perhaps be explained as a group pressure to conform to the expected pattern of behaviour. The more likely
explanation, on the evidence of the eight jobs, is that a man sees everyone else doing things a certain way and simply copies them.

He does assess the danger in a situation, but this is done on the basis of previous experience which cannot cover the whole range of possible consequences of carrying out practices in breach of regulations.

18. Instructional films showing not only safe methods of working, but the consequences of unsafe practices might be of great value, especially if shown to newcomers to the industry.

19. In assessing danger intelligence may be an important factor. There is the possibility that the less intelligent miner sees every situation as dangerous, is too cautious, and would be better in a less hazardous occupation. There may be some level of intelligence which could be used as a criterion in selecting miners who would be able to judge reasonably between the safe and the dangerous.

20. Unsafe methods of working are a factor in labour productivity since in fulfilling his task the miner may or may not adopt unsafe routines of work, enabling him to finish his task in less time than if he observed all the rules. Thus some part of his non-working time may be due to unsafe "short cuts".

21. An example of the miner’s difficulties in dealing with circumstances beyond his control was provided by the positioning of shots holes in relation to the pack, on the colliery B packing job. The holes were bored on a different shift by men who had no responsibility for the exact positioning of the holes since they were only paid per hole bored. If a hole was too near – or too far from – the pack, the packer was involved in a tremendous amount of extra work. No difficulty of this sort was experienced at colliery A where the packers bored their own holes.

22. There were twenty-one men engaged on the eight jobs studies. Of these twelve were not absent during the period of observation, six had an absence rate of from eight per cent to fourteen per cent, one had a seventeen per cent absence rate, and two had rates of fifty per cent and seventy five per cent. All these absences were "voluntary"; and although the actual percentages must be treated with
some caution, they may be regarded as showing a relative liability of absence.

However, it would appear that a proportion of the absences classified as "voluntary" under the present system should be classified under some new heading such as "permitted leave", not at present recognised by the Coal Board.

An interesting point about purely "voluntary" absence is that it was not condemned by the men who were not absent during the period of observation. It would appear that taking a day off is a "traditional" right in the mining industry.

23. Training at the two collieries was entirely done on-the-job. The implications of this are twofold.

This sort of training is liable to be inadequate since the initiative is transferred from the supervisor to the trainee - what the trainee learns is up to himself; and he may learn practically nothing if his initiative is low.

In any case, the result of this training is to perpetuate the existing habitual practices - the trainee learns the unsafe methods of working by copying his supervisor. Some training of supervisors would appear to be necessary.

It may be that training as carried out on-the-job accounts for the lack of group pressures in this study. There is no need for a group to exert pressure to conform on an individual who has learned by copying the group's habitual method of work.

24. Some special incidents which occurred during the study illustrate many of the problems already outlined.

25. An example of inadequate stone-dust sampling showed the problem of inadequate training perpetuating unsafe practices. The man carrying out the sampling copied the practice employed by the previous sampler. This was not only wrong but could have had serious consequences.

26. An incident at colliery B on the packing job shows the trouble which can result when a concession given unofficially by an overman is stopped by the manager. It is interesting to note that this dispute did not result in a strike but merely "fizzled out". The incident also shows that many of the packers were confused as to what exactly was included in their task.
27. Several small incidents to do with money show a difference between miners' values and what might be regarded as conventional values. The men saw nothing dishonest in not reporting being paid too much for instance.

28. On the question of social factors influencing labour productivity the study produced disappointingly little evidence.

There was a notable absence of group pressures in the mining situation; they were however present in the factory where I worked.

The lack of evidence on the influence of social factors on labour productivity does not deny their existence or importance. They may or may not exist and in some situations group pressures may be a factor in labour productivity.

29. The evidence from the present study supports the view of Miller who says "It may be that much of the co-operative behaviour occurring in stable groups in all societies consists of routinized responses to the dictates of recurring situations." 1

30. There was little evidence in the study of any conflict between teams in the same district of the mine.

It may be that the looseness of the tasks on these eight jobs was partly responsible for this lack of friction. Where tasks are tight, there might be friction between teams over increasing amounts of work left unfinished. Some looseness in tasks may be desirable in the three shift cycle.

31. In only one case were there frictions between teams and their deputy. This case highlights the ambiguous position of the deputy as an official responsible for safety and production. The unsafe practices observed at collieries A and B raise the question - how does the deputy reconcile the conflict between being a safety official and condoning breaches of regulations? This specific question leads outside the scope of the present study.

On the wider question of the relationship between supervision and levels of productivity it was necessary to obtain further evidence from colliery C.

1. F.E. Miller, "Situational Interactions - A Worthwhile Concept" Human Organization, Vol. 17, No. 4, p.79.
The apparent lack of supervision does not mean lack of effort on the part of the supervisor. The evidence from colliery C shows the supervisor, whether the manager or the deputy, to be extremely busy. And since all the tasks were completed in any case, closer supervision could have accomplished no more than the existing supervision. On conventional Longwall faces supervision cannot directly influence productivity beyond the point of completion of the task. On continuous mechanised faces, supervision is in a position to influence productivity provided there is no limit set on the task.

The inertia of habitual practices and attitudes may act to resist change and thus influence potential levels of productivity to be obtained by new methods of working. Insofar as supervision affects habitual practices and attitudes, it can also influence productivity indirectly.

A consideration of task negotiation in both the Scottish Division and the East Midlands Division shows that the negotiable quantity is in reality the manpower to be employed on the necessary work. The tasks are governed by the technical conditions. At the level of management-union negotiation, interpersonal relations can affect productivity to the extent that once negotiation is complete, productivity is to a considerable extent fixed and thereafter varies according to technical factors. Thus while social factors at the level of the individual do not appear to be important in this study, social factors at the negotiation level would certainly appear to be important in productivity. These will be important also in any consideration of change in negotiation procedure. For instance, to introduce the East Midlands type of agreement with its flexibility of manpower deployment into Scotland would at present involve a considerable change of attitude at the highest trade union negotiation level.

In Scotland the type of agreement arrived at after negotiation specifies a certain number of men to perform a certain task. In East Midlands, the agreements throughout most of the Division specify a "standard" number of manshifts to complete a total task. There is therefore a possibility of redeploying men as conditions vary, which there is not with the Scottish type of agreement.

This difference in approach is also shown in the Power Loading agreements...
negotiated for mechanized faces in the two divisions.

In Scotland the emphasis is on the completion of a minimum task and there is no extra payment made for exceeding this minimum. By using Method Study, East Midlands have negotiated agreed norms of performance for each mechanized face and improved performance is paid for pro-rata.

A flexible approach to manpower negotiation would seem to be essential in mining where conditions may vary so widely and so quickly.
XVIII. Discussion on the Implications of the Evidence with particular reference to Scotland.

