

Report of the Tribunal
appointed to inquire into
the Disaster at Aberfan
on October 21st, 1966

Presented pursuant to the Tribunals of Inquiry (Evidence) Act 1921, s.1

*Ordered by The House of Lords to be printed
19th July, 1967*

*Ordered by The House of Commons to be printed
19th July, 1967*

LONDON
HER MAJESTY'S STATIONERY OFFICE
PRICE 15s. 0d. NET

H.L. 316
H.C. 553

1

CONTENTS

	<i>Paragraphs</i>	<i>Page</i>
INTRODUCTION	1-23	7
PART I—GENERAL SURVEY OF ABERFAN AND ITS TIPS:		
1. Topography and Geology	24-26	13
2. History of Aberfan Tipping	27-28	13
3. The method of tipping on Tip 7	29	18
4. The springs and watercourses of Merthyr Mountain..	30-34	18
5. The flooding of Aberfan	35-41	20
6. The events leading up to the disaster.. .. .	42-48	23
PART II—WHAT HAPPENED AT ABERFAN?	49-57	26
PART III—TIP POLICY AND RESPONSIBILITY	58-73	31
PART IV—SHOULD ANYONE BE BLAMED FOR THE ABERFAN DISASTER?		
Introduction.. .. .	74-78	39
<i>Section A—History</i>		
1. The 1939 Slide at Cilfynydd (Abercynon)	79-82	41
2. The 1944 Slide of Tip 4	83-90	42
3. Tip 5 and allied topics	91-95	45
4. 1958: The selection of Tip 7 Site	96-108	47
5. The events of 1958-1963	109-111	52
6. "Tailings"	112-127	53
7. The 1963 Slide of Tip 7	128-145	61
8. The events of 1964-1966	146-158	67
9. Tymawr and the Powell memorandum of 1965	159-172	72
10. Last Days	173-176	79
<i>Section B—Conclusions as to Liability</i>		
1. The National Coal Board.. .. .	177-188	81
ADDENDUM—The attitude of the National Coal Board		
	189-206	85
2. Individual National Coal Board Officials	207-243	92
3. Merthyr Tydfil County Borough Council	244-251	107
4. National Union of Mineworkers.. .. .	252-256	110

	<i>Paragraphs</i>	<i>Pages</i>
PART V—HOW AND WHY DID THE DISASTER HAPPEN? ..	257–276	113
PART VI—LESSONS AND RECOMMENDATIONS	277–295	121
PART VII—SUMMARY		131
APPENDICES		
A. Parties and their legal representatives		133
B. Witnesses		134
C. Experts		136
D. The Powell Memorandum of 1965		138
E. Underground Stowing		150
F. Sir Andrew Bryan’s Memorandum		151

ILLUSTRATIONS

	<i>Page</i>
FIGURE 1 Extract from Ordnance Survey Map 6 in. to 1 mile—Glamorgan Sheet. XIX 2, edition of 1919, showing streams and rises	14
FIGURE 2 Extract from 6 in. to 1 mile Geological Survey Map to match Figure 1	15
FIGURE 3 Geological Cross Section of Merthyr Mountain	16
FIGURE 4 Contour Map of Tip Complex from aerial photograph, post disaster; showing positions of original streams	17
FIGURE 5 Street plan of Aberfan showing extent of flow into village and damage to property	29
FIGURE 6 Slide at Cilfynydd, 1939 (from “Powell Memorandum”)	40
FIGURE 7 Tailings Flow at Ty Mawr 1961 and 1965	73
FIGURE 10 Cross section from top of Tip 7 before and after the disaster	Facing 120

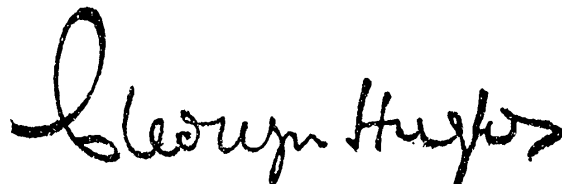
FIGURE 8 Explanatory diagram of Plate 1	} Between pp. 76 & 77
PLATE 1 Tips from directly overhead, May 1963	
PLATE 2 View of Colliery and tips shortly before disaster	
PLATE 3 View of tips, 1964	
PLATES 4 & 5 Aerial photograph from the East on the day of the disaster	
PLATE 6 View of tips after the disaster, showing drainage works	
PLATE 7 View down slope three hours after disaster, showing flow-slide with central mus-run	
PLATE 8 Tips from directly overhead—two days after disaster	
FIGURE 9 Explanatory diagram of Plate 8	

WHEREAS it has been resolved by both Houses of Parliament that it is expedient that a Tribunal be established for inquiring into a definite matter of urgent public importance, that is to say, the causes of, and all the circumstances relating to, the disaster at Aberfan, Merthyr Tydfil, on Friday the 21st day of October, 1966.

NOW I, The Right Honourable Cledwyn Hughes, one of Her Majesty's Principal Secretaries of State, do hereby appoint Sir Herbert Edmund Davies, one of Her Majesty's Lords Justices of Appeal, Harold Harding, Esquire, and Vernon Lawrence, Esquire, C.B.E., to be a Tribunal for the purposes of the said Inquiry.

AND I FURTHER APPOINT Sir Herbert Edmund Davies to be Chairman of the said Tribunal.

IN VIRTUE of Section 1 of the Tribunals of Inquiry (Evidence) Act, 1921, I hereby declare that that Act shall apply to the Tribunal and that the said Tribunal is constituted as a Tribunal within the meaning of the said Section of the said Act.



Welsh Office
26th October, 1966

One of Her Majesty's Principal
Secretaries of State

INQUIRY INTO THE ABERFAN DISASTER

REPORT OF THE TRIBUNAL APPOINTED UNDER THE TRIBUNALS OF INQUIRY (EVIDENCE) ACT, 1921

To: The Rt. Hon. CLEDWYN HUGHES, M.P., Secretary of State for Wales

INTRODUCTION

1. On Tuesday, the twenty-fifth day of October, 1966 resolutions were passed in both Houses of Parliament declaring that it was expedient that a tribunal be established for inquiring into a definite matter of public importance namely, the causes of, and all the circumstances relating to the disaster at Aberfan, Merthyr Tydfil, on Friday, the twenty-first day of October, 1966.

2. In pursuance of these resolutions a warrant was issued on Wednesday, the twenty-sixth day of October 1966, over the hand of the Secretary of State for Wales, which, after reciting the terms of the resolutions set out above, proceeded as follows:—

“NOW I, The Right Honourable Cledwyn Hughes, one of Her Majesty’s Principal Secretaries of State, do hereby appoint Sir Herbert Edmund Davies, one of Her Majesty’s Lords Justices of Appeal*, Harold Harding, Esquire, and Vernon Lawrence, Esquire, C.B.E., to be a Tribunal for the purposes of the said Inquiry.

AND I FURTHER APPOINT Sir Herbert Edmund Davies to be Chairman of the said Tribunal.

IN VIRTUE of Section 1 of the Tribunals of Inquiry (Evidence) Act, 1921, I hereby declare that the Act shall apply to the Tribunal and that the said Tribunal is constituted as a Tribunal within the meaning of the said Section of the said Act.”

3. Acting under our Warrant we have conducted the inquiry called for by our terms of reference and now present the Report which we have drawn up in order to embody our findings consequent upon that inquiry. In the course of it we sat in public for the taking of evidence on 76 days. We also held a preliminary meeting in public on November 8th, 1966, for the purpose of considering the procedure to be adopted and to give directions and also to announce the arrangements that had been made for the hearing of evidence in public.

4. We visited the seven tips during the course of our sittings at Merthyr Tydfil and travelled round them in a tracked vehicle kindly provided by the Ministry of Defence: we also visited the surface of the colliery and were shown the coal preparation plant in operation. In addition to these visits we paid a number of others individually to the scene of the disaster and to other parts of Aberfan. We also held numerous informal meetings for discussion between ourselves.

* Sworn of the Privy Council on November 11th, 1966

5. At the preliminary meeting we announced that, while we had power to sit in private, we should do so with extreme reluctance. In the event we did not find it necessary to do so. We also announced that witnesses might give their evidence in Welsh if they would find it easier to do so, but no-one expressed such a desire.

6. We were empowered by Section 2(d) of the Tribunals of Inquiry (Evidence) Act, 1921, to authorise the representation before us by counsel or solicitor or otherwise of any person appearing to us to be interested, or to refuse such representation. The word "interested" has not, as has been observed before, any precise meaning in this context. We adopted a construction which covered any person or group of persons who had been affected by the disaster and who had suffered loss or damage and also those who might be subject to adverse reflection, direct or indirect, from anything said in our report. In the result, a number of persons and associations were legally represented before us, and we set out at Appendix A a list of the names of those persons and of their counsel and solicitors.

7. The Act contains no provision giving us power to order that a witness be paid the cost of his legal representation or his expenses out of public funds. That gap in the Act was partially filled in the present instance by a public statement made on October 27th by the Secretary of State for Wales in the following terms:

"The Government has considered what may be done to enable individuals who have suffered as a result of the Aberfan Disaster to be legally represented at the hearings of the Tribunal. If the Tribunal agrees to hear representations from a Solicitor or Counsel instructed by them, representing collectively those parents, dependents or others who have suffered loss or injury, the Government will meet the reasonable costs of this representation. Provision will also be made for the financial loss allowances to be paid to those who suffer loss of earnings through attendance as witnesses before the Tribunal. The maximum rates will be those applying to witnesses attending before Government Committees generally. Provision will also be made for subsistence and travelling allowances to be paid where appropriate."

8. At the request of the Chairman, counsel acting for the Tribunal were headed by Her Majesty's Attorney-General. On 7th November, 1966, the day before the preliminary meeting of this Tribunal, the Report of a Royal Commission* was published which dealt, *inter alia*, with the desirability of an Attorney-General's participation in proceedings held under the Tribunal of Inquiry (Evidence) Act, 1921. At the preliminary meeting the Chairman announced that, while that Royal Commission had, of necessity, to make its recommendations in the light of the type of Inquiries hitherto held under that Act, the present Inquiry was in his view of a totally different character. He went on to say that in the present instance the Attorney-General, a South Walian and an advocate with great knowledge of the South Wales coalfield and its people, would be able to assist us to an extent which could not normally be expected of the head of the Bar, however zealous. In addition to the Attorney-General we were assisted in the ascertainment of the facts and the presentation of evidence by Mr. Tasker Watkins, Q.C., Mr. Breuan Rees and Mr. Ronald

* Cmnd. 3121.

Waterhouse (of counsel). We are indebted to them and to all other members of the Bar who appeared before us and their instructing solicitors for their help in the Inquiry.

9. As events transpired, the multifarious demands made upon the Attorney-General necessitated his leaving the Tribunal immediately after his opening address and prevented his appearing before us thereafter. Even so, we are unanimously of the opinion that he made so valuable a contribution that we take leave to doubt the wisdom of adopting any general rule which might hereafter totally exclude the participation of the Law Officers of the Crown in proceedings such as the present.

10. We were fortunate to have placed at our disposal the services of the Treasury Solicitor and his staff, to whom we are greatly indebted for the skill and efficiency with which they met the heavy demands made upon them. In all they took statements from 250 persons. Of these 136, whose names we set out in Appendix B, gave oral evidence before us. It is illustrative of the complexity of the matters covered by our Inquiry that the transcript of the proceedings at the public sittings for the hearing of evidence runs to 4,236 pages of foolscap typescript, and that no fewer than 61 maps and plans and numerous other documents were laid before us. We also had brought to our notice nearly 200 photographs of the tips and other places in Aberfan taken both before and after the disaster. The photographs taken before the disaster proved invaluable in showing the progress of tipping on Merthyr Mountain and the condition of the tips at several crucial periods. Their evidential value was much enhanced because none of them was taken for any purpose connected with tipping or the operations of the National Coal Board, nor were they taken to illustrate any theory or justify any special attitude. They were taken by members of the public who interest themselves in photography as a hobby, by the Press, by firms who make aerial surveys and by the Royal Air Force. We are deeply grateful to them all for the readiness with which they responded to our appeal, for their handiwork provided touchstones which frequently enabled us to make a firm decision when the oral testimony was in violent conflict. In addition, we received a large volume of correspondence either direct or through various Government Departments. We are greatly indebted to those who endeavoured to assist us in this way. At this point we wish to invite attention to the apparent disproportion between the amount of space taken up by various topics in the transcript of oral evidence and in our report. For example, the flooding at Pantglas and the plans for the construction of an aerial ropeway which occupied many hours are dealt with in short compass in our report. This is not because we believe these topics to be unimportant, but because, in our view, their relevance to our terms of reference can be briefly stated although they merited investigation at length as they revealed surprising evidence regarding the state of mind and the intentions of those concerned.

11. At the same time as we were preparing to take evidence we thought it right to set in train a series of scientific investigations under the general direction of Professor A. W. Bishop, of the Imperial College of Science and Technology. In addition to these investigations on our behalf, certain other investigations, in some cases complementary, were put in hand on behalf of some of the parties who appeared before us. The results of those investigations were reduced to writing and circulated to all parties. In view of their scientific interest, we have thought it right to arrange for separate publication of the papers.

12. We held our preliminary meeting and began our public sittings at Merthyr Tydfil for the convenience of those local residents who had been bereaved or had suffered loss or damage as a result of the disaster. We thought it right to call a large number of them as witnesses and to allow considerable latitude when they were giving evidence. We took their evidence first as a gesture of respect and out of consideration for their suffering, although, logically and chronologically, the matters to which they testified would have been taken later in the course of our proceedings. After the Christmas recess, however, we sat at Cardiff to hear the evidence of the National Coal Board, the Merthyr Tydfil Corporation and other public bodies and also the expert witnesses. We are grateful to the Merthyr Tydfil and Cardiff Corporations for making accommodation available to us and for the kindness with which we were treated by their officers.

13. At the preliminary meeting the Chairman, after indicating the far-ranging nature of the Inquiry, posed four broad questions:

1. What exactly happened?
2. Why did it happen?
3. Need it have happened? Was this a calamity which no reasonable human foresight could have prevented, or was it caused by blameworthy conduct by some persons or organisations?
4. What lessons are to be learnt from what happened at Aberfan?

In the report which follows we give our answers to those questions.

14. On the 29th and 30th November 1966 the Attorney-General opened the facts. When he had concluded his statement, we (in accordance with the recommendation of the Royal Commission) afforded counsel for each of the parties before us the opportunity of addressing us briefly, and most of them did so. Thereafter one of the counsel appearing for the Tribunal called the witnesses and they were examined in chief either by their own counsel or, if they had none, by counsel for the Tribunal. Counsel appearing for other parties were then given the opportunity of cross examining them: if a witness was called by counsel appearing for the Tribunal he was then cross-examined by another of the counsel representing the Tribunal. We devised this procedure in the light of the recommendations of the Royal Commission and the Chairman announced it at the preliminary meeting. We understand that it met with the approval of counsel appearing before us and of those instructing them.

15. We were fortunate to begin the Inquiry with a certain amount of background knowledge of the coal-mining industry and some familiarity with its operation. At the start of this Inquiry we were aware of the fact that the great bulk of mining operations take place below ground and that most of the best men in the industry are employed there. It is there that coal is won and in that direction that the attention of those employed in the industry is naturally turned. Rubbish tips are a necessary and inevitable adjunct to a coal mine, even as a dustbin is to a house, but it is plain that miners devote certainly no more attention to rubbish tips than householders do to dustbins.

16. There was not lacking evidence that this is a widespread attitude in the industry. Even the Mines and Quarries Act, 1954, which, with its subordinate regulations and orders, has many detailed provisions on the conduct of operations

National Coal Board Officials, showing positions held since 1956

	1956	1957	1958 (Tip 7 started)	1959	1960	1961	1962	1963	1964	1965	1966	1967
<i>Board Headquarters (London)</i>												
Chairman												
Director General of Production												
<i>South Western Division</i>												
Chairman												
Production Director												
Chief Engineer												
Divisional Mechanical Engineer												
Divisional Civil Engineer												
Divisional Estates Manager												
Divisional Chief Surveyor												
<i>No. 4 Area (Aberaman)</i>												
Area General Manager												
Area Production Manager												
Area Estates Manager												
Assistant Area Estates Manager												
Area Mechanical Engineer												
Area Civil Engineer												
Area Planning Engineer												
Area Chief Surveyor												
Secretary												
<i>No. 4 Group (Merthyr Vale)</i>												
Group Manager												
Group Mechanical Engineer												
Group Surveyor												
Group Planning Engineer												
<i>Merthyr Vale Colliery</i>												
Colliery Manager												
Colliery Under Manager												
Colliery Mechanical Engineer												
Colliery Deputy Mechanical Engineer												
Colliery Surveyor												
Yard Foreman												
Foreman Blacksmith												
Charge Hand Tipping Gang												

underground, is silent on the subject of refuse tips. Indeed they find a mention only in an interpretation section (Section 180) which declares that they form part of a mine. The Coal Mining Report of the Technical Advisory Committee ("The Reid Report"—Cmnd. 6610, March 1945) is silent on the topic of safety of tips and deals only with the mechanical means involved. It includes the following alarming and dangerous recommendation at paragraph 603 under the heading "Refuse Disposal":

"Very little choice usually exists in the selection of the dumping site, but where possible a site with falling ground in front of the direction of advance, or sidelong sloping ground should be chosen. In such circumstances a greater amount of material can be dealt with at no greater cost".

This seems to us to illustrate the generally prevailing attitude of mining engineers to the topic of the siting of tips up to this disaster.

17. We found that many witnesses, not excluding those who were intelligent and anxious to assist us, had been oblivious of what lay before their eyes. It did not enter their consciousness. They were like moles being asked about the habits of birds.

18. As we shall hereafter seek to make clear, our strong and unanimous view is that the Aberfan disaster could and should have been prevented. We were not unmindful of the fact that strong words of calumny had been used before our Inquiry began. But the Report which follows tells not of wickedness but of ignorance, ineptitude and a failure in communications. Ignorance on the part of those charged at all levels with the siting, control and daily management of tips; bungling ineptitude on the part of those who had the duty of supervising and directing them; and failure on the part of those having knowledge of the factors which affect tip safety to communicate that knowledge and to see that it was applied.

19. As we proceed with our report we shall find it necessary to refer to a number of members of the National Coal Board and its staff. A chronological table showing the names of holders of various appointments during the period 1956-66 is to be found facing this page.

20. The Merthyr Vale Colliery at Aberfan formed part of No. 4 Group in No. 4 Area of the South Western Division of the National Coal Board. The mine manager's office is at the surface of the mine, near the pithead; the Group Manager's office is also at Merthyr Vale about half a mile away from the mine; the Area Manager's office is at Aberaman, a few miles away from Aberfan; the Divisional Office is at Llanishen, near Cardiff, about twenty miles away from Aberfan; the National Coal Board's headquarters are in London.

21. At the time of the disaster the Chairman of the National Coal Board was Lord Robens and the senior official at headquarters was the Director-General of Production, Mr. W. V. Sheppard. The Chairman of the South Western Divisional Board was Mr. A. H. Kellett and the member of that Board with particular responsibility for tips was Mr. G. S. Morgan. The Area, Group and Mine Managers were respectively Mr. T. Wright, Mr. R. N. Lewis and Mr. T. J. Wynne.

22. Generally speaking, of those who gave evidence before us, the officials at Division and Area levels are qualified, both academically and professionally. Those at Group and Colliery levels, on the other hand, are qualified by statutory examination after long service in the industry and have risen to positions of responsibility by character and ability.

Scheme of the Report

23. We have found it convenient to divide our Report into an Introduction and seven parts: some of the parts are further sub-divided.

In Part I we describe the physical features of Aberfan and Merthyr Mountain and the history of mining and tipping there.

In Part II we describe what happened at Aberfan on 21st October 1966.

In Part III we deal with tip policy and responsibility.

In Part IV we pose the question "Should anyone be blamed for the Aberfan disaster?" This is by far the longest part of the Report. It is divided into two sections, following an introductory passage in which we explain our concepts of blameworthiness and liability. Section A deals with the history of other slides in South Wales and events on the disaster tip which either have a bearing on the causes of the disaster or serve to reveal the state of mind of some of those most intimately concerned. Section B deals with:

- (i) the National Coal Board;
- (ii) the personal responsibility of various individual officials of the National Coal Board;
- (iii) Merthyr Tydfil County Borough Council and its officials; and,
- (iv) the National Union of Mineworkers.

Part V poses the question, "How and Why did it happen?" This is answered by a summary of the views of the experts on what exactly caused the disaster and the mechanism of its occurrence.

In Part VI we give our views on the lessons to be learnt from the disaster and our recommendations for the future. These are repeated together with our findings in summary form in the seventh and last part.

PART I

ABERFAN AND ITS TIPS

1. Topography and geology

24. The sister villages of Aberfan and Merthyr Vale are situated in the valley of the Taff about four miles south of Merthyr Tydfil. The Merthyr Vale Colliery and part of the village are on the east bank, the village of Aberfan is on the west bank. To the west of Aberfan rises the Merthyr Mountain. Where it flows through the village, the River Taff is about 420 feet above sea level. At about 515 feet above sea level there is the embankment of a disused railway line, while below it, and further to the west, runs a ditch which was formerly the bed of a canal. This ditch lies between 5 and 15 feet below the railway embankment. The spoil heaps on the mountainside lie between the 650 and 1,200-foot contour lines: their respective heights above the mountainside itself vary between 60 and 110 feet. The slope of the mountainside above the village averages about one in four up to the 900 foot contour, where it steepens to about one in three up to the 1,000 foot contour, and thereafter flattens out towards the summit of the ridge. A view of the village with the Merthyr Mountain behind it is shown at Plate 2 and Figure 3 shows a cross section through the mountain from the River Taff to the summit along the line of the colliery tramway.

25. A detailed description of the geology of the area is given in a separate volume. It is sufficient for present purposes to note that the rocks form part of the coal measures laid down in the Carboniferous period many millions of years ago. Merthyr is composed for the most part of Pennant sandstone intersected by thin seams of coal and associated bands of clay. The strata incline towards the South-South East, i.e., towards the valley, at a slope of about one in twelve. Pennant sandstone itself is only very slightly porous, but is cracked and fissured and so permits water to pass fairly freely through it; when this water reaches an impermeable layer it can go no further and emerges on the mountainside in the form of springs. One such line of springs associated with the Cefn Glas coal seam lies above the spoil heaps; another associated with the Brithdir coal seam passes beneath them. From these springs there flow a number of streams down the mountainside, the volume of water in them varying according to the season and the rainfall.

26. The rock of the upper slopes is covered to a depth of 5 to 10 feet by a layer of what is known to geologists as "Head", but which the layman would regard simply as topsoil and loam. This "Head" may form a thicker layer on the lower slopes (up to 20 feet) but here it overlies boulder clay deposited by a glacier during the last Ice Age. A tongue of this boulder clay extends up the mountainside to about the 900-foot contour and lies under the southern and eastern sides of the spoil heaps. Both boulder clay and "Head" have similar physical characteristics.

2. History of tipping at Aberfan

27. The two shafts of the Merthyr Vale Colliery were sunk between 1869 and 1875 and the first tips were created west of the river, but east of the canal. Tipping began to the west of the canal during the 1914–18 War when what for the purposes of the Inquiry became known as Tip 1 was started. A diagram showing the layout of the tips is shown at Figure 8.

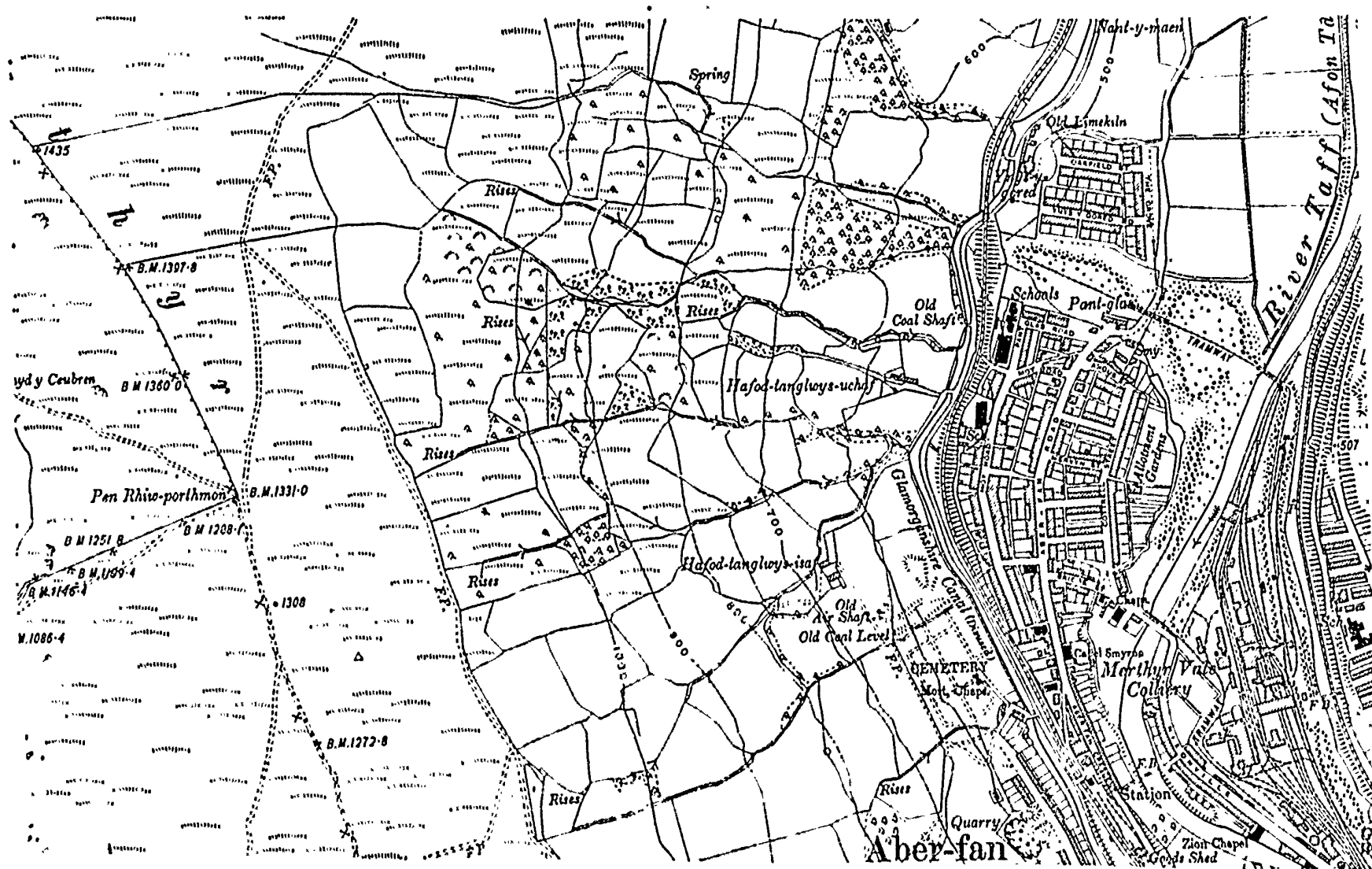


Figure 1

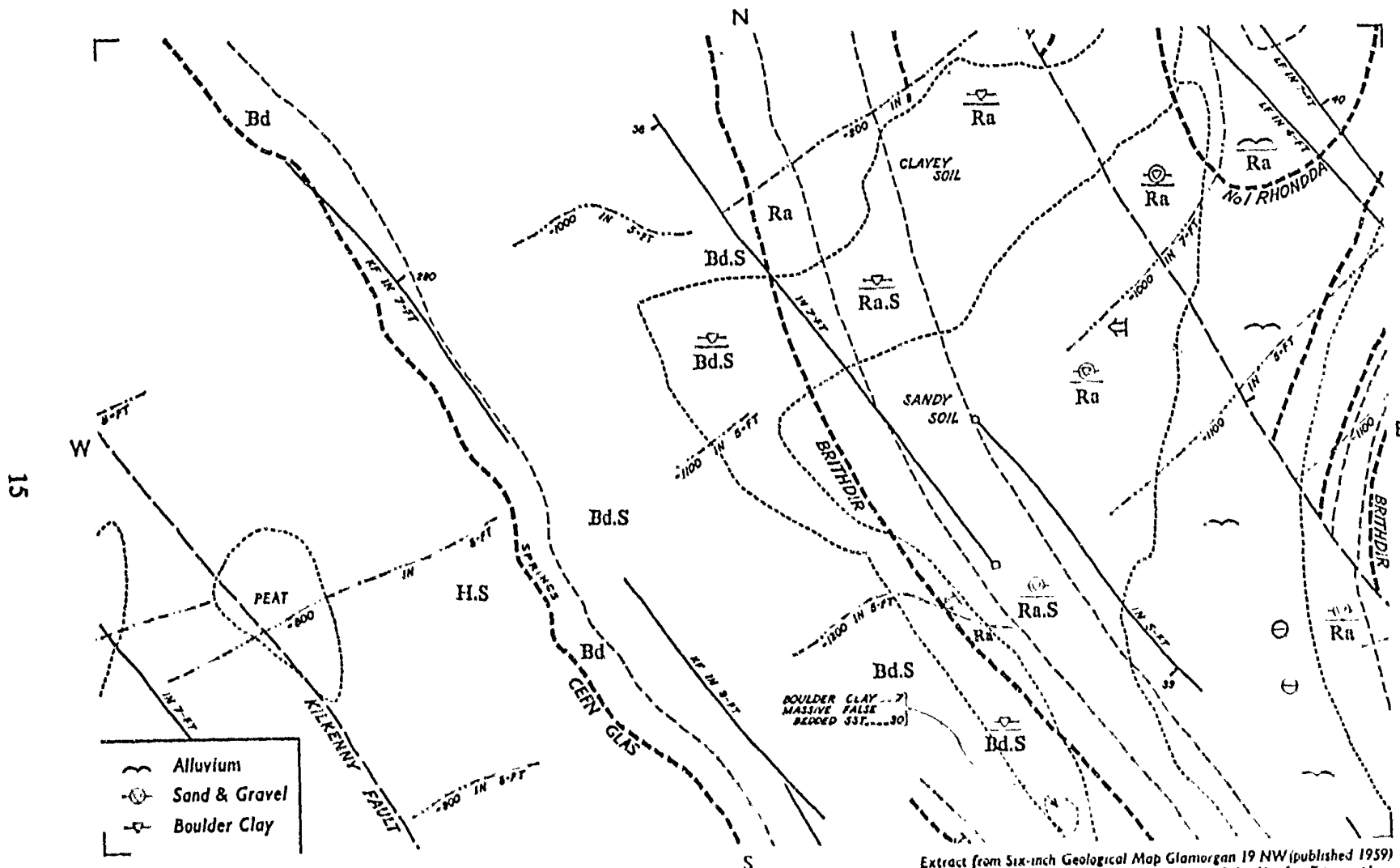


Figure 2

Extract from Six-inch Geological Map Glamorgan 19 NW (published 1959) showing the geology in the neighbourhood of the Aberfan Tip-complex: H.S. Sandstones in Hughes Beds; Bd, Brithdir Beds, undivided, Bd.S, Sandstones in Brithdir Beds, Ra, Rhondda Beds, undivided, Ra.S, Sandstones in Rhondda Beds.

27

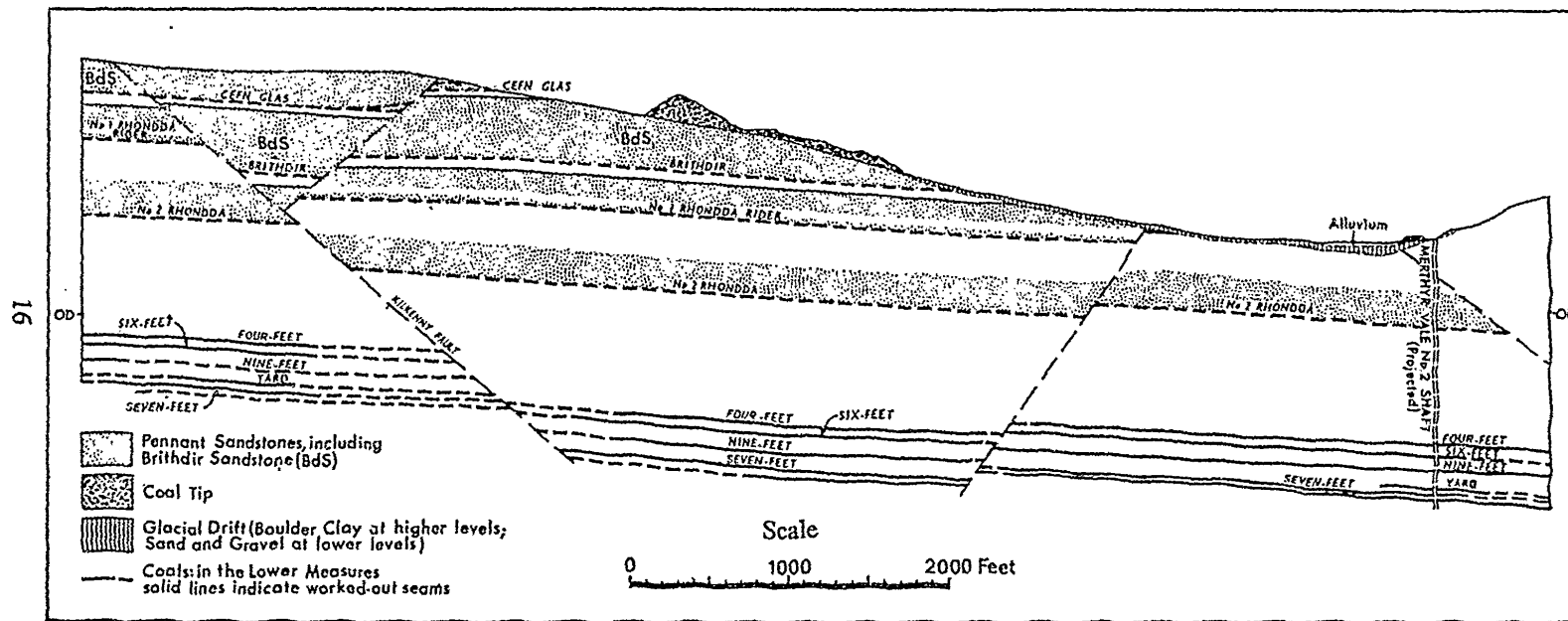
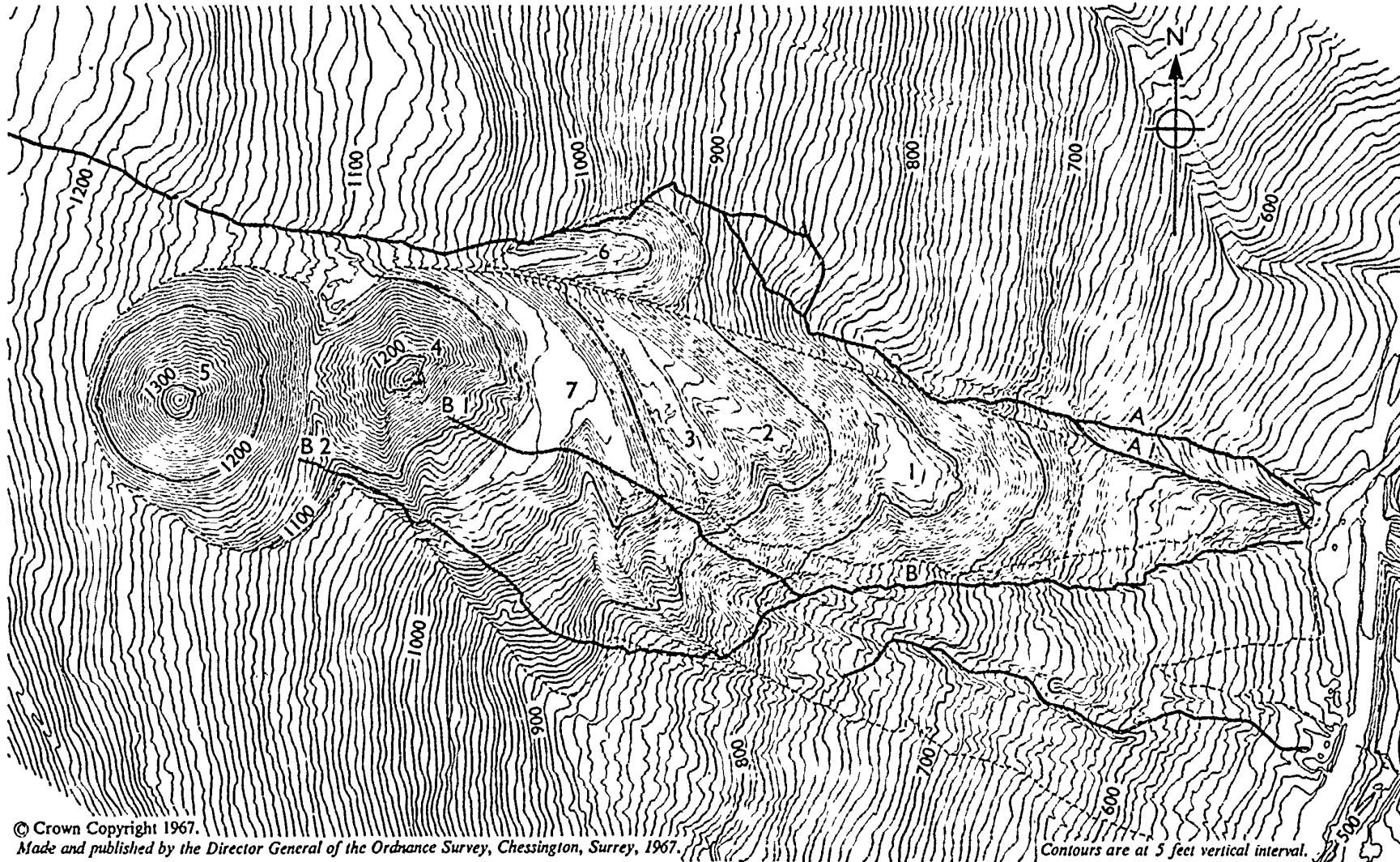


Figure 3

Figure 4



© Crown Copyright 1967.
 Made and published by the Director General of the Ordnance Survey, Chessington, Surrey, 1967.

28. Tip 1 rose to a height of 85 feet and (like all the tips except Tip 7) was composed of mine rubbish, the discard from the coal preparation plant and boiler ash. It is estimated to contain about 235,000 cubic yards of material.

Tip 2 was begun in 1918 and rose to a height of 90 feet and had an estimated content of about 574,000 cubic yards.

Tip 3, begun in 1925, rose to a height of 130 feet, the estimated contents being about 210,000 cubic yards.

Tip 4, begun in 1933, rose to a height of 147 feet and was not used after November, 1944, when a large part of the tip slipped a considerable distance down the mountainside. It is estimated to have contained about 572,000 cubic yards.

Tip 5 was begun early in 1945 and rose to a height of 171 feet by 1956, having an estimated content of about 706,000 cubic yards.

Tip 6 was begun in 1956 and was stopped in 1958 because of complaints from a nearby farmer that material from the tip was spilling over on to his land. It rose to a height of 56 feet and is estimated to contain about 67,000 cubic yards.

Tip 7—the disaster tip—was started at Easter 1958 and continued in use up to the time of the disaster. It was then estimated to be about 111 feet high and to contain about 297,000 cubic yards of waste, including about 30,000 cubic yards of a material known as “tailings” which the other tips did not contain.

3. The Method of Tipping on Tip 7

29. The method of tipping employed in connection with Tip 7 was somewhat obsolescent; evidence was given that it was still in use at only two or three other collieries in South Wales in 1966. The rubbish from the pit, whether it came direct from the mineshaft or from the coal preparation plant or from the boilerhouse, was loaded into trams at the surface of the mine. When enough trams were filled to form a “journey” or train they were hauled by ropes by means of a series of stationary engines along a track which climbed up the side of Merthyr Mountain. When the journey reached the engine-house at the top of the incline it was halted and then the trams were allowed to run by gravity (being braked by a rope) to a junction—or “parting”—and thence to a place near the point of the working tip where the crane stood on its own short length of railway track. This crane was used to lift the full tram into the air, to turn it upside down and empty out the contents so that they fell down the front or sides of the tip according to the position of the crane jib. This done, the crane then landed the empty tram on a metal plate, from which it was directed on to another set of rails leading back to the parting. These operations were carried out by a crane-driver and a gang of slingers whose work consisted in attaching and detaching the chains of the crane, all under the general control of a charge-hand. Before the tipping gang left the tip each night, it was their custom to bring the crane back from its working position at the front edge of the tip to a point as far back as the short length of railway track permitted.

4. The Springs and Watercourses of Merthyr Mountain

30. “Water is undoubtedly the root cause of most failures” said counsel for the National Coal Board in his closing address to the Tribunal. This indeed appears to be the case. In the course of our investigation we were obliged to consider a number of tip-slides, no less than three of which (including the disaster

slide) occurred on the same mountain within a space of less than 25 years and of which we must say a great deal in this report. But three slides had one thing in common. We quote from the report of experts engaged by the National Union of Teachers:

“The slips of 1944, 1963, and 1966 resulted from the fundamental mistake of tipping over surface streams and springs or seepages emanating from permeable strata forming the sloping hillsides without taking any preliminary drainage measures”.

31. Merthyr Mountain receives a fairly high annual rainfall, of the order of 60 inches, and, as indicated above, there are a number of permanent streams and springs on its eastern side which slopes down towards Aberfan. The course of these streams and the location of some of the springs are clearly shown on three Ordnance Survey maps prepared before tipping began on Merthyr Mountain. The earliest survey was in 1873 and the map published in 1874 at a scale of 1 in 2,500. There was a second survey in 1898 and the map published in 1900, being again revised in 1914 and published in 1919. These three maps all show the same streams in the area where tipping subsequently took place. The Geological Survey map also shows that the tipping area is intersected by a spring line along the Brithdir coal seam. When one plots upon these maps the tips as they were immediately before the disaster, it will be seen that as shown in Figure 4, Tips 4, 5 and 7 are all directly over watercourses and that Tip 7 extends over the spring line. What happened to each of these tips is of considerable significance. Tip 4 slid down the mountainside in 1944; Tip 5 developed a large bulge at its foot on its south-eastern side, and Tip 7 became the disaster tip. Tips 1, 3 and 6, on the other hand, were situated on saddles of land between streams and their stability has given no cause for concern.

32. The ground beneath the tipping area was affected to a greater or lesser extent by subsidence caused by mining operations at Merthyr Vale colliery. It was not suggested that subsidence caused the disaster, but some of the expert witnesses thought that it might have contributed to its magnitude in the following way: Water is stored in the joints or fissures in the sandstone and the effect of subsidence is to open the joints in some places and to close them in others. Beneath Tip 7 the joints were tending to open and therefore to contain more water. It was this water which, quite apart from the small springs and issues to which numerous witnesses referred, issued forth when, as is later explained (see *post* paragraph 276), a rotational slide of the tip occurred and tore away the mantle of impervious boulder clay and head which had been retaining it in the mountainside.

33. We accept as correct the view presented by Mr. Wien, Q.C., in his closing speech on Day 74 that:

“It is unlikely that there was any fixed point of emergence. It is likely that water emerged at some points where the boulder clay or the head was thin, the actual point varying according to the season and the amount of rainfall”.

Much time had before then been spent in canvassing the exact location of these issues and the tendency of the water table within the mountain to fall or rise. But it became plain to us that, as Mr. Howell Davies, the witness who farmed the land surrounding the tipping area, put it, “Streams were always there issuing from the ground before Tip 7 was started and did not dry up unless there was an extremely dry summer.” The tipping gang used to get drinking water from a

spring at the foot of Tip 7 before it extended beyond the foot of Tip 3. Children built bathing pools in dammed-up beds of the streams that came down the mountainside from the vicinity of Tip 7. One boy, Robert Short, who described the construction of such a pool in 1963, said that he and his friends used to dig holes "with shovels and bits of stick" at the foot of Tip 7 and "water used to bubble out". He added that the tip slide of that year "slipped all over the ground and over our pond".