As pointed out at the beginning of this thesis, the record of the coal industry in Great Britain has caused concern for many years with its unemployment history, its high incidence of disputes, its technical and human production problems, and its marketing problems. While some of the problems have changed - for instance under-production has recently given way to over-production associated with a fall in demand due to competition from, in particular, the oil industry - other problems have remained unchanged.

Standing out among these, probably even more than at any time in the past, are the problems of high cost and productivity. In this connection, the Scottish Division of the National Coal Board in particularly, can be said to have received more than its share of attention. And rightly so, for high costs, falling demand, and the exhaustion of reserves have brought about the closure of many collieries. Not only old collieries with small outputs have been affected - a new major sinking at Rothes in the Fife Area was closed down in early 1962 without ever reaching its planned output. On July 12th, 1962, the headlines of the national press told of the closure of a further 27 Scottish collieries by 1966.1

This announcement of these further closures is significant for it was given in a review of the five years 1962 - 1966 made by the Scottish Divisional Board. In this review2 the collieries of the Scottish coalfields have been, for the first time as far as the general public are concerned, classified according to their future prospects and the prospects for Scotland as a whole.

Three classes are distinguished, but the review points out that pits may be transferred from one class to another according to their results in the next five years and the classification is only made on the position as it can be seen at the present time.

1. These headlines and sub-headlines included:-
   "Angry People" - Daily Record.
   "Greatest Single Blow to Economy" - Glasgow Herald.
   "Storm Over Doomed Scots Pits" - Scottish Daily Express.
   "20,000 Pit jobs To be Axed" - Daily Worker.
   "The Coal Crisis" - The Scotsean (Editorial column).

2. A copy of this review is given in Appendix G.
Briefly, class A pits are those - "where reserves are quite adequate to last over the five year period and where generally there is potential to enable economic working to be pursued."  Class B pits are those - "with reserves, where the past results, because of working conditions, have been generally unprofitable and where their potential is doubtful."  Class C pits are those "in which the realistic reserves still available with reasonable access to the shafts or drifts are very limited and which will be exhausted at varying times before the end of 1966".

The intention is that the demand for coal in 1966 will be met by the output of the class A pits and the continued existence of the class B pits thereafter will depend on the level of demand - there may in fact be no demand for the output from these collieries in which case they too will be closed down.

The class A pits have the highest productivity of the three classes and as first the class C pits and then the class B pits are closed, this will give an increasing overall productivity for the remaining pits. That is, on a Divisional basis, productivity will increase and costs per ton will decrease; the costs per ton are, on average, some 20/- less at the class A pits compared with the class B pits.

This study set out to throw some light on the problem of labour productivity and it might be as well to consider some more general aspects of productivity, in view of the importance attached to it in the review.

Productivity is generally considered as a ratio of output to input; and in coal mines this ratio is represented by the term output-per-shift. A ratio of all inputs to output however does not isolate labour productivity. Thus any measure of overall productivity cannot at the same time be a measure of labour productivity. This is particularly true of coal mines, where technical factors play such a dominant part in determining output-per-shift. The evidence of this study shows that low output-per-shift does not necessarily mean low labour productivity; thus where an increasing number of shifts are required for the same output there is not necessarily a decrease in the contribution of labour.
A simple way of looking at labour productivity is to ask: does the miner fulfill the task expected of him? On the face of it, any accusations that the miner is not doing his bit are only justified if he does not fulfill the task expected of him. The technical conditions under which he works are such that each time, or individual, is faced with a set task - in conventional Longwall mining - and cannot do more. Therefore it would be realistic to speak only of "adequate" or "less than adequate" productivity in relation to miners. "Adequate" productivity is productivity which fulfills the given task. Whether this represents a high level of productivity or not is irrelevant here, because the miner is not in a position to do more than the set task. That is relevant, however, is the question of whether he does less than the set task, because then there would be an identifiable productivity problem; namely, either the miner is not pulling his weight or there is something wrong with the task assessment.

The evidence of this study has underlined the difficulties of task-assessment in an industry where a cyclical production system requires set tasks to be completed in a set time. 

1. With its opportunities for continuous production, fully mechanised mining provides a way round these difficulties and it may be that both management and union in Scotland would do well to adopt a type of approach similar to that in the East Midlands where manpower deployment is more flexible.

In terms of the task performed labour productivity was "adequate" at the three collieries in this study. At collieries A and B in particular where the study was carried out by participant observation on the coalface, the set tasks were completed in the available time. Indeed in some cases the tasks were completed in considerably less than the available time. The evidence with regard to time suggests that not only was a part of this time difference due to some looseness in

1. Compare chapter XI in particular; also chapter XVI.

2. Compare chapter VIII in particular.
the tasks but also that a portion of it was due to the nature of the task itself. That is, the habitual routine of work incorporated a dual rhythm of work and rest to complete the task. A further point here is that on several of the jobs there was a strong completion urge with a rest as the "reward".

This difference between the actual working time and the available working time at collieries A and B brings us back to the Five Year Review. The lower productivities of collieries A and B compared with colliery C do not necessarily mean lower labour productivity. And although an outsider might suppose that the amount of apparently idle time suggests collieries A and B are candidates for closure, they are, in the review categorised as class A.

This another dimension is added to the term "adequate" productivity. Not only may productivity be adequate from the point of view of task completion but also from the point of view of a colliery showing some measure of profit, however small it may be. There is therefore a problem of "adequate" productivity concealing a higher productivity and earnings potential. For, as has already been pointed out, as collieries close in Scotland, overall productivity will rise at the remaining collieries as their proportion of the total output increases. Thus appeals for greater effort on the part of the miner may be somewhat misguided—productivity will rise anyway, but for different reasons.

A problem which will not solve itself in the long run, as it has just been suggested will be the case with regard to the productivity problem, is the employment problem. This study has shown that there is a problem of hidden over-employment in the manning of tasks and under-employment of individual miners.

Thus there are two aspects of the employment problem with which the National Coal Board and the National Union of Mineworkers in Scotland must come to terms. Not only is there declared redundancy at these collieries which are being closed through

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1. This study does not support the view that the English miner works harder than the Scottish miner.
exhaustion of reserves or uneconomic working, but there is disguised unemployment at those collieries which are regarded as having good long term prospects. And this may well be true in coalfields other than in Scotland.

Taking the declared redundancy aspect of the employment problem first, this is particularly serious in a region such as Scotland where alternative employment is short. The problems which are always associated with the transfer of workers between industries — for instance re-housing, re-training and age — are aggravated by the limited alternative openings available for the redundant men. While many of the men will be re-employed at class A collieries, some 12,000 men in central Fife and Lanark have little prospect of employment in mining.

Is this a problem which concerns only the Board and the Union? The Scottish Divisional Board are now making every effort to improve their financial position. And, if in doing this men are declared redundant, the Board cannot be held responsible for finding alternative employment for these men outside the mining industry. This would seem to be the responsibility of the Government of the day. And not only must employment be found for redundant men, but also for those young people who would otherwise have found jobs in the mining industry.