34. It was, therefore, made abundantly clear to us that there was no lack of water in the tipping area on Merthyr Mountain and especially in the area covered by Tip 7 as it advanced in a southerly direction. It was this water that counsel for the Tribunal, summarising the experts' opinions, rightly characterised as "for long recognised as the destroyer of the stability of refuse tips". Professor Nash, the Soil Mechanics expert called on behalf of the National Coal Board, agreed with Mr. Harding (a Tribunal member) that, as far as tipping is concerned, "Water is the source of all evil" and that it must not be allowed to get into the base of a tip. He added that failure to prevent this happening by the adoption of proper drainage measures was the real explanation of the disaster. Lest it should be thought that there is any hindsight about any of this, it is worth quoting the immediately succeeding questions to and answers given by Professor Nash:

Q. Have you seen or heard anything during your attendance at the Tribunal or your examination of the plans, documents and other material, to lead you to the conclusion that the means of knowledge were denied the National Coal Board in 1957 when they were considering a tip site?

A. This information would have been available at that time.

Q. The information as to the taking of proper drainage measures which would have obviated this disaster was available to them?

A. Yes.

5. The Flooding of Aberfan

35. We turn to a topic which will be frequently referred to in this Report. From 1949 onwards certainly, and possibly from even earlier, there were complaints of damage to property due to flooding in the Pantglas area of Aberfan. The main areas affected were the backs of the houses in Pantglas Road in the vicinity of Pantglas Farm, especially near Aberfan Road and in the Cottrell Street area. The flood water was frequently between 2 feet and 2 feet 6 inches in depth and under the Black Bridge over the Aberfan Road it reached a depth of 7 feet on one occasion.

36. In his opening address the Attorney-General told us that between 1952 and 1965 severe flooding occurred on at least eleven occasions and probably more. Flooding continued even while the Tribunal was sitting and it is not surprising, therefore, that this topic was frequently referred to by many witnesses because of the effects it had on dwelling houses and on roads. Many witnesses described the flood water as filthy and complained that it left a slimy black deposit. This deposit was greasy and sticky and was much resented by those whose homes it had entered. Complaints were frequently made by local inhabitants and local organisations to the Borough Council, and the latter, in turn, were in correspondence with the National Coal Board on the subject almost

since the introduction of nationalisation. Mr. Bradley, the Deputy Borough Engineer, said that he first became involved in such correspondence as long ago as 1949. Councillor J. Williams, when asked by Counsel for the Corporation whether there had been complaints arising because of the flooding said, "Terrible complaints. I do not think there is any village that has suffered more than our village, and I will say the whole of the village—Merthyr Vale, in the region of Pantglas, in the region of Moy Road and Cottrell Street and in the region of Bryntaf. I do not think anybody has suffered more than we have suffered as far as what people have had to put up with for many, many years re flooding." When asked whether he, as one of the representatives of the village of Aberfan on the Borough Council, had done his utmost in respect of this flooding he replied:

"Everything that was humanly possible, sir; I, together with my colleagues, tried and tried again. What worried me more than anything was the flooding which was occurring directly on the north side of Pantglas, and when the floodings occurred it was pathetic to see the children who had to go to school from The Grove. On many occasions these children had to walk over the top of the tips, which constituted a grave danger because of the ropeways, the rope working the haulage taking the tram to the tips. The only other way they could go through there was to walk or to be brought through in buses, and that went for the adults as well. It was most pathetic to see the condition in that particular area, and that had gone on for many years. It was surprising to see the amount of slurry, or whatever you call it, silt, that was coming down from the mountainside into these various parts of Aberfan."

37. Among the organisations which regularly forwarded complaints to the Council were the Merthyr Vale Ward Labour Party, and a typical letter illustrative of their concern was sent to the Merthyr Tydfil Town Clerk on the 16th December, 1964. This letter so far as it relates to Aberfan, reads as follows:

Dear Sir,

Further serious flooding at Aberfan and Merthyr Vale

My Ward Party have again asked me to draw the attention, once again, of the Borough Council to further very serious flooding in various parts of the ward. We are aware and grateful for the efforts of our local councillors, and your Council, and its officers to alleviate this continually recurring danger, but feel that more drastic and urgent steps must now be taken.

a) *Flooding near Social and Democratic Club at Aberfan*

This weekend flooding at this spot, which still continues, despite the strenuous efforts of Council workmen, is a source not only of great inconvenience but very real danger, particularly to children. The tons of shale and slurry that have blocked water courses and drains prove very conclusively the responsibility of the National Coal Board in this matter, and drastic action, even if it means prosecution, should be taken to convince them they have a civic responsibility to the residents of the neighbourhood.

.....

Through the years we have drawn the attention of the Council, continually, to the flooding. We find it is time for immediate and effective action.

We would like to pay tribute to your public works staff. But for their herculean efforts, the position, bad as it was, would have been much worse.

I shall be glad if you will bring this letter to the immediate notice of your Council.

I am,

Yours faithfully,

Signed: RONALD R. SCRIVEN.

38. At the same time as this letter was sent, or shortly thereafter, the parents of children living in The Grove brought a petition to Miss Jennings, the headmistress of the junior school (who herself later became one of the victims of the disaster), complaining of the danger caused by this flooding to pupils coming to school from that area. Miss Jennings forwarded the petition to the Director of Education and it was later considered by the General Purposes Committee of the Corporation.

39. The correspondence between the Corporation and the Coal Board has been referred to in other connections elsewhere in this Report, but on only one occasion (namely in 1959) did the Corporation issue a statutory notice under the Public Health Acts requiring the National Coal Board to abate the flooding nuisance. This resulted in some temporary remedial action being taken by the Board and the notice was withdrawn. Even after this, however, in the following year we find a local resident writing to the Area Mechanical Engineer of the Board as follows:

Sir,

Friday 28th October, 1960

I am writing on behalf of all the people in *Pantglas Road, Aberfan* who are worried almost to distraction by the flood-water—which once more almost ruined our homes last night. It was only by standing up to our knees in water for several hours did we manage to prevent it entering our homes.

We really think the time has come when something was done about it, I have been living here 12 years and four times I have had my rooms flooded, each time your people have given us promises which are never carried out. Last time they did bring along a machine which cleared the lane, but the wall which was to be built to hold back the tip, was unfortunately forgotten with the result, within a few months we were back in the same mess again.

It is not just the furniture, carpets etc. which we have to worry about but the permanent damage being done to the very foundations of our homes.

I trust you will give this matter your immediate attention.

Yours faithfully,

Signed: D. M. JOHN, 35 Pantglas Road.

40. A series of meetings was held in the first half of 1965 between representatives of the Borough Council and of the Board and some degree of liability for the clogging of the drainage pipes and consequent flooding was admitted on behalf of the Board. But it was not until after the disaster, indeed on Day 55

of the Inquiry, that the Board announced that they were building a completely new culvert to take water from the mountain right into the River Taff, at a cost of some £20,000. When Counsel for the Board was questioning Mr. Bradley, the following passage occurred, "And that new water course, culverted, will cope, you have no doubt at all have you, with the water coming from the mountain? A. That would be my information, yes. Q. So, for the first time for thirty-six years perhaps, if not longer, the residents of Aberfan can now look forward to a trouble-free time as regards flooding? A. Yes. That will be a lovely prospect."

41. We have set out these examples of complaints made by the inhabitants of Aberfan—and there were very many more which we might have quoted—in order to illustrate the state of mind in the village and to explain why there was so much concentration on the menace of flooding, perhaps to the disregard of the even greater menace which threatened them. We do not claim to understand even today why the Borough Council and the National Coal Board were unable to reach an amicable settlement of what appears to be a simple drainage problem and so avoid a great deal of misery in the village over many years. The former can no more be acquitted of lack of vigilance than the latter can be absolved from grave failure to face up to their substantial responsibility in relation to what was for decades undoubtedly a scandalous state of affairs.

6. The events leading up to the Disaster

42. In his closing address, Mr. Tasker Watkins, Q.C., observed with force and accuracy that, "In the six months which have elapsed since the disaster at Aberfan took place, one thing above all else has become clear: It is that the subject of coal tip stability has received less consideration from the National Coal Board and possibly its predecessors than any other aspect of coal-mining, despite the well-known occurrences of tip slides in South Wales which alone should have caused the subject to receive a careful and special study.

It is true that previous slides had not taken a single human life, nor, as far as is known, caused physical harm to anyone. But such good fortune, you may think, flowed from Providence rather than from human design. Fate was tempted once too often when Tip 7 was allowed to grow to such a massive size on the Merthyr Mountain so close to Aberfan, which has been a mining village for almost a century. It was, unfortunately, an open invitation to Fate to neglect to keep it free from the effect of water, for so long recognised as the destroyer of the stability of refuse tips".

43. In dealing with the question, Need the disaster have happened? it is, of course, necessary to consider the events which preceded it and the extent of the information (recorded in writing or forming part of the fund of common knowledge) available to all who were concerned with the siting, working and supervising of colliery tips. This is essential if one is not to fall into the grave error of judging by hindsight, of assessing the acts or omissions of men in the light of knowledge denied to them because either such knowledge did not exist at the material time, or, if it did, it was not then in general circulation. For example, much has been learnt about the science of Soil Mechanics in recent years which even civil engineers were ignorant of a few decades ago, and it would be wrong to judge any man according as to whether he possessed or lacked acquaintance with some of its more esoteric features. Indeed, while Soil Mechanics has much

to teach us and, it is to be hoped, will be increasingly employed in civil engineering tasks in the future, we have thought it right and fair, in considering this question of whether any person or body was to be blamed, to apply simply the broad, common-sense standards up to which any reasonably intelligent man could be expected to measure.

44. Applying such standards, a landmark in the growth of knowledge relevant to our inquiry was the delivery by Professor George Knox in 1927 at the South Wales Institute of Engineers in Cardiff of a paper entitled "Landslides in South Wales Valleys". It was an outstanding contribution and became widely known among mining engineers in South Wales. These included Mr. Geoffrey Morgan, who first saw it in his student days in 1927, had studied it since, and accepted that it was regarded as the leading work on the depositing of spoil heaps upon hillsides. Professor Knox then gave full warning of the menace to tip stability presented by the uncontrolled presence of water. In the course of the ensuing discussion, in which many mining engineers joined, he uttered the sombre prediction that, if you do not pay for drainage, you will have to pay for landslides in other ways, and Mr. Richards, one of the many mining engineers who participated in the discussion, said:

"The convincing manner in which Professor Knox has marshalled the facts will be appreciated by geologists and particularly by mining engineers; and it is to be hoped that as a direct result of his researches, mining engineers will make a more careful investigation of so-called suitable ground for colliery tips. Neglect of this precaution might land the colliery companies into litigation and compensation damages might easily be the last straw for the already overloaded colliery camel".

Here, forty years before it occurred, we have the basic cause of the Aberfan disaster being recognised and warned against. But, as we shall see, it was a warning which went largely unheeded.

45. We are not here concerned to enquire whether, as a result of what had happened in the past, those connected with and responsible for Tip 7 should have foreseen a slide which might well involve the village of Aberfan. Had they foreseen a disaster of these dimensions and yet done nothing about it, their condemnation would need to be far more strongly expressed than if, while fearing a slide, the possibility of its reaching the village never occurred to them. Nevertheless, blame, though of varying degrees, would attach in both cases. Our own view upon this aspect of our task was in fact clearly and succinctly put by Mr. Tasker Watkins, Q.C., and we adopt his words:—

"It has been asserted by many witnesses that no one could foresee that if there was a slide of No. 7 tip the village would be involved. Such an assertion can absolve no one from criticism for a failure to care for the stability of tips . . . Only a short way below the tip stood the old farmhouse of Hafod-Tanglwys-Uchaf which, as we know, was inhabited at the time of the disaster. Men and women, we have been told, took their leisure upon the mountain below the tips: children played and had lessons in nature study there. All these people were owed the duty of being kept free from harm from the tips. So that the debate upon whether anyone ever thought the material would slide as far as the village is unnecessary and largely irrelevant to determine what should have been foreseen in order to bring into being proper safety precautions.

My lord, the place for colliery waste was upon the tip: the duty of the owners of it, the National Coal Board, was to keep it there. The moment this situation changed by a fall of the tip on the mountain land below, of no matter what dimensions, the danger of a breach of that duty arose, as did a situation which called for careful and conscientious investigation."

Mr. Morgan, the South Western Division Production Director, stressed in his evidence that, although there are some 500 coal-tips in South Wales, the trouble which they have given is "infinitesimal". But a general observation of this kind can be misleading, as in the present case it is. It is true that flow-slides of the kind which produced the disaster are rare, but those who are minded to talk of "unforeseeability" are confronted by the startling fact that three such flow-slides have occurred at Aberfan itself within a span of less than twenty-five years (that is, in 1944, in 1963, and in 1966) and a fourth less than five miles away just a few years earlier.

46. The stark truth is that the tragedy of Aberfan flowed from the fact that, notwithstanding the lessons of the recent past, not for one fleeting moment did many otherwise conscientious and able men turn their minds to the problem of tip stability. With all respect to Mr. Geoffrey Howe, Q.C., no such "intuitive flash", "jump in comprehension" or "leap in awareness" as he spoke of was called for. These men were not thinking and working in a vacuum. All that was required of them was a sober and intelligent consideration of the established facts. When Mr. Desmond Ackner, Q.C., accused the National Coal Board of "eight years of folly and neglect" since Tip 7 was started in 1958, he used hard words. But we cannot conscientiously say that they are unmerited, when one has regard to (a) the accumulated knowledge of the capacity of tips to slide if badly sited or otherwise neglected, and (b) the vivid exemplification of this knowledge by comparatively recent events even in the South Western Division itself.

47. On the other hand, we reject out of hand Mr. Ackner's observation that what has been revealed here is "callous indifference" by senior National Coal Board officials to the fears of a tip-slide expressed to them. Callousness betokens villainy, and in truth there are no villains in this harrowing story. In one way, it might possibly be less alarming if there were, for villains are few and far between. But the Aberfan disaster is a terrifying tale of bungling ineptitude by many men charged with tasks for which they were totally unfitted, of failure to heed clear warnings, and of total lack of direction from above. Not villains, but decent men, led astray by foolishness or by ignorance or by both in combination, are responsible for what happened at Aberfan. That, in all conscience, is a burden heavy enough for them to have to bear without the additional brand of villainy.

48. The incidents preceding the disaster which we consider later in this Report (*post* Part IV, Section A) should, in our judgment have served (whether they were regarded individually or collectively) to bring home vividly to all having any interest in coal-mining that tips placed on a hillside can and do slip and, having started, can move quickly and far; that it was accordingly necessary to formulate and maintain a system aimed at preventing such a happening; and for that purpose to issue instructions, disseminate information, train personnel, inspect frequently and report regularly. These events were so spread out over the years that there was ample time for their significance to be reflected upon and realised and so to lead to effective action. But the bitter truth is that they were allowed to pass unheeded into the limbo of forgotten things.

PART II

WHAT HAPPENED AT ABERFAN?

49. At about 9-15 a.m. on Friday, October 21st, 1966, many thousands of tons of colliery rubbish swept swiftly and with a jet-like roar down the side of the Merthyr Mountain which forms the western flank of the coal-mining village of Aberfan. This massive breakaway from a vast tip overwhelmed in its course the two Hafod-Tanglwys-Uchaf farm cottages on the mountainside and killed their occupants. It crossed the disused canal and surmounted the railway embankment. It engulfed and destroyed a school and eighteen houses and damaged another school and other dwellings in the village before its onward flow substantially ceased. Then, in the words of the Attorney-General:

“With commendable speed, the work of attacking this seemingly ever-moving slimy, wet mass began as people strove to release the afflicted. Essential services were brought to the village and there began the unprecedented and Herculean task of recovery. People came in their hundreds from far and wide to lend their hands, whilst from the local collieries there hurried the officials and the sturdy experienced colliers to use their strength and skill as never before”.

But despite the desperate and heroically sustained efforts of so many of all ages and occupations who rushed to Aberfan from far and wide, after 11 a.m. on that fateful day nobody buried by the slide was rescued alive. In the disaster no less than 144 men, women and children lost their lives. 116 of the victims were children, most of them between the ages of 7 and 10, 109 of them perishing inside the Pantglas Junior School. Of the 28 adults who died, 5 were teachers in that school. In addition, 29 children and 6 adults were injured, some of them seriously. 16 houses were damaged by sludge, 60 houses had to be evacuated, others were unavoidably damaged in the course of the rescue operations, and a number of motor cars were crushed by the initial fall. According to Professor Bishop, in the final slip some 140,000 cubic yards of rubbish were deposited on the lower slopes of the mountainside and in the village of Aberfan, whilst the amount actually crossing the embankment is estimated, very approximately, to have been about 50,000 cubic yards.

50. The disaster tip—No. 7 in the series forming the tip complex on the Merthyr Mountain—contained a vast quantity of loosely-tipped, uncompacted material which had become over the years saturated with water in its lower parts. We must later consider in detail the march of events and the views advanced by the various expert witnesses, but it may be helpful at this early stage to quote the clear description of what happened given by one of the civil engineers—Mr. G. M. J. Williams—who so greatly assisted the Tribunal:

“On the morning of the 21st October, 1966, there were several movements within the tip . . . and shortly after 9 o'clock there was apparently another movement, but in this case it took part of the saturated material past the point where liquefaction occurred. This initially liquefied material began to move rapidly, releasing energy which liquefied the rest of the saturated portion of the tip, and almost instantaneously the nature of the saturated lower parts of Tip No. 7 was changed from that of a solid to that of a heavy liquid of a density of approximately twice that of water. This was ‘the dark glistening wave’ which several witnesses saw burst from the

bottom of the tip. The upper part of the tip, not being saturated, did not liquefy but some of it would be carried forward floating on the liquefied material, whilst the rest dropped into the hole that had been left in the face of the tip. Being of the nature of a liquid the whole mass then moved very rapidly down the hillside, spreading out sideways into a layer of substantially uniform thickness. As this happened, water was escaping from the mass so that the particles of soil regained their contact and the soil mass returned to its solid nature. Unfortunately, a part of the liquefied mass flowed over the railway embankment and destroyed the schools and the houses in Moy Road.”

51. The day had begun windless and sunny, except for a belt of mist which filled the lower parts of the valley and prevented people in the village from seeing the tips on the mountainside. The men working at the top of the tip were above the mist and could see, projecting from it, the top of the colliery stack. Lessons at the junior school began at 9 o'clock. But at the senior school lessons did not begin until half-past nine, so that while the younger children were already engaged at their studies the older ones were making their way towards school. At about 9-15 a sound was heard, variously described as being like thunder, or of a low flying jet plane or as though loose trams were running down an incline. Howard Rees, a pupil at the senior school, was making his way up the Moy Road towards the school when he saw what he described as a big wave of muck higher than a house coming over the old railway embankment and heading straight towards him. In this muck he could see boulders, trees, trams, bricks, slurry and water. To him it appeared to be “moving fast, as fast as a car goes in a town” and to be accompanied “by a rumbling noise like an old train going along”. This moving mass hurled itself against the two schools and the houses which stood between them. Outside one of those houses three of Howard’s schoolfellows were sitting on a wall and he saw them buried, crushed and killed. He and some other boys who were on their way to school were fortunate to escape with their lives, though some of them were struck by flying pieces of material.

52. At this same time Mr. George Williams, a hairdresser, was making his way to his shop in Moy Road when he heard a noise “like a jet plane” which he thought came from the tip. He could see nothing at that moment because of the fog, but soon saw the windows and doors of Moy Road houses crashing in “. . . like a pile of dominoes coming down”. He too was struck by flying material and would have been buried had he not been protected by a piece of corrugated sheeting which acted as a shield to him until he was rescued by some Council workers. In a memorable phrase he told the Tribunal that after the tip fell everything went suddenly quiet, just like turning off the wireless, and he added, “In that silence you couldn’t hear a bird or a child”.

53. At the moment when disaster struck, Mr. Kenneth Davies, acting-headmaster of the senior school, the Pantglas County Secondary School, was getting ready to receive his staff and pupils for the lessons which were to begin at 9-30 a.m. His description of the terrifying events must be quoted. He was in the assembly-hall when:

“ . . . I heard a sound which to me appeared to be a jet plane screaming low over the school in the fog. Immediately following that there was a bang and the part of the school I was in shook, and some girl-pupils . . . came

running and screaming into the hall . . . When passing the Needlework Room I noticed that the furthest corner had collapsed and the roof had started to collapse into the room as well. . . The Girls' Entrance was approximately two-thirds to three-quarters full of rubble and waste material . . . I climbed onto the rubble in the doorway . . . I was still looking for this plane, and when I looked directly in front of me . . . I saw that the houses in Moy Road had vanished in a mass of tip-waste material and that the Junior School gable-ends, or part of the roof, were sticking up out of this morass. I looked down to my right and I saw that the Moy Road houses had gone . . . Around the outside edge near the school where I was standing it would have been firm enough to stand on. I was standing on the outside edge."

The witness in fact climbed up the side of the heap, which was some 25-30 feet high. With the remarkable discipline and heroic absence of panic which teachers and pupils alike exhibited at this dreadful time, the headmaster and his staff then evacuated the school and gathered their pupils at the front for a roll-call, but its completion was prevented by a rush of filthy water which brought more waste material with it. Through this swirling water the teachers guided and sometimes carried their pupils out of danger. "The children were wonderful", said Miss G. E. Evans, the deputy headmistress. So also, in our view, were the staff, and we here desire to record and re-iterate the tribute to their devotion to duty that we expressed during the hearing of the Inquiry.

54. For some time afterwards water continued to pour down from the mountainside and also from two large water pipes (owned by the Cardiff Corporation and by the Taff Fechan Water Board) which had been laid in the bed of the disused canal and which were broken by the slide of tip material. These pipes carried water from reservoirs in the Brecon Beacons to Cardiff and elsewhere and, although steps were promptly taken to have the supply turned off, it was not until 11-30 a.m. that the flow from them ceased. As invited by the two Water Authorities, we willingly state that we are entirely satisfied that (1) in the circumstances they acted with due expedition and (2) no avoidable damage was caused by the escape of water from the mains.

55. We now turn to consider events from the viewpoint of the gang of men working at the top of the tip. They had arrived there shortly before 7-30 a.m. But their charge-hand (Mr. Leslie Davies) was not with them at that time because, it being a Friday, he had to render his weekly report to the Unit Mechanical Engineer (Mr. Vivian Thomas) down at the colliery. When Mr. Gwyn Brown, the crane-driver, and Mr. David Jones, a slinger, arrived at the point of the tip they found that it had sunk by about nine or ten feet and that two pairs of rails, forming part of the track on which the crane moved, had fallen into the depression thus created. Mr. Gwyn Brown did not like the look of this and suggested that Mr. David Jones should go down and report it to Mr. Leslie Davies at the surface of the mine. Mr. David Jones accordingly set off down the mountain. (It was necessary to send a messenger because, although there had formerly been a telephone on top of the tip, it had been removed because the wire connecting the tip with the mine had been repeatedly stolen.) While Mr. David Jones was on his way down, Mr. Gwyn Brown used the crane to recover the tram landing-plate from the depression in the tip and then, with the help of others in the gang, he moved the crane further back from the edge of the tip.

Figure 5



56. Mr. David Jones made his report to Mr. Leslie Davies and advised him in his turn to make a report to Mr. Vivian Thomas, the Unit Mechanical Engineer. According to Mr. Leslie Davies, he did just that, telling Mr. Thomas of the 10-foot sinking. Mr. Thomas, on the other hand, testified that the sinking reported to him was one of 20 feet. As to this we prefer and accept the evidence of the charge-hand, Leslie Davies. What is beyond dispute is (a) that Mr. Thomas then sent men with an oxy-acetylene burner to sever the overhanging rails and gave directions for the crane to be pulled back as far as possible from the point of the tip, and (b) that Mr. Thomas then instructed Mr. Leslie Davies to stop tipping on No. 7 and added that on the following Monday he would himself go up to the tip complex in order to start tipping in a fresh place. Mr. Leslie Davies, Mr. David Jones and the two men with the burning equipment arrived at the top of the tip at about nine o'clock. They then found that the point of the tip had sunk another 10 feet, so that at that time it was beyond question 20 feet below its normal level.

57. Mr. Leslie Davies told Mr. Gwyn Brown of his instructions to move the crane even further back and suggested that they all have a cup of tea before doing so. Mercifully, this is what they did, retiring to a nearby cabin for the purpose. Had they brought the crane forwards to its usual working position and started on their tipping work, the strong probability is that they would all have gone down with the slide. But Mr. Brown, the crane-driver, remained behind while the others went off to their cabin, and what he then saw is best told in his own words. He said:

“I was standing on the edge of the depression. I was looking down into it, and what I saw I couldn't believe my eyes. It was starting to come back up. It started to rise slowly at first. I still did not believe it, I thought I was seeing things. Then it rose up after pretty fast, at a tremendous speed. Then it sort of came up out of the depression and turned itself into a wave—that is the only way I can describe it—down towards the mountain . . . towards Aberfan village . . . into the mist.”

Mr. Brown's shout brought out the rest of the tipping gang from their cabin, and the story was taken up by the charge-hand, Mr. Leslie Davies, who said:

“When he shouted, we all got to the top of the tip and all I can tell you is it was going down at a hell of a speed in waves. I myself ran down the side of No. 3 tip all the way down towards No. 2 and No. 1 tip on the side. As I was running down, I heard another roar behind me and trees cracking and a tram passing me. I stopped—I fell down in fact. All I could see was waves of muck, slush and water. I still kept running . . . I kept going down shouting. I couldn't see, nobody could. And I heard a voice answer me and he shouted, ‘Come out of there, for God's sake’. That man was Trevor Steed . . . I went with Trevor Steed down on to the old railway line. By that time my mates had come down with me, behind me. We went along the line as far as we could towards the school, which we could see. All the houses were down. We could not pass that way because there was too much water rushing down . . . we could not go the way we wanted to go.”

There can be no doubt that Mr. Leslie Davies was himself for some time in the gravest danger. Indeed, it is little short of miraculous that he and all his work-mates did not suffer the same fate as that which befell the 144 whose lives were so tragically terminated by this disaster.

Such, in bare outline, is what happened at Aberfan.

PART III

TIP POLICY AND RESPONSIBILITY

58. Tips are the discard of the coal-mining industry. Constituted of industrially-rejected material, hitherto they have been largely banished from thought. "In one sense", as was rightly observed by Mr. Alun Davies, Q.C., on behalf of the Merthyr Tydfil Corporation, "it can be said that the responsibility for the tragedy of 1966 is the accumulated responsibility of generations. When the first tramload of material was deposited on that steep mountain slope, it could be said that responsibility started. Should large quantities of material *ever* be deposited on slopes of this character? . . . When you place a large accumulation of material on a steep mountain slope, there must inevitably be a potential danger of it hurtling down the mountainside". Economic considerations have largely, if not solely, determined where they were placed. As Mr. Wynne, the Manager of Merthyr Vale Colliery, said "The type of land which is normally allocated at collieries for tipping sites is some of the lowest value that cannot possibly be used for any other purpose, and sometimes they are not good sites".

59. When earthworks and dams are constructed, there is a well-established Code of Practice as to the precautions to be observed in their siting, construction and maintenance. But as to coal-tips it is quite otherwise. Over the years the lovers of beauty have cursed their ugliness, but their *stability* has received negligible attention. Symptomatic of this is that in No. 4 Area not a single survey of the Aberfan tip complex was ever made by the employers, and they were obliged to concede that such survey-maps as they produced (both for internal use and to the Town Planning Officer) were ludicrously inaccurate. Asked by the Tribunal Chairman whether there had ever been a survey of the Aberfan tip complex, Mr. Wright (No. 4 Area General Manager) not only gave a negative answer but amplified it by saying, "It has never been the practice. I have been in management ever since 1940 and I have never known the practice to keep an up-to-date plan of surface tipping. The only time they have been surveyed is when there has been some reconstruction necessary, but I have never known it to be a common practice to have a plan like a mine-plan in an office. In other words, they are not surveyed regularly and consistently". Nor, he might have added, were they *ever* surveyed in Merthyr Vale, although Mr. Geoffrey Morgan told the Tribunal that:

" . . . the Board do carry out a tremendous amount of surface surveying, and indeed there has been a great deal of surveying of tips in this Division. Merthyr Vale seems to be rather a gap in that respect."

If indeed it be the case that the absence of any surface surveys of Merthyr Vale was a solitary gap in an otherwise regular system of surveying, the failure to notice this lacuna and (if noticed) to do anything about filling it is something which no-one attempted to explain to the Tribunal.

60. Those who expressed their fears regarding the stability of the disaster tip were brushed aside by National Coal Board officials. Others may have entertained doubts about it, but the reflection that to stop tipping could bring about the closure of the Merthyr Vale Colliery may well have led to the quick suppression of those doubts, so vividly remain in the South Wales valleys the grim memories of long years of widespread unemployment. Almost two days of the hearing were taken up by the question of whether this colliery had been

placed by the Board on the list of those undertakings whose continued existence was doubtful. It eventually emerged with certainty that it never had, and that the contrary impression entertained by Mr. S.O. Davies, the Member of Parliament for Merthyr Tydfil, had been formed as the result of his perusing a document prepared in October 1965 by Mr. William Whitehead, who was then President of the South Wales Area of the National Union of Mineworkers. Of this document the Board had absolutely no knowledge and its author himself described it as "most inaccurate". How such gross inaccuracies as the document contained ever came about was in no way made clear to the Tribunal, nor was it necessary for us to pursue the matter to finality. It is, however, one thing to say that Merthyr Vale Colliery, with its tipping facilities unimpaired and unimpeded, was in no danger of being closed down. It is quite a different thing to say that fears of a closure were groundless even in the event of tipping being restricted. Mr. Alun Davies, Q.C., was being entirely realistic when he observed:

"Accepting as I do, at any rate after 1963, that there was no intention on the part of the Board to close the Merthyr Vale Colliery, *two* things must be said—that without the tipping facilities which were available on Merthyr Mountain the future of the colliery was to some extent endangered or imperilled; and, having regard to the accelerated process of the closure of collieries in South Wales, there might well be an overriding fear that disaster would fall upon the village."

Indeed, the National Coal Board itself established the validity of these observations by the letter which its No. 4 Area Estates Manager sent to the Town Clerk of Merthyr Tydfil on November 4th, 1965. Applying for planning permission for the diversion of certain overhead lines, Mr. W. D. Llewellyn wrote:

"I feel that when the under-mentioned points are specifically mentioned in connection with the application, your Council will appreciate the importance of this overhead line diversion to Merthyr Vale Colliery. As you are aware, the Board intends reorganising the tipping facilities at Merthyr Vale Colliery. This diversion is an essential part of that scheme, and if consent is not granted, then the tipping life of the area will be curtailed, with a possible similar reaction on the life of the colliery. . . ."

61. All this is not to say that we think that people who entertained fears that a tip-slide might reach the village deliberately and consciously failed to do anything about it lest any action taken might lead to a pit closure. It is true that Mr. S. O. Davies, the Member of Parliament for Merthyr Tydfil, told the Tribunal that before the disaster he entertained the thought that Tip 7 "might not only slide, but in sliding might reach the village"; that when he expressed this fear to miners in Aberfan they told him "You make a row about that and what will happen? They will close down the blessed colliery"; and that it was the continuing fear of closure that prevented him from taking any action in regard to tip stability unless he was expressly asked to do so. We quote from the transcript of his evidence:

"*CHAIRMAN* . . . You have told us that you had entertained a fear that not only might the tip slip but it might reach the village, and, reaching the village, might involve risk to life. Is that right so far?

A. Yes, certainly.

- Q. What each and every one of the members of the Tribunal want to establish is this: If you entertained in your mind the substantial fear of risk to life, what did it matter whether people asked you to take steps or not? Why not take them, if there was a risk to life?
- A. If I had taken them I have, my lord—permit me to say this . . .
- Q. Certainly.
- A. . . . more than a shrewd suspicion that that colliery would be closed.
- Q. Then are we to understand that you went through the tortuous, and no doubt tortured, process of thought of weighing one against the other, the risk to life on the one hand and the risk of colliery closure on the other, and came down in favour of taking no action which might risk colliery closure? Mr. Davies, think about the question. You understand it is a question of considerable gravity.
- A. Yes, I have thought, if I may say so. But I had to consider the general feelings and the desires of the mass of people in that ward; and if I had had an official approach made to me about that tip, I should not like to tell the Inquiry that we could have stopped it, quite frankly. But if I had been *asked* to do so I would have done it.
- Q. Thank you.
- A. Whatever the consequences about the colliery.”

62. Inviting us to reject this evidence, which was strongly challenged by the National Union of Mineworkers, Mr. Brian Gibbens, Q.C., said:

“If Mr. S. O. Davies is to be accepted as truthful and accurate in his recollection—I am not suggesting, of course, that he is deliberately untruthful—then he bears what must be one of the largest personal burdens of responsibility for the disaster. Though your Lordship asked him twice to think before he spoke, and pointed out what a grave answer it was he was invited to give, he readily assumed—more than any other individual in this case—a knowledge of danger and absolute inactivity in dealing with it.

My lord, he was in a special position: he was not only well-known and highly regarded in the Borough but he was a Member of Parliament and had been for thirty years and if anyone could have exercised influence to overcome an obdurate or ignorant monolith like the Coal Board he was well placed to do so. But he has said that he knew of the dangers better than anyone else; he could see them plainly. He worried about them for years, but apart from mentioning the subject to miners he met about the place he appears to have never mentioned it either to the Borough Council or even to the Union, or even to the Ward Labour Party, whose letters written about that time that I quoted to Mr. S. O. Davies bear no sign of apprehension that he could have expressed to them.

That, my lord, is quite remarkable: and you will remember that he said that he knew the history of these tips and the history of Merthyr Vale Colliery. He said it was because he knew that, as well as the odd miners or whoever he spoke to—when I say “odd miners” I mean the individuals, as distinct from any of the bodies I have mentioned—that they expressed

fears of closure, which was consistent, he said, with his knowledge of the history of Merthyr Vale, which had its ups and downs—now liable to closure, at other times not.

My submission is that his evidence is to be totally rejected on this point because at the very beginning it is incredible that a man in his position, conscious of the dangers that he says he was conscious of, would have taken no step to deal with the matter. I am sure, though invited by the Tribunal to pause and think what he was saying, he never appreciated what in fact was the import of his words.”

We have thought it right to quote from the evidence of Mr. S. O. Davies, but he was the only witness to give such testimony and, like Mr. Gibbens, we doubt that he fully understood the grave implication of what he was saying. Were we convinced that he did, and (further) that his recollection was accurate and unaffected by hindsight, he could not, for the reasons indicated by Mr. Gibbens, escape censure.

63. In his closing address to the Tribunal, counsel for the National Coal Board stated:

“I wish to say in unequivocal terms that blame for the disaster must rest upon the National Coal Board. Responsibility begins with management. Clear instructions were not given. Nor was any procedure laid down, so that both officials and workmen were left without proper guidance.”

64. Immediately after the disaster there was a meeting between the Secretary of State for Wales, Lord Robens (Chairman of the National Coal Board) and others. As a result of what he was then told, the Secretary of State, speaking of tips in South Wales, informed the House of Commons on October 24th, 1966 (Hansard, Volume 734, No. 80, Col. 646) that:

“Only eighty tips are at present in use, but the Coal Board has a regular inspection of all tips on its land, whether these tips are in use or not”.

As to this, the Secretary of State had somehow or other become grievously misinformed. During the cross-examination of Lord Robens by Mr. Brian Gibbens, Q.C. (Counsel for the National Union of Mineworkers) the following passage occurred:

“Q. Your subsequent inquiries have made it plain to you that there was no inspection procedure at all for the tips at Aberfan?”

A. Well, no regular inspection that was adequate, I would agree.”

But even that will not do. It is not a matter of inspections, made with regularity, having since proved inadequate. The simple truth is that there was *no* regular inspection of the tips. On the contrary, their inspection (such as it was) was wholly haphazard in point of time and had no reference to their stability at all, but simply related to such matters as the condition of the mechanical equipment for tipping. To assert otherwise was as wrong after the disaster in 1966 as it was in 1950, when a National Coal Board official blandly assured the Merthyr Tydfil Borough Council, “We are constantly checking the position of all these tips”.

65. In the discharge of our duty, we shall hereafter be obliged to name men who must individually be blamed for having played a part in bringing about, or failing to prevent, the disaster. But at the outset we stress that fairness demands

that they be judged in their setting and in the atmosphere of neglect of tip stability which has long prevailed in the industry. Although charged with responsibility for coal-tips, these men wholly lacked any special training to enable them to detect signs of instability, they were given no instructions how this should be done, they were not required to inspect, and apart from one solitary occasion (in 1965) they had to render no report. Tip stability is a civil engineering problem, but no civil engineers were appointed even at Area level in No. 4 Area until 1958, and none were ever appointed at Group level. Until they appeared at Area, all civil engineering matters were referred to the mechanical engineer, as they at all times continued to be referred at Group and Colliery levels. One of the most tragic aspects of the Aberfan disaster, as we shall see (*post*, paragraph 164), is that, notwithstanding the appointment to No. 4 Area in 1958 of a civil engineer of high academic and practical qualifications (Mr. Exley), responsibility for tips was once more imposed upon the Area Mechanical Engineer when the forceful Mr. D. L. Roberts was appointed to that post in 1960, notwithstanding that he wholly lacked knowledge of civil engineering.

66. But it would be wrong to regard the National Coal Board as the originators of the "system" (such as it was) regarding tips which prevailed in 1966, for it existed long before nationalisation of the coal-mining industry and it was carried over from the days of private ownership. Thus, the Royal Commission on Safety in Mines (1938) made a leisurely and in many respects detailed examination of its subject, but its 500-page report makes no mention of tips or tipping. Its recommendations formed the basis of the Mines and Quarries Act, 1954, which merely declares (Section 180) that spoil heaps form part of a mine for the purposes of the Act but again does not concern itself with their safety and stability. The topic has never been considered by either the Mining Qualification Board or the Mining Research Advisory Board, and has been ignored in Town and Country Planning legislation.

Her Majesty's Inspectorate of Mines and Quarries

67. In the absence of statutory provisions imposing responsibility upon them for tip safety, it is perhaps not very surprising that Her Majesty's Inspectorate of Mines and Quarries appear to have given no thought to the subject. Indeed, we were candidly told by Mr. Leigh (Her Majesty's Divisional Inspector of Mines) that his departmental instructions contained no reference to colliery tips and that such inspections as were made would relate to the state of the mechanical equipment on a tip, its superficial appearance and the method of working, and that no member of his staff was competent either "to be pretty certain or to be absolutely sure about the stability of tips".

68. Why was there this general neglect? Human nature being what it is, we think the answer to this question lies in the fact that, as Mr. Leigh accepted ". . . while the coal industry has had a high accident rate, until this horrible disaster there is no previous case of loss of life due to tip instability known to the Inspectorate. . . . The problem of tip stability has never been looked on as a safety problem meriting close inspection or recommendation by the Chief Inspectors". Indeed, there is no record of any Inspector having visited the Aberfan tip complex for any purpose during the four years before the disaster, despite the fact that Mr. Leigh freely stated that he regarded it as part of the duties of a Mines Inspector to pay regard to tip stability so as to protect the safety of men working upon it. No explanation for this apparent failure to

inspect was forthcoming to the Tribunal. Before 1961 it is entirely conjectural what was inspected and when. This complete uncertainty arises from the fact that there is no official requirement to record exactly what part of the surface is examined or what items of plant, machinery or equipment are inspected. This contrasts sharply with the requirements governing underground inspections, as a result of which the Inspector is obliged to record punctiliously the date and time of his visit and the names and numbers of the seams and districts which he has inspected. Again, the arrangements for the inspection of the colliery surface and its ancillary tips compare very unfavourably with those governing the inspection of quarries. As to the latter, two Inspectors of the Division, both professionally trained in quarrying work, are wholly concerned with their inspection.

69. Although when the big tip-slide occurred at Aberfan in 1944 (see *post* paragraphs 83–90) Mr. Leigh was a senior Inspector at Cardiff, only twenty miles away, he told the Tribunal that he never heard of it until after the 1966 disaster. How could a slide of such magnitude have escaped the attention of the Mines Inspectorate? Such answer as was advanced is as alarming as it is simple—there was no obligation for the colliery owners (the Powell Duffryn Company) to inform the Inspectorate about it, inasmuch as no-one working on the tip had been killed or injured. And this is the position even today, the Notification of Dangerous Occurrences Order, 1959 (S.I. 1959 No. 2117) making no mention of tip-slides and, being based upon Section 116 of the Mines and Quarries Act, 1954, having application only, “Where an accident occurs at a mine . . . which causes the death of, or serious bodily injury to, a person employed at the mine”. Accordingly, the Merthyr Vale Colliery manager was not under any obligation to report even the appalling Aberfan disaster to the Inspectorate.

70. We caused inquiries to be made as to whether the Legislature of any other country had seen fit to make any enactments on this subject. We were at first informed that none had, save one to which our attention had already been drawn by the National Union of Mineworkers. This solitary voice in a general silence is that of North-Rhine-Westphalia, where the Dortmund Mines Inspectorate issued an Order in 1964 governing the construction (but not the siting) of colliery spoil-heaps. But the researches of Sir Andrew Bryan have led to the discovery that in South Africa a Mines and Works Act requires of a manager that he should “so construct any slime dam in the neighbourhood of any building, thoroughfare or other public road or railway that no danger to life or limb or property can result therefrom”. It is right to add, however, that, following upon the Aberfan disaster steps are now being taken in a number of countries to consider the desirability of legislation. As Mr. Tasker Watkins, Q.C., has said “The lamentable commentary must be that it has needed a heavy toll of human life to provoke such safety measures as are already being practised and which will surely be strengthened by legislation in the not-too-distant future”. An illustration of the pre-nationalisation attitude towards tips is provided by considering the behaviour of the Powell Duffryn Company in relation to tips upon Merthyr Mountain itself. Notwithstanding the gigantic slide at Cilfynydd in 1939 (see *post* paragraphs 79–82), no system regarding tip stability was ever devised or implemented. True, someone prepared a memorandum entitled “The Sliding of Colliery Rubbish Tips” (which was to be revived, amended and issued over a quarter of a century later) but what its

original circulation was is unknown and its contents seem to have been largely ignored. Its advice that tips on such slopes as existed in Aberfan should not exceed twenty feet in height was ignored, for Tip 4 (started, it is true, in 1933) was allowed to grow to a height of 147 feet and stopped then only because of a big slide. And so little was thought of its directions regarding the necessity for draining that Tip 5, started in 1944, proceeded directly across the source of a stream. It was left to the mechanical engineer to do with tips what seemed best to him in such time as was available after attending to his multifarious other duties.

71. And so it was after nationalisation. Sole responsibility for tips was traditionally placed on the various mechanical engineers at Divisional, Area, Group and Colliery levels. While doubtless men of ability and experience in dealing with the mechanical equipment necessary for tipping, they inclined to the view that, if a tip stood, it must therefore be stable. Doubtless they could have received expert guidance had they asked for it, but the practice was for mechanical engineers to decide all tipping questions for themselves. And Mr. D. L. Roberts (No. 4 Area Mechanical Engineer) now recognises that they all “lacked any real appreciation of the basic elements of tip stability”. An illustration of their attitude is provided by the following short passage in the cross-examination of Mr. Baker, the No. 4 Group Mechanical Engineer, by Mr. Alun Davies, Q.C., appearing for the Merthyr Tydfil Corporation:

- Q. Are you seriously putting forward that unless a tip begins to move, no precaution is necessary?
- A. That is the way it always has been, sir. But I think it has mostly been considered after the recent disaster.
- Q. Is it not a very wrong way?
- A. Probably, sir. We did not see it.