In other words, the Government and the country must either be prepared to subsidise high cost pits to provide employment and face the prospect of over-production or they must accept the consequences, both social and economic, of a series of closures of pits. And they would do well to remember — before making a decision — that pits cannot be closed and re-opened at will. If demand were to increase beyond the productive capacity of the industry even allowing for some stocking of coal, then considerable sums of money would be required to expand the productive capacity again.

The second aspect of the employment problem concerns those pits which have good prospects and, in Scotland, are expected to produce sufficient coal to meet future demand. At these pits, as this study has shown, there is the possibility of disguised unemployment with adequate productivity concealing a higher productivity
potential. If the manpower at these pits was redeployed to better advantage, assuming management and men could agree on some more flexible manpower deployment system, then the overall productivity would be increased even more than will result from the closures. Either production would then exceed demand, or there would be further redundancies. In these circumstances, it is not difficult to appreciate the attitude of the union in resisting change. Not only would jobs be threatened at the class A type of colliery, but the position of the class B type of colliery would become even more serious.

In connection with resistance to change an interesting point emerged from the evidence in this study. There was a notable absence of the type of group pressures so frequently mentioned in the literature on human relations in industry. The bulk of the evidence suggests that in coal mines the worker’s behaviour is habitual — with regard for instance not only to methods of work but also to situations in which there is danger — and is dictated by technical factors in his work situation, over which he had no control. This does not mean that the miner is, in some fundamental way, different from his counterpart in other industries. It emphasises, rather, the dominance of technical factors in coal mining. With regard to conventional hand-filling production on the Longwall coalface, the nature of the operations which make up the production cycle does not allow for the formation of groups which might be able to exert some pressure to conform on their members. A further factor in this complex situation is the nature of the training given on the coalface. The trainee learns a job by copying his supervising workman and there appeared to be little in the way of direct teaching of correct methods — in the legal sense. There is no necessity for a group to exert pressure on an individual who has learned by copying — he adopts the habitual methods of work, which in many cases are simpler and easier than the ‘official’ methods, without prompting. This has implications for training and it would seem that some training of supervising workmen is necessary to fulfill the coalface training programme requirements in the spirit in which they are intended.
We might speculate, however, for the future. With increasing mechanisation, more and more men on the coalface are being formed into teams to produce coal continuously and to perform all the tasks necessary for production. It may be that in these circumstances, group pressures may become important factors in productivity.

To test a 'hypothesis' such as this, and also - for instance - to obtain information quickly on trouble-spots, the method of participant observation detailed in chapter III might be useful. An engineer, with access to the type of situation under consideration, might act as a participant observer. He would report to the neutral observer who would assess the information and maintain an objective view of the situation.

There would be ethical considerations involved in this type of study but, in this connection, it is important to distinguish between studying a situation and the people involved in it, and censoring the people involved by making misguided use of the information obtained.
APPENDIX A.

Regulations governing Training.

The provisions for training are contained in Section 88 of The Mines and Quarries Act, 1954 and the entire section reads:

"It shall be the duty of the manager of every mine to secure that no person is employed thereat in any work otherwise than under the instruction and supervision of some person competent to give instruction in, and supervise, the doing of that work, unless the first-mentioned person has received adequate instruction in, and (where necessary) training for, the doing of that work and is competent to do it without supervision."1

The Coal Mines (Training) Regulations, 1956 apply without prejudice to the generality of this section, and replace the Training Regulations 1945, bringing them up-to-date to conform with the 1954 Act. Because of the length of time involved in creating new law by Act of Parliament, the Acts relating to Mines contain principles, and empower Ministers to create Regulations to meet changing conditions; the Regulations conform with the principles contained in the Acts without prejudicing their generality.

The procedure for making Regulations is contained in Sections 141, 142, 143 of the Mines and Quarries Act, 1954.

The Coal Mines (Training) Regulations, 1956, are divided into five parts as follows:

(i) Restricting the regulations to Coal Mines.
(ii) Dealing with training and supervision.
(iii) Dealing with certificates and notices.

(iv) Dealing with appointment and duties of training officers.
(v) Dealing with defences to legal proceedings, exemptions, and interpretations.

The part which is particularly relevant to this study is part (ii) and it details the period of training and the operations to be carried out as follows:

"The period of training ....shall, where the training comprises instruction in performing one only of the operations ... be sixty working days ......; and where the training comprises instruction in performing more than one such operation, the said periods of training shall be extended in respect of each additional operation by twenty ...... working days respectively."

"The operations ...... are :-

(a) the getting of coal, including the filling or loading of coal for removal from the coal-face;
(b) in a case in which packs are built and supports withdrawn from the waste in the mine in which the person being trained is to be employed in performing that operation, the building of packs and the withdrawal of supports from the waste and in any other case, the building of packs or the withdrawal of supports from the waste;
(c) the ripping of the roof or floor, including the building of roadside packs in a case in which such packs are built in the mine in which the person being trained is to be employed in performing that operation;
(d) The shifting of mechanical conveyors and gate-end loaders;

2. The omitted words refer to boys under 18 years.
(e) The use of machines for cutting or getting and loading coal;"

In section 14 of the Regulations, in part (v), the supervising workman is defined as follows:—

"'Supervising workman' means a workman appointed by the manager of the mine in pursuance of section 13 of the Act who is skilled in the performance of the work in which instruction and supervision are being given;"
Appendix B

Output-per-man-shift and Output for the Scottish Division, Collieries A and B, the East Midlands Division, Colliery C and Great Britain - 1959, 1960

<table>
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<th>1959</th>
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<td>Output (in tons)</td>
<td>8,459,400</td>
<td>17,669,000</td>
<td>254,000</td>
<td>1,123,656</td>
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<tr>
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<td>57.5</td>
<td>61.1</td>
<td>22.3</td>
<td>28.3</td>
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<td>56.8</td>
<td>53.2</td>
<td>25.1</td>
<td>28.6</td>
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<td>114.9</td>
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<td>70.3</td>
<td>27.0</td>
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<tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Colliery C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great Britain</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
APPENDIX C.

Copy of Job-Contract for a Section in Colliery A

NATIONAL COAL BOARD
(SCOTTISH DIVISION)

CONTRACT - BRUSHING

"A" Colliery.

ELL COAL Seam.

No. 1 LEVEL Section.

MAIN Road.