It was not simply hindsight which led Mr. Gareth Jones (Divisional Civil Engineer) to say that such a system was wholly inadequate. Yet that was the “system” which prevailed and Mr. D. J. L. Powell of the South Western Division, while agreeing in its condemnation, admitted that he had given no contrary instruction in the matter. The warning uttered over ten years ago in the Report of the Advisory Committee on Organisation of the National Coal Board (“The Fleck Report, 1955”) that:

“In the field of mechanical and electrical engineering the industry has relied too much in the past on people who have been long in the pit but have not got the high technical qualifications that are necessary”

has a relevance to problems of civil engineering also. Certainly as far as tip stability was concerned, it was a warning which was ignored at national level and in No. 4 Area.

72. Tip slides are not new phenomena. Although not frequent, they have happened throughout the world and particularly in South Wales for many years, and they have given rise to quite an extensive body of literature available long before the disaster. Reference was earlier made (paragraph 44) to the paper read in 1927 by Professor Knox to the South Wales Institute of Engineers on “Landslides in the South Wales Coalfield” and the ensuing discussion regarding the causes of instability in tips, and we later refer extensively to the Cilfynydd slide of 1939 (paragraphs 79–82) and the Aberfan slides of

1944 and 1963 (paragraphs 83–90 and 128–145). Yet, according to Mr. Powell, until the Tymawr incident of 1965 (*post* paragraphs 159 *et seq.*) there was no general apprehension in the National Coal Board regarding tip stability. And one may venture to doubt whether even thereafter such apprehension was anything like widespread. Certainly that very incident never reached the ears of the Director-General, Mr. Sheppard, in London. He actually told the Tribunal that, while he knew that tips can slide, he had not appreciated before the Aberfan disaster that, once started, they can slide a long way, a piece of evidence which Mr. Leigh, Her Majesty's Inspector, agreed was "astounding". Mr. Sheppard said that before the Aberfan disaster the National Coal Board had no national policy or system regarding spoil safety. But in 1955 the Board had issued a directive to Divisions which placed upon heads of departments the duty of framing policy in matters falling within their respective fields. This meant, for example, that advice on the framing of policy regarding tips was the responsibility of Production Departments, which in the South Western Division was headed by Mr. Geoffrey Morgan. Yet nothing was done at Divisional level about tip stability beyond issuing the Powell memorandum of 1965. Mr. Morgan found himself unable to deny that the absence of any general policy regarding tips played a crucial part in causing the Aberfan disaster.

73. It is, however, vitally important to observe that, even despite the absence of such general policy or system, Mr. Morgan's view is that when in April or May 1965, Mr. Roberts visited the tip complex there were then such features to be seen as should have led to the Area Surveyor and Civil Engineer being asked to investigate, and they in turn could have brought in the Divisional Civil Engineer and Geologist. Had this been done, Mr. Morgan considered that tipping might well have been stopped, with the consequence that (whatever its precise cause) there might never have been a disaster at all. For our part, we are firmly of the opinion that, had a competent civil engineer examined Tip 7 in May, 1965, the inevitable result would have been that all tipping there would immediately have been stopped.

PART IV

SHOULD ANYONE BE BLAMED FOR THE ABERFAN DISASTER?

Introduction

74. The legal liability of the National Coal Board to pay compensation for the personal injuries (fatal and otherwise) and damage to property caused by the slide of Tip 7 is incontestable. In such cases as the present this liability exists quite independently and regardless of personal blame. A hundred years ago it was decided (*Rylands v. Fletcher*, 1868 L.R. 3 H.L. 330) that where, as here, an occupier of land brings and keeps upon it anything likely to do damage if it escapes he is bound at his peril to prevent its escape, and is liable for all the direct consequences of its escape, even if he has been guilty of no negligence. The landowner is said in such a case to be “absolutely” liable—in other words, he must pay compensation even though he took every possible care to prevent the material from escaping. Thus, in *Attorney-General v. Cory Brothers and Company, Limited* (1921 1 A.C. 521), where a coal-tip situated on a steep hillside in the Rhondda Valley slipped and destroyed several buildings, the House of Lords held that the doctrine of *Rylands v. Fletcher* rendered Cory Brothers liable for the consequences of their tipping, and it was immaterial whether or not there had been negligence on their part. It follows that in the present case those who conceivably have claims for compensation against the National Coal Board are not called upon to prove negligence, for, negligent or not, the Board must in either case financially compensate those who have suffered as the result of the disaster.

75. But the third broad question raised at the outset by the Tribunal involves an entirely different consideration. We set ourselves to answer this question:

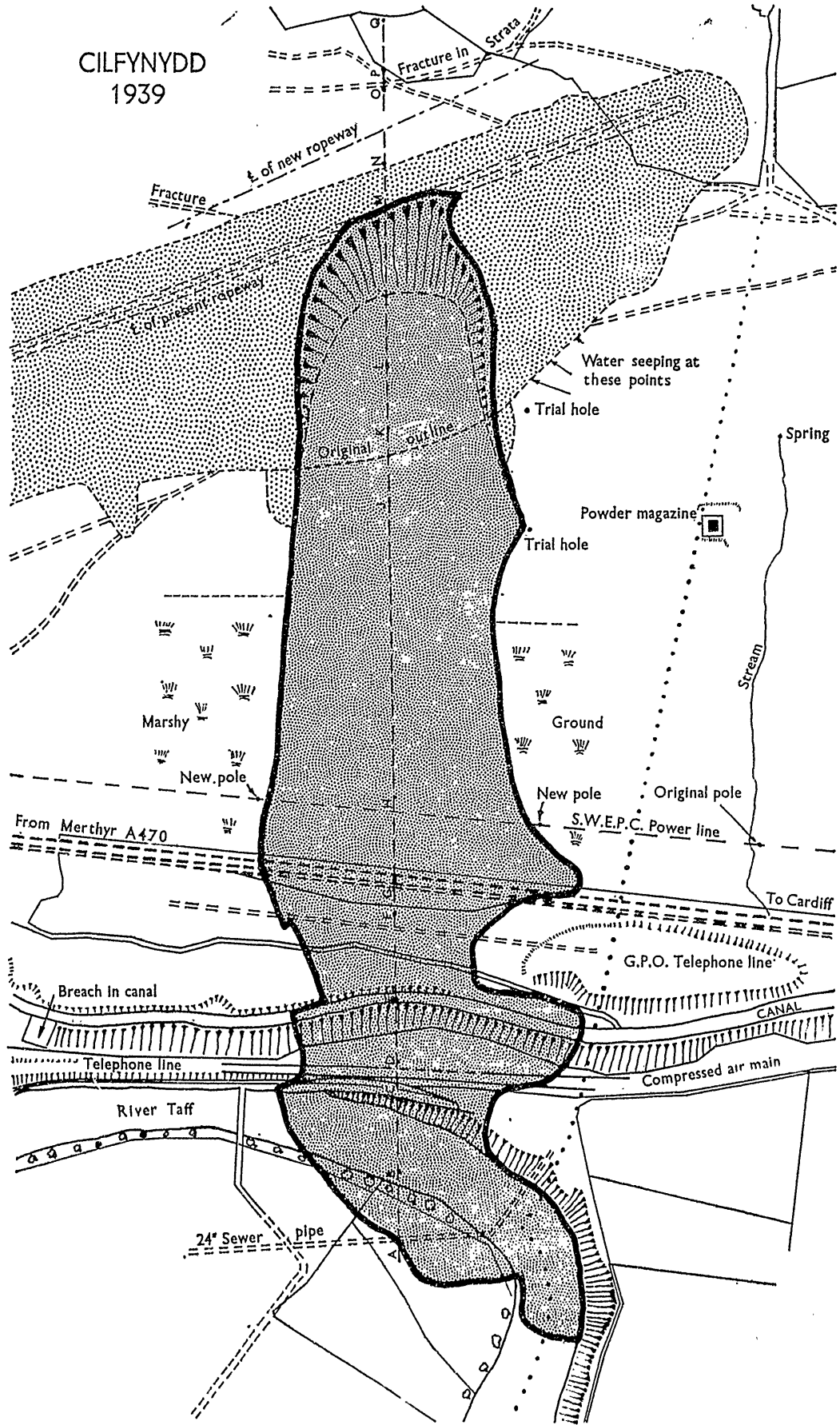
Need the disaster have happened? In other words, was this a calamity which no reasonable human foresight could have prevented, or was it caused by blameworthy conduct by some persons or organisation?

76. This involved consideration of whether, in addition to the clear financial liability of the National Coal Board in accordance with *Rylands v. Fletcher*, the Board (or any other person or body) could be said to be blameworthy. Had they, in other words, failed to use reasonable care in relation to the tip, and, if so, had that failure caused or contributed to the disaster?

77. We must make it clear that, for our present purposes, we are not regarding “blameworthiness” as synonymous with legal liability. In other words, we are not concerned to enquire whether the persons or bodies under consideration can be said to have been “negligent” in the sense in which lawyers use that word. For a person to be found negligent in a civil court the plaintiff has to establish three things; (1) that the defendant owed him a legal duty to take care; (2) that the defendant committed a breach of that duty; and (3) that damage was sustained by the plaintiff as a result of that breach. Regardless of the claims of humanity, the law recognises no *general* duty to protect another from harm; thus, a bystander who could clearly and easily prevent a stranger from being knocked down by the simple expedient of grabbing him or calling out a warning is not in law guilty of negligence even if he deliberately decides to do nothing, inasmuch as he owes no legal duty to do either of these things; yet in common parlance probably few would deny that he was blameworthy. It is with blame-

Figure 6

CILFYNYDD
1939



worthiness that the Tribunal has here concerned itself. Whilst attempting no strict definition, we regard it as established if, regardless of whether a strict legal duty exists to act or refrain from acting in a certain manner, it is clearly shown that the particular person or body being considered should have realised that unless certain steps were taken others would be injuriously affected and he inexcusably did nothing about it. "Negligence" is accordingly a narrower field than "blameworthiness", as thus understood, every blameworthy person not being necessarily negligent, whereas conversely every negligent person is probably also blameworthy. To illustrate, the National Coal Board and all its officials and employees charged with responsibility for the tipping process owed a legal duty to see that it was performed properly, a duty which they owed to all who could reasonably be regarded as capable of being injuriously affected were the process performed improperly. On the other hand, it may be that other persons or bodies not engaged in or directly connected with the tipping process (such as the Merthyr Tydfil Corporation and its officers, members of Trades Unions, and others) owed no *legal* duty to anyone in relation to the manner of its performance. But, even so, we should stamp them as blameworthy were it convincingly established that by means which lay well within their capacity they could have taken effective action to remedy matters, that they nevertheless inexcusably failed to exert themselves, and that by that failure they contributed to the disaster.

78. Our conclusion regarding the clear blameworthiness of the National Coal Board as a body is by no means founded solely upon their own belated admission. They, like others, fall to be judged against the background of events occurring over a period of some years before the disaster. It is to those events that we now turn.

Section A—HISTORY

1. The 1939 Slide at Cilfynydd (Abercynon)

79. At 1-40 p.m. on 5th December, 1939, after a period of heavy rainfall, a large slide of a tip belonging to the Albion Colliery (owned by the Powell Duffryn Company) occurred at Cilfynydd Common, near Abercynon, some five miles from Aberfan. The tip, situated on the hillside adjoining the main Cardiff-Merthyr road, slid some 710 feet to the road, crossed it, and then progressed a further 720 feet to beyond the river bed (see Figure 6). The width of the slide below the tip was 400 feet, the main road was blocked for 585 feet to a depth of 20-25 feet, the Glamorgan Canal was filled for 540 feet and the railway for 500 feet. The River Taff was blocked to a depth of 15 feet for some 500 feet and substantially diverted. It was estimated that the total weight of the tip material in the slide was some 180,000 tons. Having regard to the heavy volume of traffic normally passing along this road, it is remarkable that there were no fatalities. Even so, the incident made a big impression locally and is still remembered by many, including members of the staff of the National Coal Board and the Merthyr Tydfil County Borough Council.

80. It was a serious slide and it was taken seriously—at least, at the time. Mr. Geoffrey Morgan, at that time manager of another Powell Duffryn Colliery, had seen tip-slides on two earlier occasions, but agreed that he "had never seen the like of such a colliery slide before". As Mr. Philip Owen, Q.C. (for the Powell Duffryn Company) said, "It called for and got immediate and high level

attention from the Company's directors and senior officials". Mr. Brynmor Davies, a consultant civil and mining engineer, was instructed to investigate and report on the causes of the slide, and he in fact reported in great detail. He concluded that unusually heavy rainfall had caused a rotational slide.

81. It is right to point out that the Powell Duffryn organisation appeared in some respects to be more "tip-minded" than seems to have been general at this or any other time. Not only was the 1939 slide itself reported extensively to its London directors, but we were shown other reports, fortuitously preserved after the lapse of more than twenty years, which relate to other incidents involving other tips. One result of this greater alertness was that, immediately following upon the Cilfynydd slide, in that same month of December, 1939, a Powell Duffryn engineer (thought to be a Mr. A. L. Davies) prepared an illustrated memorandum entitled "The Sliding of Colliery Rubbish Tips". The Chief Engineer of the Rhymney Valley area of Powell Duffryn handed a copy of this memorandum to his son, Mr. Clifford Jones, who later became the Divisional Mechanical Engineer of the National Coal Board South Western Division. We shall have much to say hereafter about this memorandum, and content ourselves at this stage by saying that it was full of common-sense. Indeed, had its points and warnings been observed, the probability is that there would have been no disaster in 1966. But the memorandum was put into a drawer and forgotten until 1965, when there occurred another substantial incident (see "Tymawr", paragraphs 159-172).

82. On the issue of blameworthiness, the 1939 slide at Cilfynydd is of vital importance, both in relation to organisations and to individuals. In the opening words of the Attorney-General, "Its speed and destructive effect were comparable with the disaster at Aberfan, but fortunately no school, house or person lay in its path". It caused damage in the region of £10,000, a large sum in 1939. It could not fail to have alerted the minds of all reasonably prudent personnel employed in the industry of the danger lurking in all coal-tips unless they were so remote as to be incapable of causing harm. It afforded a vivid and alarming illustration of the importance of a proper tipping policy. Even had they no knowledge of the existing literature regarding the precautions called for when tipping on mountain slopes, all those connected with the Powell Duffryn Company, in particular, should have learnt therefrom an unforgettable lesson. On the contrary, the lesson if ever learnt, was soon forgotten.

2. The 1944 Slide of Tip 4

83. In 1933 the Welsh Associated Collieries started Tip 4. This was a conical tip, created by a conveyor taking waste to the tip apex and there depositing it by a MacLean tippler. This entailed erecting a steel tower in the place intended to become the centre of the proposed new tip. An engine wound the trams of coal-refuse to a parting and they were then hauled by a winch at ground level to a see-saw tipping device which rotated and tipped the refuse and so built up the tip in the form of a cone. We heard no evidence as to whether any investigation of the site was carried out before it was started, but it seems that no drainage work was done, despite the fact that, once it had been decided to erect the steel tower where it was placed, it was inevitable that the tip must eventually spread over the source of a stream were it to grow to any substantial size. In 1935 the Merthyr Vale Colliery was acquired by the Powell Duffryn Company. The

two-year-old tip was probably not of any great size at that time, and the new owners continued to work it for the following nine years, during two of which (1940–42) Mr. Geoffrey Morgan was the Colliery Manager.

84. On 27th October, 1944, a large portion of Tip 4 slid down the mountain-side for a considerable distance, Prof. Nash estimating that some of it travelled as much as 1,800 feet. This was an incident of considerable significance. Its effect was plainly visible right up to the disaster of October, 1966. The extremities of the slip stopped only some 5–600 feet from the disused Glamorgan Canal and the concavity in the face of the tip is to be seen to this day and is similar to that left in Tip 7 immediately after the disaster (see Plates 3 and 6). The events leading up to it are of importance despite the fact that they occurred in the pre-nationalisation era.

85. There are good grounds for thinking that Tip 4 gave rise to trouble even before the big slide of 1944. An aerial photograph taken in August, 1945, discloses features indicating that before the big slide it had already assumed a most unusually irregular shape, running south-eastwards at its foot and showing that it was beginning to bulge in the same direction as that later taken by the big slide. This has led Mr. Lawrence Scott, a chartered surveyor, to wonder “. . . whether there had been a previous collapse of Tip 4 before the (1944) collapse”. Professor Nash is in no doubt about the matter and expressed the view that, “It is *evident* from . . . (the) photograph taken in August, 1945, that Tip 4, which had suffered a major collapse the previous November, was not a perfect cone prior to the slide, i.e. a movement which distorted the base had *already* taken place”. The result would have been that a slip surface was created over which material was subsequently tipped. As we shall see (*post* paragraph 128), the same sequence later took place in Tip 7, a slip surface being created by a big slide in 1963 upon which material continued to be tipped and which played a fatal part in inducing the disaster slide. Thus in the case of Tip 4 as well as Tip 7 the ultimate failure was along a pre-existing shear surface.

86. The foregoing goes far to explain the report rendered in January, 1944, by the then Merthyr Tydfil Borough Engineer that:

“The [No. 4 Tip], which has assumed rather large proportions, is situated between two streams flowing down the mountainside, but there does not appear to be any interference with the free flow of the waters therein. I have, however, ascertained that owing to some cause—probably heavy rainfall—*one or two large movements of the tip have occurred*, but not sufficiently severe to cause any damage. The site of the tip in question is undoubtedly water-laden to some considerable degree, as I observed in a few places what appeared to be surface water emanating from the toe of the slope, which would indicate that the land, before being tipped upon, was of a boggy nature . . . I consider this matter is sufficiently important for a Sub-Committee to be appointed to visit the site with a view to making an examination of the conditions as they exist, and at the same time requesting the Colliery Committee to appoint . . . representatives to discuss the matter when they meet”.

87. Accordingly, in February, 1944, a Sub-Committee met on the site representatives of the Powell Duffryn Company, including Mr. Geoffrey Morgan, who had left Merthyr Vale two years earlier to become Colliery Agent and who in due course became Production Director of the South Western Division of the

National Coal Board. The Colliery officials then assured the Sub-Committee that there was no immediate danger, but that they felt it necessary to take certain steps to obviate risks. These involved digging a trench to the south and south-west of Tip 4 and laying, higher up the mountain, the foundations for a new MacLean tip (which eventually became Tip 5). The work was indeed carried out, but, as will appear, it proved useless to prevent a slide in Tip 4 or the development of a degree of instability in Tip 5.

88. Despite the Company's assurance given in February, on 21st November of that same year a substantial portion of Tip 4 slid away right from the top of the cone and ended up some 5–600 feet from the canal bank, carrying away growing trees and tearing away at least 4 feet of the subsoil. The Colliery Manager, Mr. Titus Davies, had never seen anything like it and was so troubled that he called in the Colliery agent (Mr. Geoffrey Morgan). The latter was "greatly concerned" by what he saw. He nevertheless informed the Borough Council in the following month that the drainage works he had had carried out earlier in the year had "prevented the tip movement from assuming serious proportions", that the slip had been due "to the very abnormal rainfall" (a view which Mr. Morgan has since abandoned in favour of subsidence as the probable cause), and that there would be no further tipping on Tip 4. Nor, indeed, could there have been, for the slide had rendered impossible any further use of the MacLean tippler. Apparently, no-one troubled to investigate why it had slipped, but a completely adequate explanation was to hand. In the opinion of Mr. D. P. Davies, a chartered surveyor, before it slipped the wholly undrained tip had so grown that it covered about 400 feet of a totally unculverted stream. No further explanation need be sought.

89. It is difficult to exaggerate the importance of this slide in 1944. To all who had eyes to see, it provided a constant and vivid reminder (if any were needed) that tips built on slopes can and do slip and, having once started, can and do travel long distances. Mr. Geoffrey Morgan, while denying (in common with the vast majority of the witnesses) any appreciation of the possibility that a tip slide could ever reach Aberfan village, conceded that "... once a tip of considerable proportions on a mountainside does slip, it is impossible to predict how far it will reach". And, as Mr. Philip Owen Q.C. (for Powell Duffryn) rightly observed:

"The mere fact that it did not come down into the village, although that is of course of importance, does not dispose of the position (*sic*) at all. Had somebody been upon the mountain, or indeed upon the tip when this happened, the fact of its having moved at all inevitably and obviously is a matter of seriousness."

With this constant reminder of what had happened, ordinary prudence demanded that, while the precise cause of the 1944 slide remained unknown, it would be folly to tip on the same mountainside (and *a fortiori* even nearer the village) without first making a thorough site investigation. As Mr. Gareth Jones, Divisional Civil Engineer said:

"I would want to know why Tip 4 slipped. I would want to know what the soil was and the depth of the boulder clay, and possibly the water table in the area. I would not approve of tipping on that site unless the results of such an investigation were all favourable."

Yet, as we shall see, that is precisely the folly which was later perpetrated—to the knowledge of the Colliery Agent and many others. The truth is that the

lesson of the 1944 slide was brought home to very few. Although the broken shape of Tip 4 is to be seen to this day, Mr. Leigh, H. M. Inspector of Mines, had no knowledge of the 1944 slip until after the disaster. And although Mr. D. L. J. Powell had frequently visited the colliery and naturally again went there when the disaster occurred, he actually told the Tribunal that it was not until after our sittings began that he first learnt that there had been any slip in 1944.

90. As well as acting as a warning, the slide of 1944 is important for its physical results. "I think there is no doubt that the slide of Tip 4 did cover an original stream" said Mr. Geoffrey Morgan, and he agreed that, as a result, for "some hundreds of yards . . . an essential natural drainage watercourse of the mountain was destroyed". Furthermore, it is a matter of almost common agreement that it was unwise to tip any material on top of that which had slipped from Tip 4. Had this consideration been observed, it would have severely limited the use of Tip 7 and would virtually have prevented its proceeding beyond the southern extremity of Tip 3. Yet tipping proceeded on Tip 7 regardless of the fact that the material was being deposited on and across the material which had slipped away from Tip 4 in 1944.