1. The following rates and conditions are agreed for Brushing.

2. Normal Conditions and Agreed Tasks:

   (a) Normal Conditions:

       (i) Height of Working 30" - 40"
       (ii) Coal Height 26" - 36"
       (iii) Dirt Bands or fallen stone 4"
       (iv) Nature of Floor - Hard.
       (v) Nature of Roof - Blaes and Sandstone.
       (vi) Gradient on line of face 1 in 8.
       (vii) Gradient on line of advance - Level.
       (viii) ......................(any local feature)

   (b) Agreed Task:

       (i) Height of Top Carry - 7' 3"
       (ii) Floor ripping (if any) state dimensions. Nil.
       (iii) Breakers set at 13 ft. 6 ins.
       (iv) Depth of undercut 4' 6".
       (v) Type and dimensions of support - 12' x 8' C.A.-15" stilts.
       (vi) Cubic Content of Brushing - 420 cub. ft.
       (vii) Length of Packs:
            Right Side - 35 ft. - ins.
            Left Side - 40 ft. - ins.
       (viii) No. of Men - 6.
       (ix) Brushes to set supports in accordance with C.M.A.
            Regulations and Colliery Support Rules and Manage¬
            ment to be responsible for the provision of
            adequate supplies.
       (x) All dirt to be stowed but surplus dirt to be
            filled if the Management so desire.
       (xi) Packs to be solidly built from floor to roof.
       (xii) All roof supports to be withdrawn from packing
            areas and placed forward conveniently for re-use.
       (xiii) Holeboring to be carried out by Brushes with
       (xiv) Hard Bore and Belt. (any local feature)

Structure Consolidates.

1. This form is standard; figures are filled in on the dotted line
   according to the agreement between the Manager and the Union
   officials.
Rates:
For the completion of the above task the rate of 448/- per fathom advance to be paid.
(This rate is agreed to cover any variation in working conditions shown on the accompanying Schedule and for which separate payment was previously made.

3. Adjustments for Variations.
Variations from normal to be dealt with by agreed adjustments in task and rate.

4. Tools.
Brushers to supply and maintain all tools necessary for their work with the exception of prop drawing devices and power driven machines if these are used for holesboring.

5. Explosives.
Cost of explosives to be borne by the Board. The method of carrying explosives to be in accordance with the existing pit practice, namely (record such pit practice).

6. Abnormal Conditions.
Abnormal conditions to be dealt with on a day to day basis between the M.C.B. Official in charge and the workmen concerned.

Work outwith contract to be paid for (men's own work not being available) at the appropriate day wage rate in accordance with prevailing practice at the pit, or if other contract work, at the prevailing rate for that work.

Conditions of Service to be in accordance with Agreements between the National Coal Board and the National Union of Mineworkers.
Waiting time and Overtime to be paid in accordance with National Agreements, subject to the provisions of the 5th Porter Award which permits existing practices which are more favourable to be continued in operation.
9. **Disputes.**

In the event of questions arising under this contract, work will be continued and the questions settled in accordance with the Conciliation Procedure.

10. **Duration.**

This contract supersedes all previous Agreements on this subject. Termination of the contract to be by 8 days written notice by either party.

(Note. While the terms of notice for termination of employment are 7 days, it is necessary in terminating a contract to give 8 days to allow the full 7 days for any counter notice).

SIGNED FOR AND ON BEHALF OF THE NATIONAL COAL BOARD

................................Manager.

................................Group Manager.

SIGNED FOR AND ON BEHALF OF THE NATIONAL UNION OF MINeworkers

................................Delegate.

................................Agent.

DATE

...................................
APPENDIX D

Fig. 1: PILLAR AND STALL WORKING

HAULAGE TO SHAFT

"No. 1" SECTION

"No. 2" SECTION

STALLS BEING DRIVEN IN COAL SEAM.

HAULAGE FROM WORKING PLACES

PILLARS BEING EXTRACTED

AREA FROM WHICH COAL HAS BEEN EXTRACTED

PILLARS
Fig. 3: MODERN LONGWALL WORKING

"DEVELOPMENT SECTION"

"NORTH 2 SECTION" SINGLE UNIT

"NORTH 3 SECTION" DOUBLE-UNIT LINE OF ADVANCE
Fig. 4: SECTION ACROSS THE FACE AT THE END OF EACH SHIFT

(a) END OF N/S - COAL UNDERCUT BY COALCUTTER ALONG ENTIRE LENGTH OF FACE

(b) END OF D/S - COAL FILLED ON TO CONVEYOR

(c) END OF B/S - SUPPORTS WITHDRAWN AND CONVEYOR ADVANCED
Fig. 5: SECTION ACROSS LONGWALL COALFACE SHOWING PRESSURE-ARCH

Note: The strata within the pressure arch separates as coal is removed beneath it, and it no longer supports the strata above the arch. This weight is taken by the solid coal in advance and the collapsed waste behind, and acts along the directions A and B. Thus the main weight of the strata above the coal seam is diverted away from the coalface area. The pressure arch extends from end to end along the coalface; its height and width depend on the nature of the strata, the depth and dip of the seam.
Fig. 6: SECTION ACROSS FACE AT ROADHEAD TO SHOW BRUSHING OPERATION

(a) END OF D/S
ROADWAY  CONVEYOR

(b) END OF B/S
ROCK REMOVED, PACKED INTO SIDES OF ROADWAY
NEW GIRDER ERECTED
All four operations were done in one district at Odlaary A.

Note: The names in brackets refer to men mentioned in the text. The numbers refer to the total number of men engaged on that operation.
The conveyor-shifting operation was done by men engaged in the text. The numbers refer to the total number of men engaged on that operation. The names in brackets refer to men mentioned in the text. The names in brackets refer to the other three operations.

Note: The conveyor-shifting operation with John, Ted and Alan was done in a different section from the other three operations.

- 5 men
  - (Ian)
  - (Ted)
  - (Jom)
- 10 men
  - (Mike)
  - (Gertie)
- 2 men
  - (Harry)
  - (Jerry)
- 1 man
  - (Sid)
  - (Fred)
- 5 men
  - (Betty)
  - (Pat)
  - (George)
  - (Joe)
  - (John)
APPENDIX E.

SCOTTISH DISTRICT CONCILIATION BOARD

LONGWALL POWER LOADING

An AGREEMENT made this fourteenth day of May, 1965, between the National Coal Board (Scottish Division) and the National Union of Mineworkers (Scottish Area) relating to wage rates and conditions of employment of workmen whilst employed on Longwall Power Loading Operations at the coal face in Scotland.

IT IS HEREBY AGREED AS FOLLOWS :-

1. Scope of Agreement.

This Agreement shall apply in respect of the machines listed in the First Schedule hereto (which Schedule forms part of this Agreement).

This Agreement shall also apply to experimental machines (as set out in the Second Schedule hereto which also forms part of this Agreement) which have yet to be proved and in the process might only work spasmodically because of alterations that may be required in the design of the machine or method of working.

It is further agreed that other types of power loading machines may from time to time be included within this Agreement, in which event they may be included in the First or Second Schedules by mutual consent of the parties to this Agreement.

2. Power Loading Team (D.L.W. No. 257).

The Power Loading team shall consist of the men who on the production shift (1) move along the face with the power loading machine and whose jobs include operating the controls of the machine or setting or withdrawing supports or trimming the face or breaking up coal; (2) advance the conveyor or rubbing rail or set supports immediately behind the conveyor or rubbing rail. The suggested basic team for each machine is given in the Appendix to the First Schedule hereto. Additions to the basic team may be made if the Management consider that they are required. Stablemen shall be regarded as within the Power Loading Team.