3. Tip 5 and allied topics

91. Although some preparation for a new tip west of Tip 4 had been made before the latter slipped in 1944, it was immediately thereafter that Tip 5 became the sole working tip. This was during the period of ownership of the Merthyr Vale Colliery by the Powell Duffryn Co. Higher up the mountain than Tip 4, Tip 5 again had no proper drainage system—indeed, it was tipped right over the single, open, drainage trench which Mr. Geoffrey Morgan, the Colliery Agent, had shortly before caused to be cut in the hillside, he being the person responsible for taking the tipping higher up the mountain. True to pattern, therefore, Tip 5 began to bulge to the South-East, just as Tip 4 had done. When exactly this bulging process began was not ascertained. It is not discernible in an aerial photograph taken in April, 1947, that is, just after nationalisation, but by May, 1951, the bulge had become very marked. It was, as one witness put it "a very big bulge . . . due to a slip". Why this occurred is, like the far greater slip of Tip 4, not far to seek—as it grew, it covered the course of a stream for a distance of some 900 feet.

92. On 11th September, 1950, during a meeting between the Merthyr Tydfil Borough Engineer and Mr. D. P. Davies (the No. 4 Area Estates Manager), the latter said that tipping on Merthyr Mountain would cease in about a twelvemonth on the introduction of underground stowing. Reflecting upon this, Mr. D. C. W. Jones wrote on the following day in these terms:

"Pantglas Tip

I shall be glad if you will inform me what the present and ultimate position will be regarding the tip at the above. I should be glad to know also what routine inspections you propose undertaking ultimately after tipping ceases."

On 13th September, 1950, Mr. Davies replied:

"Pantglas Tip

With reference to your letter of the 12th instant, I confirm that the present tipping is extending away from the old tips, and that we do not anticipate tipping will continue on this site for more than another twelve months.

We are also constantly checking the position of all these tips."

This correspondence calls for comment:

(a) Mr. Davies, naturally vague after this lapse of time, thinks that his assurance regarding the constant checking of all tips was based upon what he had been told by Mr. Baker. Mr. Baker has no knowledge of saying this, but, whether he did or not, was quite clear that he personally never checked any of the tips for stability and knew of no-one else who did. No-one in fact made any check.

(b) Despite the reference to stopping Tip 5 in a twelvemonth, it continued to be the active tip for another five years, i.e. until 1956. Why, accordingly, was there any reference to a time limit? Certainly there is no suggestion that any plans for automatic stowing existed which could be possibly implemented within a twelvemonth, or, indeed, at any time. Certainly there is no evidence indicating that the National Coal Board ever regarded it as a practical proposition (see *post*, "Underground Stowing", paragraphs 281–2). It looks very much as though this is yet another example (of which there are many) of National Coal Board officials fobbing-off "outsiders" who sought information from them regarding their activities.

93. On 23rd October, 1952 Mr. Baker sent to the Area Estates Manager, Mr. D. P. Davies, details of a proposal for tipping higher up the mountain beyond Tip 5. This new arrangement involved removal of an electric crane and extension of the incline and rail track, and the minute and plans were accompanied by an estimate of cost made up item by item and amounting in total to £7,185 12s. 9d. This scheme appears *prima facie* to be rather clumsy, though practicable and inexpensive, but, for some reason it was not implemented nor even further discussed. None of our witnesses (and least of all Mr. Baker) could explain why this was so, but it is obvious—and it may be significant—that the later decisions to tip on the sites of Tips 6 and 7 involved no capital expenditure, and were more economical of manpower.

94. About this time a Development Plan of the area was being prepared by the Borough Council for submission to the Minister of Housing and Local Government. Inquiries disclosed that the National Coal Board was seeking to *extend* the tipping area. Although the Borough Engineer was surprised by this, he does not seem to have asked what had happened to the automatic stowage project. But at a meeting between him and Mr. D. P. Davies on 15th January, 1953, he referred to "the high, huge mass of material, and I did feel that the stability of the tips could be suspect". The National Coal Board took up the attitude, as they were legally entitled to do, that tipping on the larger area which they contemplated was "permitted development". Nevertheless, the Borough Engineer sought an assurance that, if further surface tipping were to take place, proper precautions regarding methods of tipping and inspection would be instituted.

95. Reassurance came in the letter of 2nd March, 1953, in which Mr. D. P. Davies said:

" . . . It is the intention of the Board's representatives at the hearing before the Minister's Inspector on the 18th instant to state that proper consideration will be given to prevent risks of further slipping when tipping extension is being arranged."

There was some disputation as to whether the Inspector, in his turn, was informed that steps would be taken to prevent "future" (and not "further") slipping. But

the distinction is of no importance to our inquiry. The simple fact is that, as hitherto, *no* precautions against slipping were taken during the remaining three years of the working life of Tip 5. Why in fact it ceased in 1956 to be the working tip is not, to our way of thinking, clear. We were told that it was because it had taken fire. But it seems that on December 13th, 1958, the Merthyr Vale Labour Party wrote to the Merthyr Tydfil Corporation complaining that "*the tip had been on fire for months* and the smell, sulphur and dust blew down the village when the wind was west", and Mr. Baker thought that this trouble arose in 1959 or 1960. Be it in 1958, 1959, or 1960, the fact that Tip 5 started burning cannot, it seems, be an explanation why it was abandoned. It may well be that the truth is to be found in the fact that when tipping was stopped there in 1956 it had become huge (containing approximately 706,000 cubic yards of material) and, in the words of an expert:

"the toe was beginning to flow downhill and has remained just stable under fluctuating seepage pressures from the spring. Had the front of the tip been advanced downhill much further it would have failed in the manner (of) Tip No. 4. One may conclude that No. 5 has been standing and is standing at a very low factor of safety".

Again, when Tip 6 was started in 1956 no plans were produced and no precautions against slipping were taken, and the same is true of the inception of Tip 7 in 1958. Before either of them was started, the big slide of Tip 4 and the big bulge in Tip 5 were clearly to be seen by anyone who was minded to look.

4. 1958: The Selection of Tip No. 7 Site

96. The siting of the new Tip 7 was decided upon at Easter, 1958, by the Colliery Manager (Mr. R. N. Lewis) and the Group Mechanical Engineer (Mr. Joseph Baker) and by nobody else. "In selecting a tipping site", declared Mr. Powell, the South Western Divisional Chief Engineer, "expertise is absolutely necessary". Yet the only recorded case of investigation of a proposed tipping site of which the Tribunal learnt was that conducted at Nantgarw Colliery by Messrs. George Wimpey and Son in 1958, just at the time when the siting of Tip 7 was being decided upon. This was put in hand by Mr. Grant (No. 3 Area Civil Engineer), at the instance of the Western Region Railway Engineer, Mr. Bickerton. Expert advice on such occasions is readily available, if sought. And these occasions are far from infrequent, for a document specially prepared by the Board at the Tribunal's request showed, as Mr. Wien said, ". . . that there have been fifty-nine entirely new tips since nationalisation and fifty-nine extensions of existing tipping areas since nationalisation. We have a period of approximately twenty years, so . . . it works out at about three completely new tips per year on average, as well as three extensions". Accordingly, the importance of the questions posed by Mr. Tasker Watkins, Q.C., in his closing address cannot be exaggerated: "Site investigation and preparation has for long been common practice in civil engineering. Can there be *any* excuse for the failure to study the problem of tip stability? . . . Looking back over the last thirty or forty years and no more, was there sufficient knowledge and instruction, example and precept, to destroy any excuse for not having made a proper system for looking after tips?".

97. In most cases, the starting of a new tip would be coincident with the starting up of a new colliery, and this would inevitably bring in officials from Divisional level. An extension to an existing tip complex, on the other hand,

would not necessarily bring them in. This was within the competence of the individual colliery, but nevertheless Mr. Powell said he would have expected the Area Mechanical Engineer to be brought in, and he in turn would probably have enlisted the help of others, including the Area Chief Surveyor and the Area Civil Engineer. He would have expected them to visit the site armed with a complete geological plan, and the Divisional Civil Engineer should have been called upon if needs be. Even had the Area Mechanical Engineer, Mr. D. L. Roberts, been available (and he did not succeed to the appointment until 1960) he lacked—in the opinion of Mr. Clifford Jones, his Divisional superior—the qualifications necessary to enable him to make a proper site selection. And at the material time there was no Area Civil Engineer available to be consulted in No. 4 Area, for Mr. Exley (the first holder of that post) did not appear until April, 1958.

98. So much for the views of some of the National Coal Board officials. But, with the enduring reminder of the 1944 slide so clearly visible and its causes still remaining unknown, no fresh tipping on the mountainside should have been begun without a complete survey, without boreholes, without proper drainage, and without indicating the limits of the tipping area. And even without a survey, reference to the available geological map would have revealed a line of springs at the Brithdir seam, the Ordnance Survey would have given warning of water-courses, and the site would thus have been revealed as obviously unsuitable for tipping beyond a short distance from the rail incline. Indeed, even without referring to a single map, we are satisfied that there were features clearly to be seen which should have brought home to Mr. R. N. Lewis (Colliery Manager) and Mr. Joseph Baker (Group Mechanical Engineer) how limited was the area of suitable tipping land there available to them. Although they had no training in civil engineering, each said that he appreciated that the presence of water could threaten the stability of a tip. Yet what was visible to them as they surveyed the scene before tipping started in 1958? This question was answered for us by the following passage in the evidence of the slinger, Mr. D. B. Jones, who was an impressive witness:

“*Chairman* . . . Could anybody before Tip 7 started—not necessarily a surveyor or an engineer or anything of that kind—could I walking up that mountainside before Tip 7 began fail firstly to see that there was a stream on the land which later became covered by Tip 7? If I used my eyes at all, could I possibly fail to see it?

A. You could not fail to see it, my lord, no.

Q. What about the spring you have been referring to? Could a lawyer, with no knowledge of these expert matters at all, taking a country walk up that mountainside, fail to see the place of the spring you have spoken of, or (if the weather was dry) that there was a place where in wetter weather a spring probably ran—could you fail to see that?

A. He could not fail to see it, my lord, no.

Q. Those are the stream and the spring, we understand, you tell us later on were covered by Tip 7?

A. Yes, my lord.”

99. How far a tip is to extend is of vital concern in the selection of its site. The real evil in the present case is not that a certain amount of tipping was done between Tips 3 and 4, but that it was allowed to continue on southerly slopes to

the vast extent that it was. Any proper tipping programme which contemplates using inclined ground must embrace close consideration of the area of the land intended to be utilised. It is obvious that tipping on a slope, however carefully done, presents difficulties in controlling and confining the tipped material which do not arise in the case of tipping on the flat. Prudence accordingly demands that the area designed to be utilised should be determined beforehand and its geological and other features considered. But the simple fact is that no one gave any thought to the ultimate maximum area of Tip 7, although Mr. Baker told the Tribunal that he contemplated that tipping would stop at the northern edge of the 1944 slip material and would take about 5 to 7 years to reach that point. Taking no Ordnance Survey or other map with them when the two (Mr. R. N. Lewis and Mr. Baker) selected the site, no area was designated to Mr. Vivian Thomas, whose responsibility it was to control the tipping. Although the maximum size of the new tip was never discussed, they came to the conclusion that they had some years of tipping ahead of them. Although they have no recollection of having any plan with them, it is noteworthy that several months before (on June 20th, 1957) the National Coal Board had prepared a plan (H.28) showing the proposed tipping area, which extends right across the 1944 slip, while Mr. Vivian Thomas' understanding was that they could tip even farther. He considered, indeed, that he was free to tip even as far as the southern boundary of the National Coal Board land, which would have resulted in a tip exceeding 400 yards in length! Yet such a decision was come to without a single survey or any consideration of the geological or geographical features.

100. Small wonder, then, that it was of no concern to Mr. Vivian Thomas how far the toe of the tip spread. He now considers that it was courting danger to tip beyond the southern extremity of Tip 3 and that it was inadvisable to tip over material which had previously slipped from Tip 4. But none of these matters were then present to his mind. That, we think, is both true and understandable. Wholly lacking in training in tip stability, to him any ground which appeared suitable to the Colliery Manager and Group Mechanic could be tipped upon without question. One of the many tragic aspects of the events leading up to the disaster is that neither of his superiors was any better qualified than he to select either the site or to limit the area of tipping.

101. We must here revert to the so-called plan of the tip complex prepared in 1957. Its draughtsman was Mr. W. J. Strong, who was then No. 4 Group Planning Engineer. He explained that he was brought into the matter by Mr. Baker (No. 4 Area Mechanical Engineer), who told him that, owing to complaints by the neighbouring farmer that Tip 6 was encroaching on his land, they proposed tipping in another direction, and ". . . would I please ascertain if it was Board property, so that there would not be a recurrence of tipping on other people's land". Mr. Strong then proceeded to make some enquiries, had a plan (H.28) drawn by a member of his staff, and on June 20th, 1957, sent it to Mr. D. P. Davies, No. 4 Area Estates Manager, with an accompanying memorandum, explaining that "The area coloured *blue* is the present tipping area and that marked in *red* the proposed tipping area. It is proposed to start immediately on preparation of this site. If you have any objections to the use of the area shown, I would be grateful if you would let me know immediately."

102. Copies of this memorandum and the plan were also supplied to (*inter alia*) Mr. Baker and Mr. Vivian Thomas, but the only comment was that of Mr. D. P. Davies, who replied that he saw "no objection to tipping proceeding

over the area coloured red in the plan". This red area embraced the site of Tip 7 which was started in the following year. Even though the plan was thus prepared for a special and limited purpose, it has to be observed that the manner of its preparation was ludicrous. Mr. Strong had never visited the site and had no knowledge of any of its geographical or geological features. Mr. Baker supplied him with a sketch-plan of the tip complex (H.36), which, based on a Powell Duffryn map of 1919, was itself entirely inaccurate as a representation of the size and disposition of the tip complex in 1957; for example, Plan H.36 did not record the size to which Tip 4 had grown nor the fact that it had slipped three years before Vesting Day. All Mr. Strong did was ". . . to see what on H.36 did not have a tip on it and . . . drew a line round that untipped area". The result of all this was that, in the words of counsel for the Board itself, "a thoroughly inaccurate plan" was produced. It was a plan which, as Mr. Strong conceded, he would have realised was "utter nonsense" had he cast even a superficial glance up at the mountain from his colliery office.

103. The importance of this lies in the possibility that thereafter, when Tip 7 was being started and as it progressed, those responsible for its initiation and growth may well have been misled by this plan prepared by Mr. Strong. He conceded that it had occurred to him that two of those to whom his plan and memorandum were circulated—namely the Area and Unit Mechanical Engineers—"had responsibility for the safety of the tip which might well go on the site marked red", and, while denying that he had acted "in a somewhat cavalier manner", accepted "that Baker and Thomas, on this vital matter of siting the tip, were basing themselves on a thoroughly inaccurate map". But in fairness to Mr. Strong, it should be said that he regarded as an accurate delineation of the tip complex the earlier map (H.36) which Mr. Baker had himself produced and appeared to vouch for; accordingly, Mr. Baker of all people ought not to have been misled by the plan Mr. Strong prepared with his collaboration—nor, indeed, does Mr. Baker attempt to say that he was so misled. But the whole incident is illustrative of the slapdash attitude in No. 4 Area regarding surface maps and surveys.

104. No precautions were taken. Tip 7 was started at Easter 1958, because (as we have already said, paragraph 28) the farmer's complaints rendered impossible any further use of Tip 6. There had been a certain amount of tipping previously between Tip 3 and Tip 4 but this was insignificant. Three people went onto the mountainside to consider a new tipping site. Of these, Mr. Vivian Thomas played so subordinate a role in this matter that he must be absolved from the responsibility for the decision then made. The other two, Mr. Joseph Baker (No. 4 Group Mechanical Engineer), and Mr. R. N. Lewis (Merthyr Vale Colliery Manager) were jointly and severally quite unfitted by training to come to an unaided decision as to the suitability of the proposed site. To recapitulate: they had no Ordnance Survey map, and they took no plan with them, because none existed; they made no boreholes; they came to no conclusion regarding the limits of the tipping area; and they consulted no one else—not even the Colliery Surveyor. They arranged for no drainage, for they considered none necessary. It was a case of the blind leading the blind, and, as Mr. Geoffrey Howe, Q.C. rightly added ". . . in a system which had been inherited from the blind".

105. In our judgment, such inspection as they made was worthless. They were unfitted by training to judge the matter, and what stared them in the face

they ignored. Mr. Lewis said in terms that he never directed his mind to the question of the stability of the future Tip 7 when he was considering the site in 1958, because he thought it would never project beyond Tip 3. We have dealt elsewhere (*vide* paragraph 31) with what watercourses were on the mountainside in early 1958, and we have already referred to the 1944 slide. There is evidence that the mountainside was quite boggy. Why, then, did they decide to tip there? The one and only true answer emerged, as we think, during the evidence of Mr. R. N. Lewis. To the question "What were the reasons which caused you to select that site?", he replied "At that time it was the *only* available site which we could see there", and, "It *also* provided a convenient tip near to Tip 6, making it very easy for the transfer of equipment". It was, as the Unit Mechanical Engineer expressed it, economic to begin tipping there and it presented the prospect of several years of tipping. The fact is that there never was a "selection" of the tipping site, in the sense of careful examination by persons possessed of adequate knowledge to assess the situation and come to an informed conclusion. It was, indeed, a site which should never have been used for tipping over any but a very limited area.

106. It is pertinent for the future, as well as in relation to the Aberfan disaster, to record at this stage the views of the experts. As to the steps which a competent civil engineer might have been expected to take when selecting the site for Tip 7 in 1958, Mr. G. M. J. Williams (called on behalf of the Parents' and Residents' Association) reported:

"His first steps would be similar to those taken in any site investigation. He would examine the ground and probably walk over it, and he would examine the Geological and Ordnance Survey plans of the site and consult the geological sheet memoirs if he was not already familiar with the properties of the various formations in the locality . . . During these considerations he is bound to have observed the remains of the 1944 slip, both on the plans and on the ground. As he was engaged in considering the stability of a future tip, he would have considered how Tip No. 4 had failed, and the only satisfactory explanation of the remains of this slip would have involved an element of liquefaction.* He would have examined the 1957 Ordnance Survey Plans during this exercise. As this indicated "Issues" of water in the area of the new tip, it would have been obvious that the ground-water conditions would be an important consideration. Indeed, there are many references to the desirability of providing drainage for tips, and the importance of drainage would certainly be in the mind of an engineer who had studied the behaviour of tips in South Wales.

At this stage it would be obvious that, whilst a *small* amount of material might be safely placed in the valley between Tip No's. 3 and 4, a major site investigation would be necessary to establish the measures that would be necessary to ensure the safety of the tip if it extended out of the valley, or if it were to rise to an appreciable height above Tip No. 3.

Such a site investigation *must* have indicated that the safe construction of a large tip on this site would have been a difficult and complex undertaking involving expense which I would expect to have been prohibitive".

107. Professor Moore, called by the National Coal Board, put it more laconically by saying that, having looked at the geological map, he would have

* For the present purposes, "liquefaction" may here be interpreted as synonymous with a "flow slide."

advised against tipping because of the boulder clay covering the mountainside, for “. . . it is relatively impermeable and it tends to flow, as one can see on the hillside; when it gets wet it creeps on the hillside”. He accepted that the complete site investigation called for “would have led to the discovery of *all* the features, unusual or common” which existed on Merthyr Mountain. So much for the “coincidence of a set of geological factors . . . which collectively created a particularly critical geological environment” upon which learned counsel for the National Coal Board dwelt in his opening address on the second day of the Tribunal’s sittings.

108. The last words on the importance of site investigation before *any* tip is started came from Professor Bishop (the Tribunal’s expert) in the following passage:

- Q. If I have understood you correctly, you say there never should be, even on flat land, a tip begun without a proper site investigation?
- A. That is so.
- Q. It follows, therefore, that, there having been no site investigation in this particular case, there never should have been a tip. That is right, is it not?
- A. Yes.
- Q. And no tip, no slide?
- A. Quite.

5. The Events of 1958–1963

109. As we have already observed (*ante* paragraphs 35–41) for about 40 years there have been well-founded complaints of flooding at Aberfan. These complaints became more frequent and vociferous after Tip 7 was begun and, being addressed to the Merthyr Tydfil Borough Council, led to its setting-up in 1959 of a sub-committee to deal with complaints regarding the Aberfan tip complex. Whilst there can be no doubt that, as we have said, it was the flooding problem which inspired such complaints, the manner in which the residents of Aberfan advanced their criticisms and the language in which they were expressed cannot be ignored in considering the question of whether the National Coal Board (and others) ought not to have become alerted into instituting an investigation of the state of affairs on Merthyr Mountain a long time before the disaster.

110. As early as July 29th, 1959, the Merthyr Tydfil Town Clerk wrote to Mr. Stiles, the Board’s Area Estates Manager, regarding the “reference made to the potential danger of the above tip at Aberfan” and seeking a meeting. On October 30th, the Merthyr Vale Ward Labour Party informed the Town Clerk that “further grave concern was unanimously expressed at the continued inaction and almost contemptuous disregard by the National Coal Board of the representations made by your Council re matters concerned with the safety and health of the residents of this Ward. We were instructed to draw your attention to:

- (1) the continued flooding of the brook near the Aberfan Social and Democratic Club;
- (2) the continued danger of the tipping and stone dusting at the coal tip at Aberfan, which is still on fire, despite the National Coal Board assurances that it would be put out;
- (3) a further danger of serious flooding on the main road at Merthyr Vale . . .”

On November 25th, 1959, these complaints were transmitted by the Town Clerk to the National Coal Board and a meeting requested, but no reply seems to have been sent. On June 17th, 1960, the Town Clerk wrote to Mr. Stiles that a deputation:

“... wish to discuss with you the potential danger of the above Tip. Concern has been expressed that the Tip could slide after heavy rainfall,”

and on June 20th the Sub-Committee met Mr. Baker, Mr. Stiles and Mr. Roberts of the National Coal Board. At that meeting, held in Merthyr, the discussion was about the Aberfan tip complex *as a whole* and it was minuted thus:

“The Council side expressed the concern that had been expressed of the potential danger of slipping the Tip after heavy rainfall and that hot clinkers were being tipped by the Board without having previously been sprayed with water.

The National Coal Board representatives stated that the Board had tried to move the Tip using a bulldozer but this had been abandoned because of the danger from fire.

The Board did not agree that there was a potential danger of the Tip slipping and it was pointed out to the Council side that the Tip which was burning was not being tipped upon.

The National Coal Board’s representatives agreed however to discuss the problem with a view to seeing what could be done about the burning tip, and what needs to be done with the tip as a whole with regard to the question of it slipping. They would also investigate the position with regard to the spraying of the hot clinkers.

They undertook to write to the Council further in the matter.”

111. Fears of a tip-slide were thus being expressed as early as July, 1960 and the National Coal Board representatives were contending they were groundless. But Mr. Baker now thinks that no worthwhile view could have been expressed on the matter by Board officials “without a most detailed investigation taking place”. The promised investigation never materialised and the promised letter was never sent by the Board. But the next day Mr. Baker told the colliery mechanic “that the Council were very much concerned about the tip slipping” and, despite the fact that he “did not think they (the Merthyr Tydfil authorities) were making a nuisance of themselves by any means”, he nevertheless limited his activities to putting a few pegs in the mountainside. Apart from that, no-one appears to have said or done anything to assuage the fears which had been expressed. On the other hand, it is right to point out that, while many letters passed between the National Coal Board and the Merthyr Tydfil Council during the remainder of 1960 and a few during 1961 and 1962, they were all restricted to discussing the flooding problem and they contain no reference to fears of a tip-slide. Indeed, when the National Coal Board and Council Officials met on February 6th, 1962, it was simply in relation to flooding. That was, in another respect, an important month, being that in which Tailings were first produced. These constituted in some respects an important (certainly a time-consuming) aspect of our investigation and we now turn to consider them.

6. “Tailings”

112. Tailings are the final discard of a modern coal filtration plant. They are very fine particles left after a chemical process has extracted by means of

filter drums even the smallest coal from the material going through the preparation, and they are then vacuum-dried. They have an average ash content of 39 per cent. Although frequently described as, and compared with, "slurry", the latter is in reality very small coal with some water in it. When tailings are wetted they become like quicksand. They trapped sheep on Merthyr Mountain and on one occasion necessitated a child being pulled out, leaving his gum-boots behind. More than one witness described them as "slimes". They were produced at Merthyr Vale for the first time in February, 1962. Thereafter they were tipped regularly on Tip 7 until the end of 1963 and intermittently until early 1965. According to the National Coal Board there were about 30,000 cubic yards of Tailings in the 297,000 cubic yards of material in the Tip.

113. The question of whether tailings played any part in bringing about the disaster-slide occupied a great deal of time during the Inquiry. We regard as correct the attitude adopted from the outset by the National Coal Board that they were not even a contributory factor. Professor Bishop thought that "the tip would have failed eventually without tailings; they may simply have brought forward slightly the date of failure", while Mr. G. M. J. Williams, the expert called on behalf of the Aberfan Parents' and Residents' Association, said that, while "They may have led to an increase in the amount of saturated material within this tip and consequently they might have increased the amount of material that flowed", their presence in the tip, once it had started to move, would neither have increased its mobility nor the distance travelled by the slipping material. These views are in accordance with the evidence of Mr. W. E. Raybould, Scientific Adviser to the National Coal Board that the black clay-like material found on the face of the disaster-slip was, as he had reported, "a breakdown of washery shale and is not froth flotation tailings, nor does it contain any significant proportion of tailings".

114. Even so, it by no means follows that tailings can now be dismissed from consideration. On the contrary, at certain stages in the events leading up to the disaster, the adverse effect which they undoubtedly can have on tip-stability created fears and caused doubts in the minds of people of responsibility, and if there had been a proper investigation with a view to allaying the fears and resolving the doubts, the effect on the course of events must, in our opinion, have been dramatic and decisive. Mr. Geoffrey Howe, Q.C., who described Tailings as "a massive decoy, a kind of red herring", invited us to regard them as having played an important role in that "... they were believed to be *the* significant hazard, and with their stoppage, with their discontinuance on the site, it was believed that the hazard had been removed". This is an aspect which we have not overlooked.

115. It is beyond doubt that tailings can create trouble. They can cause oozing and spreading even when tipped on flat land, and long before the disaster the National Coal Board recognised that it would be dangerous to put them on a tip situated on sloping land. This fact is of such importance that the matter must be dealt with chronologically. The tale begins at Hafodyrnyys in No. 6 Area in February, 1962, the very month in which the Tailings process began at Aberfan. There tailings induced such a low angle of repose—10°—that tipping space was being very quickly used up. Mr. D. L. J. Powell (Divisional Chief Engineer) and Mr. Gareth Jones (Divisional Civil Engineer) visited the site, and as a result it was decided that rubbish and tailings must in future be disposed of separately, the latter being put down a redundant shaft. The

desirability of tipping these materials separately was also underlined by water pollution by tailings which occurred at this time at two other collieries (Cynheidre and Abernant). Mr. Powell averred that this decision was disseminated at Divisional level and that there were frequent meetings between Divisional and Area Engineers. He also expressed surprise that, even if Mr. Roberts did not learn of it along the normal lines of communication, he failed to acquire knowledge of it through his relationship with the Divisional Mechanical Engineer, Mr. Clifford Jones. Nevertheless, we accept that Mr. Roberts knew nothing about it, and neither did Mr. R. N. Lewis, No. 4 Group Manager. It seems extraordinary that no steps were taken to circulate Areas and Groups systematically about so important a matter. So the tipping of tailings started on Tip 7 in February 1962 and continued at the rate of about 70–80 tons out of a total of 250 tons tipped daily until early 1964, and intermittently thereafter. It was troublesome stuff to tip out of the trams, and soon the men started to wetten it in order to facilitate the process. As it was deposited, it made cavities in the sides of the tip; if thereafter it dried out, it became rock-like and would dam and hold back water; if it became wet it oozed like slime.

116. Although flooding in the Pantglas area was, as we have seen (*ante* 35–41), an old problem, there is no doubt that it became aggravated after tailings were put on Tip 7. But increased flooding was not the only result: fears began to be entertained as to the effect of tailings on stability, and these fears initiated a long correspondence (extending from July 1963, to March 1964) between the local authority and the National Coal Board under the heading “Danger from Coal Slurry being tipped at the rear of the Pantglas Schools”. The first of the many letters so headed was addressed by the Assistant Borough Engineer (writing in the name of the Borough Engineer) on 24th July, 1963, to Mr. Ritchie (the Borough Public Works Superintendent) and was in these terms:

Dear Sir,

*Danger from Coal Slurry being tipped at the rear
of the Pantglas Schools*

In connection with the above, Councillor Mrs. Williams has advised me that the National Coal Board appear to be taking slurry, similar to that which was deposited and gave so much trouble in the Quarry at Merthyr Vale, up on to the existing tip at the rear of the Pantglas Schools.

If this is a true statement of the position then I regard it as extremely serious as the slurry is so fluid and the gradient so steep that it could not possibly stay in position in the winter time or during periods of heavy rain.

Before writing to the National Coal Board I thought it would be advisable if you called to see the position for yourself and I will leave it to you to decide whether you call at the Merthyr Vale Colliery to see the Manager before you pay the visit. If you do this it may be a good thing as the Manager would probably decide to go with you and show you exactly what they are doing.

Your faithfully,

Signed: D. C. W. JONES, J.B.

Borough and Waterworks Engineer

As a result, on 20th August, 1963 Mr. Ritchie visited the Colliery and saw the Manager.

117. What then transpired is in dispute, but we accept as accurate in the main the account of the interview given in the letter of the same date from Mr. Bradley to Mr. D. L. Roberts at No. 4 Area Headquarters in these terms:

Dear Sir,

*Danger from Coal Slurry being tipped at the rear
of the Pantglas Schools*

In connection with the above my Public Works Superintendent has been in touch with Mr. Wynne, Manager at the Merthyr Vale Colliery in connection with the deposit of slurry on the existing tip at the rear of the Pantglas Schools.

I am very apprehensive about this matter and this apprehension is also in the minds of the local Councillors and the residents in this area, as they have previously experienced, during periods of heavy rain the movement of the slurry to the danger and detriment of people and property adjoining the site of the tips.

I understand that Mr. Wynne has told my Superintendent that the slurry is 40 per cent. de-watered before being tipped but he agrees of course that this would not be a solution to the movement of the slurry in the Winter time, due to the absorption of storm water.

You are no doubt well aware that the tips at Merthyr Vale tower above the Pantglas Area and if they were to move a very serious position would accrue.

I should like your observations upon this as soon as possible.

Yours faithfully,

Signed: D. C. W. JONES, J.B.

Borough and Waterworks Engineer

118. On September 13th, 1963, Mr. Roberts replied that he was considering transporting tailings by road from the Merthyr Vale Colliery to another site at the Plymouth Colliery, and in his acknowledgement of 16th September Mr. Bradley stressed that, wherever the tailings were tipped, “. . . nothing must be done to endanger the security of people living within the Borough”, and suggesting an early meeting. There was no reply, and the tipping of tailings on Tip 7 continued unabated. In late November, 1963, there occurred the big slide which we shall shortly be considering (*post*, paragraphs 128 to 145). This event having been raised by Alderman Tudor in the Consultative Committee meeting of November 26th, 1963, Mr. Wynne (Manager) says that he visited the tip the following day, and, in the light of what he then saw and heard, decided that the tipping of tailings must stop as soon as possible.

119. As we shall see, Mr. D. L. Roberts visited the tip that same day, but there was no collaboration between the two men, and the tipping of tailings simply continued, though in reduced quantities. We elsewhere refer to the letter of 28th January, 1964 in which Mr. Roberts wrote that:

“A satisfactory and suitable place other than the tip to dispose of the tailings elude me at the moment and causes me great concern”.

Thereafter, letters from the Borough Council expressing dissatisfaction with the National Coal Board's failure to deal with the flooding problem were ignored and on March 12th, 1964 they justly complained of "being treated in a very cavalier manner". This evoked an immediate reply from Mr. Roberts, the final paragraph of which is important:

"With regard to disposing of slurries—this is, at present, still being disposed of on the tipping site, via the local tramway, but it is our intention to discontinue this and dispose of the slimes mixed with Washery Shale at Plymouth Colliery Site until such time as a new tipping site can be found. As you will appreciate, these tailings are very difficult to handle and we are very careful in disposing of this material, so as not to inconvenience any person or persons, and, therefore, *we would not like to continue beyond the next 6/8 weeks in tipping it on the mountainside where it is likely to be a source of danger to Pantglas School.*"

120. In his reply Mr. Bradley regretted that further tipping even for such a short period was necessary, and added:

"In the meantime I am sure that you are fully appreciative of the fact that you may be creating a considerable liability which your Board, and your Board alone, will have to shoulder in the event of any movement of the tip".

121. Most surprisingly, the Colliery Manager, Mr. Wynne, was throughout as unaware of this correspondence as was the Area General Manager (Mr. Wright). Mr. Roberts is indeed a man who kept much to himself.

122. But during 1964 others besides the Borough Council were expressing their dislike of tailings. Thus in several Capital Projects submitted to the National Coal Board Finance Director in respect of the Merthyr Vale Colliery it is stated that:

"Disposal of tailings on the existing tip is not considered advisable, *due to the tendency of the tailings to induce slip*"

Indeed, there is unanimous condemnation of the practice of indiscriminate disposal of tailings which was adopted on Tip 7. Thus, Mr. P. M. Grant, who succeeded Mr. Exley in December, 1965, as the Area Civil Engineer of No. 4 Area, disapproved of their being taken to the tip at all unless they were compacted into it by using mechanical plant and thought that if they once began to move they would quickly accelerate. Mr. D. L. J. Powell said that after the Hafodyrynys incident of February, 1962, he personally would not have allowed tailings on Tip 7; accordingly, since such tipping continued until early 1965, it follows that there was either a failure to impress Mr. Roberts about Hafodyrynys or, despite such information, Mr. Roberts wrongly allowed it to continue. Although Mr. Sheppard, the National Coal Board Director-General of Production, had no knowledge before the disaster of any dangerous qualities in tailings, he has since discovered that in no less than four Divisions they had given rise to difficulty (another striking example of a breakdown in communications, as to which see Paragraph 284) and he now accepts that they can affect the stability of a tip.

123. What happened at Tymawr in 1965 (see *post* paragraphs 159–172) brought home to all the mobile quality of tailings. So much so that, as Mr. Powell expressed it, he was determined to alert all to this danger, and hence the

addition dealing with this very topic which he made to the Powell Duffryn memorandum of 1939 (see *post* paragraph 160). What is so astonishing is that Mr. Roberts, one of the recipients, had himself written in such unfavourable terms about tailings in 1964, undoubtedly visited the tipping site with Mr. Church and Mr. Exley on 13th April, 1965, and claims to have paid an unaccompanied visit on 4th May and could clearly see for himself that (even on the National Coal Board's version) there had been a very substantial "slurry run". Yet, as we shall learn, he saw fit in 1965 to report that "a small slip (occurred) during the latter part of last year . . . otherwise the tip remained stable".

124. It is now clear that even before and certainly ever since the November 1963 incident Tip 7 was unstable and remained so until the disaster. Owing to the geological and geographical features and the size of the tip, the expert evidence is that there would have been a major slide even had no tailings been placed on it. Even so, for the reasons we have indicated, tailings do not fade from the picture. So unfavourably were they regarded that the complaints (written and oral) to which they gave rise should have compelled senior National Coal Board officials to investigate the position for themselves not later than the early part of 1964. Had they done so, they themselves now unanimously consider that further tipping would have been stopped until a proper scientific investigation had taken place. If this had been done there would have been no disaster. Accordingly, even although the presence of tailings was not a contributory cause of the disaster, evidence relating to them has been of importance in leading us to our general conclusions.

125. We revert to the correspondence with Mr. D. L. Roberts initiated by Mr. Bradley on July 24th, 1963 and headed "Danger from Coal Slurry being tipped at the rear of the Pantglas Schools" (see paragraph 116). Why did Mr. Bradley select this wording and to what "danger" did the correspondence relate? Mr. Roberts said that he had only *flooding* in mind and that no question of tip stability occurred to him as being involved. Mr. D. C. W. Jones, the Borough Engineer on whose behalf the letters were sent, said that:

" . . . What we wanted to do was to stop Tailings going to Tip No. 7. The letters should be forceful, even exaggerated and perhaps dramatic. We had to do something. We were not getting anywhere with the Board, so Mr. Bradley's type of letter suited me".

126. Mr. Bradley, their author, proved unsatisfactory when explaining why his letters were headed and expressed as they were. He began by saying that they were inspired by the concern expressed to him in July, 1963, by Councillor Mrs. Williams that tailings ". . . would be a danger to the schools if it came down. And I subscribed to this view, and this triggered off the correspondence that was to follow". The heading of the first letter being "descriptive of her fears and mine", its contents were thus explained:

" . . . I am bound to say that flooding in my mind was a secondary consideration, and that the expression of opinion was influenced by past experiences, where I felt quite convinced that with slurry in this tip . . . it could come down in bulk,"

adding this qualification,

"But one most important point is this: I did *not* conceive of the magnitude of the occurrence that did in fact happen. And I do make the point that nowhere in this correspondence would you find a reference to *fatality*, or the possibility of *fatality*."

Flooding, he re-iterated, was of secondary importance in his mind, whereas “the possibility of a substantial quantity coming down the mountainside [was] of primary importance”. How important is illustrated by the following passage:

“*Mr. Tasker Watkins, Q.C.*: Did you ever have in mind the possibility that coal waste would slip away from the tips and enter the properties of the people at Aberfan?

A. Yes, Sir. That was the reason for the heading on the letters, which were inspired originally by Mrs. Williams’ complaint.

Q. Will you now tell us whether or not you had any particular property or properties in mind as being vulnerable in this respect?

A. The slurry could have entered the schools at the east side of the railway embankment, because had the material flowed down in sufficient quantity it would have run over that embankment or flowed over that embankment, and it could have caused a lot of damage to the schools. The complete blockage of drainage systems and the troubles with water that emanated from that would cost thousands of pounds to put right”.

But when cross-examined by learned counsel for the National Coal Board, Mr. Bradley explained that by a “movement of the tip” he meant simply “a slurry run” and that:

“When I initiated the heading “Danger” to the correspondence, the only *danger* I had in mind was that there might be *flooding* of the property and thereby damage to the property”.

On the other hand, in cross-examination by Mr. Aubrey Myerson, Q.C., Mr. Bradley having said that his fears of the tip coming down in bulk were never completely demolished, an important passage occurred which must be quoted at length:

Q. So that from 19th March of 1964 you had in your mind an apprehension of the tip coming down in bulk?

A. The potential was there, and coming down in bulk and a large flow of material to my mind are speaking about the same thing.

Q. So it was not merely a question of apprehension of flooding in the village associated with slurry movements, it was an apprehension of more than that occurring?

A. Yes.

Q. And that meant a substantial movement of the tip?

A. Yes, it meant that I could have thought of a lot of material coming down.

Q. And a lot of material coming down would constitute a threat to the lives and health of the residents?

A. As I said before, the threat to life was a matter that I never conceived.

Q. Did you conceive of injury without loss of life?

A. No, I always thought that this material if it came down would flow down and that there would be ample time for people to be warned about it.

Q. Including the residents of Hafod Tanglwys?

A. There again I told my lord this morning that that was one factor which had not come into my mind or it would have appeared in the correspondence.

Chairman: You had a conscious thought at some time or at some times, did you, "With all I know about this tip complex it may get on the move and it may come down in bulk"?

A. Yes, my lord.

Q. "But, if that did start to happen, I think there would be ample time to warn people in nearby houses or in the school and they could be evacuated"?

A. That is what I thought, my lord, yes.

Q. You mean that, do you? You had that conscious train of thought?

A. Yes, I never contemplated that this would come down in such a way as to trap people; I never contemplated it.

Q. You are not following me. I want you to be careful, please; I say this in your own interest. Are you saying "I had a conscious train of thought; I thought to myself, knowing what I do about that tip complex, it is quite on the cards that the tip may start to move down in bulk"?

A. I did not think of it as a conscious train of thought in that way, but I thought the potential was there.

Q. You had fears that it might happen?

A. Yes.

Q. Then did you say to yourself, "If it does happen, there will always be time to get the people out"?

A. That was what I thought.

Q. So that was a train of thought?

A. I never thought people would be trapped in this. I never imagined the magnitude of it; that was completely beyond my thoughts.

Q. But you have told Mr. Myerson and you said several times today you did contemplate it entering property?

A. Yes, sir.

Q. But that before people were trapped inside their property there would be sufficient time to warn them?

A. Yes, sir.

Q. You thought about that and that was the conclusion you came to?

A. That was the thought I had.

Q. And that was the conclusion you came to?

A. Yes, sir.

Q. I suppose, looking back now, you realise that was a hideously risky line of thought, was it not?

A. Yes, sir.

127. Mr. Bradley last visited the locus when on February 11th, 1964, he met Mr. Baker in Aberfan Road. We consider hereafter the acceptability of his claim that, despite what he had earlier said, his fears of slurry entering the schools and houses were allayed once he learnt that tailings were no longer being placed on Tip 7. Let it suffice at this stage to say that in our judgment Mr. Bradley, a witness of keen intelligence, had for some time before the disaster entertained substantial fears that the tip might slip and, having slipped, travel a substantial distance. The adequacy of his conduct in these circumstances we shall also consider later in this Report (paragraphs 244–251).

7. The 1963 Slide of Tip 7

128. Late in 1963 there occurred on Tip 7 an incident the importance of which cannot be exaggerated, as no-one who appeared before the Tribunal realised more clearly than the National Coal Board themselves. By this time, tailings had been deposited there for something like eighteen months and the practice of wetting them to facilitate their tipping was being followed. It was not contested that the presence of such wettened tailings affected the tipping process, that as a result there was much washing of tip material into the Pantglas brook, and that in consequence people in the Pantglas area suffered grievously from flooding. During the earlier stages of the Inquiry it did not seem to the Tribunal that any doubt existed that sometime in the latter half of 1963 there was also a substantial slide of a part of Tip 7. But later this was strenuously challenged, the National Coal Board submitting that in fact there was no slide (which would be indicative of instability in the tip itself), but simply a tailings "run" from the tip (which nevertheless left its stability unaffected). It would be exhausting and profitless to go through all the lengthy evidence on these and allied points. Ultimately it was established that in fact there was more than one slip from Tip 7 during 1963, for by May of that year it had covered a source of water which caused back-sapping and created a 70-80 foot high steepish face in the tip, while by September there had developed a flattening of its southern toe indicative of shear failure (*see* Plate 1). And there is now no doubt that in the autumn of that year (probably in November) there occurred a rotational slide of a substantial portion of the actual body of the tip, accompanied by a small flowslide, of which the traces were uncovered by the site investigation. The gravity of such a conclusion from the point of view of the National Coal Board is manifest, for, with the important exception that thereafter the tipping of Tailings was greatly reduced and later stopped, no difference in tipping technique was effected from 1963 until the disaster. It is, therefore, wholly understandable that on behalf of the National Coal Board it was for a long time strenuously submitted that the only noteworthy incident was a "slurry or (tailings) run" which left stability unaffected. As Mr. Ackner, Q.C., expressed it:

'... it is clear that the National Coal Board were conscious of the seriousness of matters raised by the existence of the 1963 slip in relation to the total inactivity of their officials to take any steps to prevent its repetition; and were aware, too, that not only was nothing done, but that the only positive activity taken was an activity which built up the tip into its disastrous proportions of 1966. The whole attempt... has been directed to underplay the evidence on this matter'.

129. But the testimony of a number of witnesses, and especially that of members of the tipping gang, would in any event have convinced us that the original submission of the National Coal Board on this point should be rejected even had they not themselves ultimately been forced to concede that at that time a slide of substantial proportions undoubtedly took place. Mr. Colston, who was acting tip chargehand, was down in Aberfan village and proceeding to his work just before 6-45 a.m. when he heard a noise which "he took to be a jet engine"; when he reached the top of the tip, he saw that about 7½ yards of the point of the tip had slid about three-fourths of the way down the face. The mechanic was summoned and he arrived together with a burner who then burnt off the portion of the crane-rails which overhung the point of the tip. The crane-driver (Mr. Gwyn Brown) contributed a convincing touch: he said that

he had no doubt that the 1963 and 1966 slips started from the same position at the top of the tip, so that on both occasions the crane would have gone down with the slip had it not previously been drawn back from the point. The incident was one which frightened a slinger (Mr. Elvet Jones), and we are satisfied that the slip material in fact travelled some hundreds of feet and reached the field known as Coedcae, covering a good deal of the 1944 slip material from Tip 4 (see *ante* paragraphs 83–90). And as the appearance which the tip presented even to a layman is of importance, we quote from the evidence of Mr. W. R. King, the National Union of Mineworkers' Lodge secretary:

“What I noticed on the day that I had a look at the tip in November (1963) was as if somebody had scooped the middle of the tip out with a huge shovel and also that the base of the tip had run forward. There was a distinct hole in the centre of the tip, and the top plateau of the tip had sunk a little, and the other feature then was the fact that slurry had run down for a considerable distance. . . . The hole extended up two-thirds of the tip itself . . . from the bottom. The width, as far as I could recall, (was) about 80 to 90 yards.”