Amendment (D.L.W. No. 257).

The scope of the Power Loading Agreement dated 14th May, 1955, was extended on 20.7.56 subject to the undernoted provisions, namely :-
(i) Categories to be included in the Power Loading Agreement.

Grade I Faceworkers employed on a power loading face who are capable of interchanging with the Power Loading Team and who work on a full production shift. This includes:

(a) Brushers or Rippers who are employed on continuous mining and on the production shift.
(b) Conveyor Movers on the production shift;
(c) Holeboxers (capable of interchanging with the Power Loading Team and employed on the production shift);
(d) Spillage Cleaners and Trackers (capable of interchanging with the Power Loading Team and employed on the production shift).

(ii) Categories to be excluded from the Power Loading Agreement.

- Brushers or Rippers
- Conveyor Movers
- Holeboxers
- Spillage Cleaners and Trackers

who do not satisfy the provisions of paragraph (i) above.

and

Supplies Transporters,

Conveyor Operators and Attendants,

Fitters and Electricians,

Water Injection and Dust Suppression Men.

3. Wage Rates.

All members of the team shall be paid on a day wage basis at the rate of 59/2 per shift. (D.L.W. 536). For each individual face on which a power loading machine is employed on cyclic operations there shall be an agreed task representing a reasonable shift's work. For the completion of this task within the normal shift each worker in the Power Loading Team shall receive a bonus of 6/- per shift. (D.L.W. 523).
Where a power loading machine is employed on a continuous process the bonus shall be payable for the completion of an agreed minimum task.

Where, through circumstances outwith their control and except where alternative work has been provided as in paragraph 4 hereof, workmen are prevented from completing the task within the normal shift they shall nevertheless be paid the bonus referred to herein.

The Leading Man shall be nominated by the Management after consultation with the Delegate and shall be paid an addition of 3/- per shift.

Where a second man is appointed he shall be paid an addition of 2/- per shift.

In plough installations where winders are employed the following rates will be paid—(D.L.W. 336).

(a) Winders situated back from the face 39/- per shift.
(b) Winders situated at the end of the face conveyor 41/- per shift.

The provisions of this Clause shall not be altered except under the authority of the Joint Naval Negotiating Committee.


If, for any reason, the work of any member of the team is not available and he is given employment on other work he will be paid the prevailing contract rate for this alternative work or a rate of 39/- per shift, whichever is greater (D.L.W. 323).

If, however, the workmen have commenced power loading operations and on account of a breakdown of machinery or of circumstances beyond their control, are prevented from completing their task and are sent to alternative work which they perform satisfactorily they shall be paid for that shift the wage they would have received had they continued to work on the power loading face, excluding the task bonus.

In the event of absenteeism among members of the team or if any temporary addition to the team is required, the men sent on to the face will be paid the power loading wage for the shifts worked on power loading and in addition when
earned the task bonus in terms of Clause 3 hereof.

5. **Leading Men.**

It is agreed that the Leading Men where appointed will be in full charge of the team and that the others will work under him as a team and accept his reasonable instructions.

6. **Standard of Work and Attendance.**

It is a condition of this Agreement that all workers in the team will pull their full weight and work in the team spirit during each working shift.

In individual cases where the Management is satisfied that any member of the team is unsatisfactory by reason of his standard of work or attendance thereof he will be replaced by another but the Manager before giving the appropriate notice of termination of contract shall consult with the Trade Union Representative. Normally notice will be given and the unsatisfactory worker placed on a lower grade or on other work in keeping with his capabilities. He may be immediately replaced by another without prejudice to the payment of the shift wage during the period of notice providing the Management and the workers are satisfied that his immediate removal is desirable. Nothing in this clause precludes the possibility of dismissal for serious misconduct.

7. **Tools.**

Special tools will be supplied by the National Coal Board. With regard to ordinary working tools such as Pick, Shovel, Axe, Hax, Saw and Crowbar, the Board will supply these to the team initially and at the expiry of each six months period a payment will be made to the Leading Man for maintenance and renewal as follows: (B.I.W. 323).

(a) A payment of £7 10/- where the Power Loading Team consists of up to 6 persons;

(b) A payment of £10 for any Power Loading Team in excess of 6 persons up to and including 20 persons;
(c) A payment of £1210/- for any Power Loading Team in excess of 20 persons:

Such payments will be made only if the Contract is continued on day wages.

8. Co-operation.

It is clearly understood that this Agreement is to be fairly carried out by both parties and is conditional on the maintenance of full co-operation. Without prejudice to Clause 15 hereof (Termination) the Board reserve the right to give the normal 15 days' notice in individual installations if co-operation is not given.


The amount of bonus payment arising from the Five-Day Week Agreement shall be calculated in accordance with the bonus provisions of the Five-Day week Agreement relative to daywages.

The bonus payable under Clause 3 for satisfactory completion of the task shall be excluded from the calculation.

10. Payment for Overtime.

Payment for overtime shall be calculated on the daywage rates provided for in Clause 3, excluding the completion of task bonus.

11. District and National Agreements.

Nothing in this Agreement will affect the operation of District or National Agreements.

12. Date of Commencement of Agreement.

This Agreement shall operate with effect from the beginning of the pay week commencing 14th May, 1955.

13. Cancellation of Existing Agreement and Arrangements.

This Agreement shall from its operative date cancel and supersede the Agreement dated 16th April, 1949, relating to Longwall Power Loading (Neco-Moore and Logan Slab Cutter) and all other Agreements and arrangements in the Division relative to the payment of workmen engaged in Longwall Power Loading operations at the coalface.
14. **Continuance.**

This Agreement will not be altered in any detail without prior consultation with the signatories to this Agreement or their successors in office.

15. **Termination.**

This Agreement shall continue in force until the expiry of 3 months' notice to be given in writing by one of the parties to the other intimating the intention to terminate it.
APPENDIX F.

AN AGREEMENT made this Nineteenth day of August, One thousand nine hundred and fifty seven BETWEEN the NATIONAL COAL BOARD (EAST MIDLANDS DIVISION) and the NATIONAL UNION OF MINEMEN (NOTTINGHAMSHIRE AREA), relating to wage rates and conditions of employment of workmen whilst employed on Power Loader operations at the coal face in the East Midlands Division of the National Coal Board.

IT IS HEREBY AGREED as follows:—

PART I — APPLICATION OF THIS AGREEMENT

1. The provisions of this Agreement will supersede all existing arrangements whether arising from pit, district or divisional agreements; from pit, district or divisional awards; or from custom and practice relating to matters dealt with in this Agreement.

2. In the event of any inconsistency between this Agreement and any such arrangements now existing, the provisions of this Agreement shall prevail.

3. Notwithstanding Clauses 1 and 2, in the event of any inconsistency between the terms of this Agreement and of National Agreements applicable to the grades of workmen covered by this Agreement, the terms of the National Agreements shall prevail.

4. Notwithstanding Clauses 1 and 2, where an existing pit or district power loading agreement, award, custom or practice provides better rates and conditions, taken as a whole, such better conditions may continue to apply unchanged until:—

   (i) the face or panel comes to an end

   or (ii) for a period of one year from the operative date of this Agreement

whichever is the shorter, provided that the workmen on any such face may opt at any time to have the terms of this Agreement applied to them. In which case, the terms of this Agreement shall apply from an agreed forward date of transfer.

5. Pit and district agreements, awards, customs and practices which confer more favourable conditions than the terms of this Agreement shall be "frozen" in their present form and no application for changes in those arrangements shall be made or
granted. Neither shall any of the terms of this Agreement be applied in part to such arrangements.

6. The Board and the Union also agree to establish comparable norms of task as between one power loading installation and another, by applying method study techniques to the assessment of task norms.

7. The terms and conditions of this Agreement shall not be altered except by mutual consent of the parties to the Agreement and with the authority of the Joint National Negotiating Committee.

8. The Divisional Board and the Area of the Union will co-operate in ensuring adherence to the provisions of this Agreement and in preventing any act or omission in contravention thereof. The parties will also ensure that any contravening act or omission shall be rectified forthwith.

9. This Agreement shall operate from the beginning of the first pay week following the Nineteenth day of August One thousand nine hundred and fifty seven.

PART II - SCOPE OF THIS AGREEMENT

10. This Agreement shall apply to all present and future power loading installations (whether subject to pit or divisional agreements) using power loading machines of the types defined in the First Schedule and to no others.

11. Changes in the First Schedule may be made only by mutual agreement of the Divisional Board and the Area of the National Union of Mineworkers.

12. This Agreement shall apply to pieceworkers doing the following operations on power loading faces eligible under this Agreement and who are doing jobs assimilated as follows:

- F.44 Power Loader Operator Longwall
- F.46 Power Loader Operator other than Longwall
- F.1 Collier
- F.5 Packer
- F.6 Timberer
13. All jobs which come within the scope of this Agreement shall be graded in accordance with the National Schedule of Occupations and Job Descriptions and as required by paragraph 4 of the Schedule to the Revision of the Wages Structure Agreement and no other designations or names shall be used.

14. All workmen within the scope of this Agreement shall be classed as pieceworkers.

15. Appointment and Payment of Changeover: The Management shall, in consultation with the Union, appoint one or more competent working changeover on each power loading installation. In addition to his normal wage, the changeover shall be paid 3/- per shift in recognition of his extra responsibility. The extra 3/- per shift shall be regarded as earnings for the purpose of Five Day Week bonus.

PART III - TASK HOURS

16. Establishment of Task Hours: Rates of task shall be based on method study. The number of men required as a team to perform the various operations for the face as a whole shall be negotiated at pit level with the National Union of Mine workers.

17. Local Agreements for each individual face to which this Agreement applies, relevant information on machine performance, method of work, type and system of supports, and environmental conditions, the normal complement of men and the norm of task for the team shall be registered in the Second Schedule to this Agreement.
One signed and dated copy must be sent to the Area Secretary of the National Union of Mineworkers, and a second signed and dated copy to the Industrial Relations Department at Divisional Headquarters. This shall be regarded as the local agreement and deemed to be part of this Agreement.

18. Norms of task established under this Agreement do not necessarily mean the prevailing norms of performance, and on no account shall the prevailing norms of performance be regarded as the correct norm of task.

19. Alterations in Local Task Norms: Alterations in local task norms may not be made without the mutual consent of representatives of the Board and the National Union of Mineworkers at Area level.

20. No claim for an alteration in task norms shall be entertained by either party except in the following circumstances (all of which presuppose a substantial and semi-permanent change in mining conditions and/or methods of working on a particular face):

(i) on the introduction of new or improved machines or equipment entailing substantial changes in task norms, such as would make a reasonable increase in task norms justifiable.

(ii) on the introduction of changes in methods of working or in statutory regulations requiring substantial changes in the task standards or norms.

(iii) on the occurrence of significant and persistent (lasting more than four weeks) changes in environmental conditions as logged in the Second Schedule and which require substantial changes in task norms.

21. Applications for changes in task norms for reasons given in the preceding paragraph must be set out in detail in the form of the Second Schedule. One signed and dated copy must be sent to the Area Secretary of the National Union of Mineworkers, and a second signed and dated copy to the Industrial Relations Divisional Headquarters.*
22. Initial Settling-in Period: A "settling-in" period not exceeding four weeks may be allowed for working up to the prescribed task standards on a new power loading installation. During this period, the Board and the Union agree that the earnings of the workmen concerned shall be given special protection and the wage rates provided in Clause 24 shall be paid.

23. Relief Teams: Where faces are too long to make it possible for cutting to be completed normally within the shift, either a relief team shall be provided, or alternatively, the excess length of face shall be filled off by hand. Where a relief team is provided, every endeavour shall be made to arrange for it to relieve at the time at which the first team would normally leave the working face. Where a relief team is employed, the task actually performed by the original team shall be noted daily and payment to this team shall be on the basis of the work completed. Payment to the relief team shall be on the basis of the actual loading done and the time at which it is completed. Thus, cutting done shall be paid for at a rate proportionate to that which is paid for the agreed norm up to the time at which loading is completed. Provision shall be made for a relief team to perform other work upon completion of loading before the end of their normal shift.

PART IV - WAGE RATES

24. Wage Rates: For achieving the agreed norm of task specified in Clause 16 of this Agreement the wages to be paid shall be as follows:

(i) Members of the Power Loading Team and men employed on work complementary to Power Loading 60/- per shift.

(ii) Assistants 55/- per shift.

25. These wage rates are inclusive of the district percentage, the 1950 and 1951 pieceworkers' flat rates, the skilled shilling where payable, and all completion of task bonuses which shall be deemed to have been consolidated.
26. These wage rates are exclusive of overtime additions and the Five Day Week bonus.

27. No additions by way of "allowances" and similar "consideration" payments other than those permitted by this Agreement or by a National Agreement shall be made to the wage rates or the earnings derived from these wage rates.

28. No alteration may be made in the 1957 District power loading wage rates except by mutual agreement between the Divisional Board and the Area of the National Union of Mineworkers, and subject to approval by the Joint National Negotiating Committee.

29. Performance in excess of or below the established norm of task shall be paid for pro rata, subject to Clause 34. Payments made under this paragraph shall be calculated on the average shift performance over a full week and not on separate shifts, and shall be treated as "earnings" for purposes of the Five Day Week Bonus.

30. It is provided that for the purpose of calculating payments due under Clause 29, any period of time during which workmen are prevented from working through circumstances outside their control (e.g. shortage of wagons, abnormal physical conditions, breakdown of machinery, etc.) shall be ignored. In arriving at the deduction to be made in respect of standing time, any stoppage of less than 20 minutes duration shall be disregarded.

31. Overtime-

(i) Week Day. Payment for work done outside the normal shift shall be on the basis of the shift rate produced by the contract, averaged over the week, plus added time for the overtime worked at 50% of the shift rate produced by the contract.

(ii) Saturday. Payment for Saturday voluntary shift shall be on the basis of the shift rate produced by the contract, averaged over the week, plus added time for the overtime worked at 50% of the shift rate produced by the contract.
(iii) Week-end. Payment for work done from the beginning of
the afternoon shift on Saturday to the end of
the afternoon shift on Sunday shall be on the
basis of the shift rate produced by the
contract, averaged over the week, plus added
time for the overtime worked at 100% of the
shift rate produced by the contract.

32. Guaranteed Wages:- Payment for guaranteed wage shall be at the appropriate
standard grade rate for the job in accordance with the Revision of the Wages
Structure Agreement.

33. Five Day Week Bonus:- The amount of the Five Day Week bonus shall be
calculated in accordance with the provisions of the Five Day Week Agreement
relating to pieceworkers and shall normally be at the rate of 10% of aggregate
earnings excluding overtime payments.

34. Abnormality Rate:- When workmen covered by this Agreement are prevented
by geological conditions or mechanical breakdowns beyond their control from
completing their task norm, the management shall pay the wage rates provided
in Clause 24, provided that the management are satisfied that every reasonable
effort has been made by the workmen to achieve the prescribed task norm.

AS WITNESS the hands of the parties:-

On behalf of the NATIONAL COAL BOARD

(EAST MIDLANDS DIVISION)

R. KINCHAM
W.L. MIKIN
W.H. SANSON
E.S. MOSLEY

On behalf of the NATIONAL UNION OF MINERS (NOTTINGHAMSHIRE
AREA)

ALBERT MARTIN
J.T. TIGHE
W.L. ELLIS
W. BAKER
L. CLARKE
INTRODUCTION

1. The size of the Mining Industry in Scotland over the next five years will be determined by the amount of coal that can be sold. Production must be in broad accord with demand, not only in total volume, but also as regards sizes and sorts. Production plans, therefore, must be flexible and cannot be given in detail except for a short period ahead, but the broad pattern of production in each of the four Scottish coalfields can be shown.

2. In the Scottish coalfields there are pits, generally either new or reconstructed where substantial increases in output are expected which should yield results that will improve the position of the Division both as regards productivity and finance. The policy of the National Coal Board is to ensure that such capacity is fully employed.

3. Against that background the pits expected to be working at 30th June, 1962, have been put, by coalfields (Appendix I to IV) into three classes, viz:

   Class A. The pits under this heading are those where reserves are quite adequate to last over the five year period and where generally there is potential to enable economic working to be pursued. If certain of these pits fail to operate at the productivity of which they appear capable, they may well be transferred to Class B.

   Class B. These comprise pits, with reserves, where the past results, because of working conditions, have been generally unprofitable and where their potential is doubtful. Many of these are likely to close within the period, some quite soon, and the continued existence of the remainder will depend on the two factors, demand and their own performance.

   Class C. This class comprises the pits in which the realistic reserves still available with reasonable access to the
shafts or drifts are very limited and which will be exhausted at varying times before the end of 1966. No pit is ever exhausted to the last ton of coal and the Appendices show only the approximate year of exhaustion. Some of these pits are profitable, other uneconomic.

4. This classification is made on the position as it is seen at present. The position of a pit can change quite quickly for the better or for the worse, e.g., through the incidence of geology, industrial relations, the successful introduction of power loading, or the market trends of demand. A pit now in Class B could well establish itself in Class A and vice versa.

DEMAND.

5. Disposals of coal in 1961 were approximately 19.2 M. tons made up as follows:

<table>
<thead>
<tr>
<th>Scottish Coal</th>
<th>M. Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>3.40</td>
</tr>
<tr>
<td>Railways</td>
<td>0.60</td>
</tr>
<tr>
<td>Gas</td>
<td>1.50</td>
</tr>
<tr>
<td>Electricity</td>
<td>3.70</td>
</tr>
<tr>
<td>Coke Ovens</td>
<td>1.60</td>
</tr>
<tr>
<td>All other Scottish Markets</td>
<td>5.60</td>
</tr>
<tr>
<td>General industry, etc.</td>
<td>1.60</td>
</tr>
<tr>
<td>Outwith Scotland</td>
<td></td>
</tr>
<tr>
<td>English Coal required mainly for Railways and certain domestic markets</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>19.20</td>
</tr>
</tbody>
</table>

6. Over the five years disposals of coal should benefit from a substantial increase in the coal used for electricity generation and from an increase over the present rate of supply to coke ovens, even allowing for economies in consumption likely to be affected by oil injection and technical improvements. But disposals
to gas works (which will increasingly use oil based feed stocks) will be less and there will be intensive competition principally with oil in the field of General Industry and with oil, gas and electricity in the domestic market. Disposals to Railways will also be less but this will be offset in the first instance by a contraction in the amount of English coal brought into Scotland.

The principal competition undoubtedly comes from oil and over the past six years business to the extent of over 1.5 M tons must have been lost to coal.

7. The level of disposals both within and outwith Scotland is likely to decrease from that of 1961. The National Board has declared its willingness to provide from the profits of other coalfields during this period of redeployment the interest charges attaching to the Scottish Division. It is essential that productivity be increased so that the operating costs may be lowered to enable the price of coal in Scotland to be kept competitive.

PRODUCTION.

8. In 1961 the output of coal in Scotland was:

<table>
<thead>
<tr>
<th>Class</th>
<th>N. tons</th>
<th>N. tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>Class B</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Class C</td>
<td>2.1</td>
<td>15.8</td>
</tr>
<tr>
<td>From pits working in 1961 but closed or regarded as closed by 30th June, 1962.</td>
<td></td>
<td>1.2</td>
</tr>
<tr>
<td>From sales of uplifted slurry</td>
<td></td>
<td>0.2</td>
</tr>
</tbody>
</table>

Total Output

H.C.R. Mines 1961

17.2

Open cast and Licensed mines

1.2

Total Output In Scotland 1961

18.4

9. The pits listed in Class A include new pits still in the course of construction and pits under reconstruction where the development work is not yet complete; in both cases the build up of output to the planned capacity has still to take place.
Generally pits in this class offer opportunities for the exploitation of mechanisation.

10. In 1966 the pits in Class 'A' are expected to produce about 14.5 - 15 M. tons; (this increase in output of 4.5 - 5 M. tons over their output in 1961 does much more than replace the production of pits in Class 'C' which produced 2.1 M. tons in that year and are all likely to have closed by 1966); output from Licensed Mines and Open cast will be about 1.0 M. tons and the extent to which output is required from Class 'B' pits will depend on the total level of demand for Scottish coal.

PRODUCTIVITY.

11. In 1961 overall productivity in the Scottish coalfields was 22.34 cwt. per manshift. There was an improvement in the latter part of the year which has continued in 1962 due mainly to the increasing proportion of the output coming from pits in Class A and from increased mechanisation. Productivity in each class over the past five years has been as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>CLASS A</th>
<th>CLASS B</th>
<th>CLASS C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cwt. M. tons</td>
<td>cwt. M. tons</td>
<td>cwt. M. tons</td>
</tr>
<tr>
<td>1957</td>
<td>20.5 8.7</td>
<td>19.5 5.0</td>
<td>19.8 2.3</td>
</tr>
<tr>
<td>1958</td>
<td>20.3 8.3</td>
<td>19.8 4.5</td>
<td>19.9 2.1</td>
</tr>
<tr>
<td>1959</td>
<td>22.5 8.9</td>
<td>19.5 4.2</td>
<td>20.3 2.0</td>
</tr>
<tr>
<td>1960</td>
<td>23.8 9.3</td>
<td>19.8 4.0</td>
<td>22.1 2.0</td>
</tr>
<tr>
<td>1961</td>
<td>24.8 10.0</td>
<td>19.8 3.7</td>
<td>23.7 2.1</td>
</tr>
<tr>
<td>1st Qtr.1962</td>
<td>27.8</td>
<td>20.6</td>
<td>23.3</td>
</tr>
</tbody>
</table>

In the first quarter of 1962 the average cost of production in the Class 'A' pits was about 20/- per ton less than the average cost of production in the Class 'B' pits.

12. Broadly, productivity has been conditioned by the extent to which it has been possible to mechanise face operations successfully. Class A pits have been affected by the initial period of build up of output which in several pits is still continuing.
Class B pits generally have had difficult geological conditions to contend with and in most cases these conditions persist. Class C pits have in quite a number of cases conditions which allowed of successful mechanisation of the remaining coal and increases in productivity in such pits in recent years have offset the gradual decline in other pits in this class.

13. With the considerable increase in the output expected from Class A pits and the reduction in output from Class B and C pits, it is to be expected that productivity will increase over the period to 30/31 cwt. by 1966.

14. An increase in productivity of this order is essential. On the basis of current prices and costs an O.P.S. of about 26½/27 cwt. is necessary to avoid an operating loss, even on the basis that interest in carried by other coalfields. And a regular increase in productivity is necessary to meet inevitable increases in cost and the effect of mechanisation on proceeds over the period.

STOCKS.

15. It is not possible, nor would it be right, to keep an exact balance between production and demand. That balance must be achieved by means of stocks. Stocks in the Division already amount to over 1.75 m tons. To lay down, hold and then lift stocks requires not only the provision of large sums of capital monies but it also adds substantially to costs. This cost is in the region of 15/- to 20/- per ton if the stocks are held for 12 months and there must be an upper limit to the stock of unsold coal held in the Division.

MANPOWER.

16. The total manpower employed, including trainees, common services and men on salvage was about 64,000 on the 30th June, 1962. The future manpower required in the Division will depend on the level of demand, of production and productivity and estimates of re-deployment are conditioned by these factors and the broad assumptions which must be made as to rates of wastage, recruitment, etc. Only a very broad appraisal can, therefore, be given of the manpower position.
17. The Class A pits employed directly about 39,000 men at the 30th June, 1962. These pits are expected to increase their total manpower by some 6,000 men by the end of 1966 to over 44,000. During the same period to replace natural wastage in these pits would require about 24/25,000 men, so that the 'A' pits alone will make available about 30/31,000 vacancies. The Class B pits employed directly about 16,000 men and the Class C pits about 8,000 men at 30th June, 1962. 18. It is not possible to say how many of the Class 'B' pits will be working in 1966 and how many men are likely to be employed. If demand in 1966 only justified deep-mined output at a level of 14.5/15 m. tons then only Class 'A' pits would continue and approximately 44,000 men would be required; if, say, 2 m. tons more were needed then a further 6/7,000 men would be employed making a total of 50/51,000 men directly employed at the pits, and in both cases trainees and men in common services would add to the total. 19. Even assuming the lower level of demand, Class 'A' pits over the period would provide new jobs and require natural wastage replacements to the extent of 30/31,000 places in total against a manpower now employed in Class 'B' and 'C' pits of 24,000 men - a figure which could be expected to reduce before the actual dates of closure. If the geographical and time factors involved allowed of simple and direct redeployment of men from pits as they closed to continuing pits in Class 'A' the problem of re-deployment would not create serious difficulties and redundancy would be limited to men whose kind of work, e.g. surface workers would not be readily available at Class 'A' pits. 20. This position will apply in the Lothians and generally in the Ayrshire coalfield but it will not be realistic elsewhere and, unless men transfer to other coalfields, general re-deployment to other pits will not be possible in some localities. The localities likely to be particularly affected are:

Central Fife, where pits employing 7/8,000 men at present could be affected over the period and the prospects of re-deployment to pits within travelling distances are limited.
Douglas, where pits employing about 1,500 men at present could be affected with little prospects of re-deployment in the Area.

Harthill/Shotts/Forth, where pits employing 2,100 men at present could be affected. The majority could probably be re-deployed in the Area but this would take time.

Motherwell/Hamilton, where pits employing about 1,000 men at present could be affected. Again the majority could probably be re-deployed in the Area over a period.

Campbeltown. If Argyll Colliery closed 150 men would be affected with no prospect of re-deployment in the Area.

21. The first endeavour of the Board will be to offer a man a job within reasonable travelling distance of his home. If this is not possible then it is hoped that all underground workers will still be offered work in the mining industry in other Areas of Scotland or in the Midlands and Yorkshire coalfields of England.

22. During the period the policy of the Board will be to continue the recruiting of juveniles to some degree in all Areas, both for mining and for craftsmen apprenticeship. In addition it will be necessary to recruit re-entrant minersworkers in certain localities, to the extent that men transferring from closing collieries in other parts of Scotland are not sufficient to meet the needs of these places.

23. It is appreciated that overall output may be lower than at present and the number of men employed substantially less. This will mean seriously reduced employment prospects in several localities. While the Coal Industry is not in a position to accept responsibility for maintaining employment in such cases, the Board will take all necessary steps to ensure that Government Departments and other interested bodies are given information as early as possible about the future
prospects for employment in the industry.

**ADMINISTRATIVE ORGANISATION.**

24. The Board propose, during this period, to make changes in their administrative organisation. The number of areas will be reduced to four (to conform broadly to the four Scottish coalfields). This involves merging the two Ayrshire Areas and the Fife and Alloa Areas. The Lothians and Central Areas will remain substantially as constituted at present.

**THE INTERMEDIATE YEARS.**

25. There, for economics or to avoid stocks reaching too high a level, or both, it is necessary to accelerate closures the position of each pit in Classes "B" and "C" would be considered and the Board's proposals would take into account the record of performance, the prospects, the state of the reserves, market demands and the problem of re-deployment.
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