130. Yet, in conformity with their long-sustained denial that there had been any slip in 1963, the Board for weeks insisted that there never was “a hole in the centre of the tip”, and that the photographs conveyed a false impression in this respect. Pursuing this line, Mr. Wien addressed the following question to this same witness:

“What I am suggesting, Mr. King, is this, that, *owing to the configuration of the land*, at any time when you looked at this tip, even up to the day of the disaster, there would always appear to be something which you could call a hole?”

to which the witness gave a negative reply.

131. Although on Day 65 Mr. Piggott, the National Coal Board expert, accepted that . . . “there were signs of failure and degrees of failure on the tip from about 1963 onwards”, it was not until the 66th sitting of the Tribunal that the issue of whether or not there had been a slide of Tip 7 late in 1963 was removed from the realm of controversy. This was when Professor Nash, the expert witness called by the National Coal Board, agreed that the relevant aerial photograph established (a) that there had been a rotational slip of the tip which was quite different from a tailings run, (b) that a big volume of material had moved, though it might not have moved very far, and (c) that the result of this movement would inevitably have been observed by any proper investigation of the tip. This evidence needs to be set against that of Dr. Woodland, who reported that, “The almost constant run of tailings from the surface of the tip, dating from a time virtually coincident with the passage of the tip itself over the spring, appears to have confused observation and concealed the evidence of developing instability within the main mass of Tip 7”.

132. The length of this slide and the substantial amount of material involved is of importance. So also is the fact that thereafter there was throughout the bowl-like depression in the tip face spoken of by many witnesses and to be seen in several of the photographs. These features were all indicative of instability in the tip. In the words of Mr. G. M. J. Williams, a consulting engineer:

“In my opinion the tip presented such a vulnerable appearance at that time that any experienced engineer would have prohibited further tipping upon it until a complete investigation could have been made . . . It is inconceivable that any experienced engineer would have agreed to the continuation of tipping until the tip regained its previous shape without extensive protective measures, which would have been very expensive”.

133. Furthermore, in the view of Professor Bishop, if tipping had stopped when the 1963 slide occurred, there would have been no slide reaching Aberfan and, therefore, no disaster. The tragedy is that, so far from tipping being stopped, as Mr. Ackner, Q.C., expressed it:

“. . . Not only was nothing done to prevent any further failure, but the very course of action most likely to give rise to a further slide was immediately embarked upon—that is, tipping into the hole left by the slide and reconstituting the tip as far as possible into its pre-failure condition”.

134. But the importance of the 1963 slide does not stop even there. Its effect upon the watercourses is important. We have already referred (see paragraph 98) to the evidence of, among others, Mr. D. B. Jones, that when Tip 7 was started, the tipping gang used to go down for water from a stream which emerged from under Tip 4, but that as tipping advanced it covered this stream and the men had to obtain water from the village. Significant in this connection is the view expressed by Professor Nash that, “. . . there is a run from the toe of Tip 7 seen *first in the May, 1963, photograph*. There is no reason to connect this with tailings and it is probably normal tip material which has flowed under an increased water content. The cwm which developed behind it is visible through the remainder of the aerial photographs and it is not far from the point of emergence of the stream which accompanied the disaster. This gives the appearance of toe erosion . . .”. There is also vivid evidence that immediately after the 1963 slide the interference with water courses became more marked. For example, the tenant of Hafod Tanglwys Cottage was unchallenged in his testimony that the November, 1963, slide cut off his domestic water supply by covering the stream on the south side of Coedcae which fed a trench cut by a previous farmer, and that thereafter they had only seepage water. And 15-year-old Robert Short who spoke of water bubbling out of the foot of Tip 7 if they dug holes there, said that the 1963 slip covered a man-made pond which children used for bathing. There is no doubt in our minds that after this slide the mountainside at the base of the tip was at times very wet, for sheep became stuck in the slurry and schoolboys playing there used planks and ropes to enable them to cross. Nor did the 1963 slip stop the downward creep of the tipped material. Mr. W. Lloyd Evans said that, “It kept pushing forward, as though it were being overturned by pressure from behind”, while the tenant of fields on the mountainside spoke of having to renew his fences from time to time over the last 4–5 years as the toe of Tip 7 crept downwards. Another credible witness (Mr. D. T. Jones) stated that during four months before the disaster the toe moved downwards some 20–30 feet.

135. The *insouciance* of the National Coal Board regarding this substantial slide late in 1963 is remarkable. After the 1944 slide, tipping on Tip 4 was stopped. Yet, as we have already remarked, after the 1963 slide there was no cessation of tipping; material continued to be tipped in the same way, except for tailings; there were no tipping instructions, and there was no inspection for

stability. There is absolutely no record of the slide in the National Coal Board archives, and several of the officers, not only from Division, but even from Area and Group, had no knowledge that it had taken place.

136. But the result of the slide was there to be seen by all, and the sight alarmed some. Mr. W. R. King told the Tribunal of "a number of people in Aberfan who were apprehensive of a further slide in the tip . . . after the 1963 slide" and added, "The fear that they expressed to me was that the tip would come away again, and it would run over the remaining 150 yards of the Coedcae and it could overwhelm the school and the houses". Two ladies expressed their concern to Alderman David Tudor, and at a Colliery Consultative Committee meeting on 26th November, 1963, presided over by Mr. Wynne (the Colliery Manager), he voiced their fears. The relevant minute is material:

"Rubbish Tip. D. R. Tudor reported that many people residing in the neighbourhood of the rubbish tip were very disturbed that a further slide would take place. The Chairman stated that there was a big banking before the houses would be in any danger. He stated that tenders were out for an aerial ropeway which would be tipping on the top of the mountain."

137. Mr. Wynne lacked frankness when seeking to explain this minute. He said that by "big banking" he was referring to a flattening-out of the mountain-side which he felt would act as a brake, and that the only "danger" he had in mind was the flooding of houses on the north side of Pantglas Road. We do not accept this evidence and it was certainly not the meaning which he conveyed to Mr. King, who clearly understood the phrase "big banking" as referring to "the canal bank and the railway bank". We think that in truth and in fact Mr. Wynne had in mind the possibility of tip material reaching houses and that he intended to convey that the banking formed by the disused canal and railway embankment would prevent this.

138. The complaint was sufficiently serious to call for a report to higher authority, but neither Group nor Area was brought in by the Colliery Manager. Instead, on 27th November 1963 Mr. Wynne went unaccompanied to the mountainside, and talked to the tipping crew. As a result of what he then saw and heard, he immediately decided that no more tailings should be tipped there. But nothing more than that did he do. Yet confronting him on the southern slopes of Merthyr Mountain was a sight which, had he looked properly, must surely have shown that the fears expressed to him had, at least, all the appearances of having some foundation. And if what he saw puzzled him, he could have sought help in time for the next Consultative Committee meeting. As was stressed in the National Coal Board booklet ("Guide to Consultation in the Coalmining Industry"), issued only in May of that year, "Good Committees are always anxious to get the views of specialists, who are often invited to attend meetings . . . they are always happy to attend Colliery Meetings to answer questions and to discuss points". His report to the next Committee meeting (17th December, 1963) was minuted in this way:

"Rubbish Tip. The Chairman reported that after reaching the top he was in a position to report that the tip seemed to be drying out and that work would be done on the watercourses by the local authority and that there should be an improvement with no apparent danger. It was anticipated that a new aerial flight would be installed on the rubbish tip, starting next May."

This assurance satisfied Alderman Tudor. But, as we shall shortly see, others remained far from satisfied.

139. Before turning to consider these others, one of the several strange features of this Inquiry must be referred to. We have already written of Mr. Wynne's failure to inform Group or Area of the 1963 incident. What is even more curious is that he, on the other hand, was completely ignorant of the fact that the local authority was from 24th July, 1963, sending letters to the Area Mechanical Engineer (Mr. D. L. Roberts) under the heading "Danger from Coal Slurry being tipped at the rear of the Pantglas Schools". (This correspondence is dealt with in detail elsewhere at paragraph 116-120.) Furthermore, he had no knowledge of the fact that, as a result of this correspondence, on the very day that he (Mr. Wynne) visited the Tips (27th November, 1963), the Area Mechanical Engineer and the Assistant Borough Engineer (Mr. Bradley) made a joint inspection of the Pantglas flooding area. In the same way, Mr. Wynne had no knowledge that, after being pressed by the local authority, Mr. Roberts on 28th January, 1964 wrote to the Town Clerk saying:

" . . . I have been trying to find ways and means of disposing of the tailings and what can be done to prevent any being washed down the culvert. . . . A satisfactory and suitable place other than the tip to dispose of the tailings eludes me at the moment, and *causes me great concern.*"

140. Mr. Roberts was not the only person in a concerned state of mind regarding the tip. On 1st January, 1964, the Town Planning Committee of Merthyr Borough Council "Resolved that the . . ., Member of Parliament and the Association of Municipal Corporations be informed of the concern and alarm of the Committee at the excessive amount of tipping by the National Coal Board taking place in the area". But this minute palely reflects the vigour with which at least one member of that Committee expressed herself. For this one must have resort to a report, the accuracy of which is not impugned, contained in the issue of the "Merthyr Express" of 11th January 1964. Headed, "Councillors object to Aerial Ropeway Plan", the material part reads as follows:

"Councillor Mrs. G. L. Williams said there were dangers arising from surface tipping. 'We had a lot of trouble from slurry causing flooding at Merthyr Vale. If the tip moved it could threaten the whole school.'"

Aerial Ropeway

141. From time to time during the sittings of the Inquiry references to the proposed aerial ropeway flitted in and out of our proceedings like a will-o'-the-wisp. It might be convenient at this stage to digress somewhat to set down in chronological order the few facts known about the proposal. It seems to have been first mooted, among other proposals for rubbish disposal, at a meeting on 20th August 1962 of officials of the National Coal Board who were discussing the reconstruction of Merthyr Vale Colliery. The following day the Area General Manager, Mr. Wright, decided in favour of the aerial ropeway which would tip rubbish on the mountainside beyond Tip 5. A preliminary application for planning approval was made to the Merthyr Tydfil County Borough Council in October 1962 and the Council gave their approval on 31st December, 1962. It will be recalled that at a Pit Consultative Committee meeting on 26th November, 1963, Mr. Wynne quite erroneously stated that, ". . . tenders were out for an aerial ropeway which would be tipping on top of the mountain", and that

at another meeting in the following month he, with equal inaccuracy, said, "It was anticipated that a new aerial flight would be installed on the rubbish tip, starting next May". The proposal as submitted in the original application was withdrawn and an amended application was submitted to the Council in January 1964. This led to the meeting of 11th March 1964 where Mr. McInnes (see *post* paragraph 149) expounded the ill-starred tier-tipping proposals. At the same time as application was made for planning permission, an application was made to the National Coal Board headquarters in London for authority to spend a sum of £300,000 for constructing the ropeway. In June, 1964, headquarters expressed concern at the expenditure of so large a sum, queried whether it was essential, and asked to be given details of the economics of the proposal. Permission to proceed was not given for some time, but approval was finally given in July 1966 for the expenditure of £331,196.

142. In his opening address the Attorney-General invited the Tribunal ". . . to consider whether, if the aerial ropeway scheme had been brought into use reasonably soon after it had been contemplated in 1962 . . . the disaster itself might have been avoided." We do not think the question admits of a simple answer. If there had been no withdrawal of the original application and if there had been no difficulty about obtaining approval for the requisite capital expenditure, the ropeway might have come into operation by mid-1964 at the earliest. Applying the same assumptions to the second application, this might have come into operation in the second half of 1965. The inauguration of the aerial ropeway might have meant the cessation of tipping on Tip 7. The ropeway scheme was not put forward because it was desired to stop tipping on Tip 7 but because of the inadequacy of the crane tipping system on that tip to dispose of all the rubbish coming from the mine quickly enough and because the site available for dumping by lorry had only a few years to go before it would be filled to capacity. A National Coal Board document of February, 1964 put the position thus:

" . . . the operation of the surface rubbish disposal facilities are (sic) unable to cope with the present make of rubbish except by supplementing the tram haulage to the tip crane, with disposal by lorry to alternative sites. During the next two years active consideration will have to be given to the proposal for an aerial ropeway."

It is therefore impossible to conjecture when tipping on Tip 7 would have ceased and, if it had ceased at any particular date, whether or not a slide would have occurred subsequently on Tip 7 and whether such a slide would have been of disastrous proportions. The fact is that the question posed at the outset by the Attorney-General cannot be answered except in the most general terms, and those used by Mr. Alun Davies, Q.C., are as good as any: "If the aerial ropeway had been implemented, the disaster might well have been avoided, *provided* it could have been implemented in good time".

143. Let us now revert to our main theme and state our conclusions. Late in 1963, and probably in the month of November, there was a considerable slide of a substantial part of Tip 7. It was a significant incident, the importance of which in relation to stability was there to be seen. Mr. Wynne inspected within a few days of its happening, and so did Mr. Roberts. They saw nothing which aroused their fears. Since they are both doubtless honourable men, it is tempting to describe their absence of fear to the fact that they had no knowledge of civil

engineering or soil mechanics. But this will not do; we are firmly of the opinion that to all who had eyes to see the prospect presented by Tip 7 was such that any reasonable person having any knowledge of tipping would regard it as so unusual as to call for reporting and investigation. The truth can only be that they never looked properly.

144. That Mr. Bradley, with his civil engineering training, was far from satisfied emerges from his letter of December 13th, 1963 to the Town Clerk, in which he writes (*inter alia*) of “The venue of future tipping of this troublesome waste material”, and added:

“I feel that it is necessary that the National Coal Board be made to commit themselves without further delay . . . and that they ought to be told that although the current solution at Pantglas may be difficult it will not by any means be as difficult as would apply in the event of the tips sliding in the manner that I have envisaged”.

What exactly did Mr. Bradley envisage? From his own evidence, we conclude that very shortly after the 1963 slide he entertained fears of the tip coming down in bulk, and even that he felt that a part of the village might be engulfed thereby. The only qualification he made was that, as he contemplated a sufficiently gradual collapse of the tip to enable evacuation of occupied premises to be effected, he envisaged danger to property but not to life. That, he now realises, was a hideously risky approach, for the collapse might occur at dead of night and render impossible the giving of any warning.

145. The length of our treatment of the 1963 slide is some indication of the importance with which we view it. It was indeed an outstanding incident. In pattern it bears striking resemblances to the fatal disaster. For nearly three years its results presented a vivid warning of the terrible danger which loomed ahead. But it was a warning which no-one in authority ever heeded.

8. The events of 1964–1966

146. Having dealt at some length with the slide of November, 1963, it is now necessary to consider what happened after Councillor Mrs. Williams’ outburst in the Town Planning Committee of 1st January, 1964. It is a sorry tale of inertia and neglect, and one from which the taint of subterfuge and arrogance by the National Coal Board is not wholly absent. There is much force in the observation of Mr. Alun Davies, Q.C., regarding the Board, “that perhaps the natural mistake made by the Merthyr Corporation was that it accepted the opinions of the experts of this organisation at their own valuation. Little did the Corporation realise how empty were the assurances given by their experts. . . . There has been a complete failure on the part of the Board to appreciate problems in human terms, a failure to appreciate that when representations have been made they must be considered with care and respect”. That due consideration was certainly not extended to their representations is now the view shared by Board officials themselves—certainly by Mr. Wright, the No. 4 Area General Manager. And as Mr. Wien, Q.C., put it:

“Whether the many letters from the Corporation amounted to warnings of tip instability or not, they should have been referred, within the Coal Board organisation, to the Area General Manager. . . . It seems that if those letters of complaint had been referred to the Area General Manager, then in all probability some investigation of the tip complex would have followed”.

147. Notwithstanding the terms of the Town Planning Committee's resolution of January 1st, 1964, "... that the Member of Parliament and the Association of Municipal Corporations be informed of the concern and alarm of the Committee at the excessive amount of tipping by the National Coal Board taking place in this area", this resolution was regarded as interlocked with the Planning Officer's recommendation that the application by the National Coal Board for planning permission in respect of the aerial ropeway be approved. Accordingly, when, after reference back by the Town Council, it was reported to the Town Planning Committee on 5th February, 1964, that the planning application had been withdrawn, that part of the resolution which called for action regarding the excessive tipping already taking place was just allowed to drop.

148. Meanwhile, during January, 1964, correspondence was passing between Mr. Bradley and Mr. D. L. Roberts regarding the undesirability of tipping tailings on the mountainside (see "Tailings" paragraphs 112-127). On 11th February, 1964, there was a meeting on the Aberfan Road between Mr. Bradley for the local authority and Mr. Baker (Group Mechanical Engineer) and Mr. Vivian Thomas for the National Coal Board, Mr. Bradley expressing regret that Mr. Roberts was not there as expected to deal with the problem of Tailings being eroded from the tip and causing flooding in the Pantglas area.

149. On 11th March, 1964, a meeting of the Town Planning Committee was attended by Mr. Smith (No. 4 Area Deputy Estates Manager) and Mr. McInnes (Area Planning Engineer), when the subject of discussion was the National Coal Board application in relation to the aerial ropeway. But there can be no doubt that some apprehension was then expressed by the Council representatives that depositing rubbish higher up the mountain would place pressure on the existing tip complex and cause instability. By way of reassurance, Mr. McInnes explained that tipping would proceed by a system of steps starting from the disused canal, that the existing tips would be dealt with in this way westwards from the canal, and that thereby the danger feared would be obviated. But the Council representatives remained dissatisfied and consideration of the aerial ropeway application was deferred, Mr. McInnes undertaking to submit within some 3-4 weeks details of what he had in mind. About one point the Committee was decisive, the minute of this meeting ending, "It was further resolved to recommend that, in the event of planning permission being granted, it be a condition that *no* tailings be tipped". In fact Mr. McInnes never supplied the promised details, and the aerial ropeway project (estimated to cost some £300,000) vanished into thin air, though we were told that it has still not been abandoned.

Mr. McInnes

150. Here our duty demands strictures on Mr. McInnes. The position he occupied and the part he played were important. Objecting to taking the oath on the ground that he made it a practice always to tell the truth, his unreliability as a witness proved as great as his manifest self-satisfaction. Although as Area Planning Engineer (and later Senior Area Planning Engineer) he examined sites to determine their suitability for spoil-heaps and regarded this as an important task, he never looked at the Aberfan complex. His scheme for tier-tipping would have meant going up the hillside, regardless of streams and of the need to flatten the existing high tips, each containing many thousands of tons of material.

Although he had received a copy-memorandum, dated 20th June 1957 relating to the proposed new tip (later to become Tip 7), he regarded this project as merely an extension of an existing tip and therefore not calling for his personal consideration. It is true that this memorandum was addressed to the Area Estates Manager, but it ended with the words, "It is proposed to start immediately on preparation of this site. If you have any objection to the use of the area shown, I would be grateful if you would let me know immediately". Yet Mr. McInnes, who had seen the results of the Cilfynydd slide of 1939, regarded the memorandum as calling for no action by him. Certainly it received none. Although he denied being responsible for Tailings being placed on Tip 7, he it was who on February 29th, 1962, recommended that this very thing be done, and his explanation to the Tribunal that this recommendation was advanced purely on financial grounds and had no reference to the suitability of Tailings as tip material made unattractive hearing, coming as it did from a planning officer. His evidence regarding the meeting with Council representatives on 11th March 1964 was even more unattractive. He explained that he was invited to attend it only at the last minute, deputising for either Mr. Stiles or Mr. Roberts; that he was not familiar with the situation and not briefed, and advanced his tier-tipping suggestion without premeditation, deriving the idea from some such project which had recently been carried out at Mountain Ash in the adjoining valley; and that he presented it as an idea which, while tentatively advanced and worthy of further consideration, in no sense represented the official National Coal Board view. Whether or not it is true that he was brought in at the last minute (which we find difficult to accept), we certainly do not believe him in other respects. We believe the Council witnesses who swore that he spoke as one authorised to express the National Coal Board view. Thus, Mr. Bradley (the Deputy Borough Engineer) testified that:

"As Mr. McInnes put this (scheme) to the Committee, he spoke with the greatest authority, and I would not have conceived it possible that he could have dealt with it in the detail that he did unless he had had substantial prior consultation".

Again contrary to Mr. McInnes' assertion, we believe that he did undertake to submit details of his tier-tipping system within 3-4 weeks and to arrange a joint visit with the Borough Engineer and Committee Chairman to the tip complex. But he never did, and the reason therefore is clear. Gullible though the Council representatives and officials were, the system did not bear examination, and Mr. T. Wright, the Area General Manager, agreed that it was "nothing short of nonsense".

151. Why, then, was it ever advanced? A wholly satisfactory answer to this question is not forthcoming, but it may not be without significance that at this time the National Coal Board itself was seriously concerned about what was happening on Tip 7. It may here conveniently be recalled that only two days later (that is, on March 13th, 1964) we find Mr. D. L. Roberts writing to the Merthyr Tydfil Borough Engineer regarding Tailings, that ". . . we would not like to continue beyond the next 6-8 weeks in tipping it on the mountainside *where it is likely to be a source of danger to Pantglas School*". We believe that as likely an explanation as any is that Mr. McInnes was simply fobbing-off the Council representatives by advancing a plan which (even making the assumption in his favour that he ever regarded it as feasible) was one which he had never

thought out, despite the pontifical air with which he presented it. Certainly it seems to have had the effect, both immediate and prolonged, of quelling the fears of the Council, for never again is there any reference in Council or Committee minutes to tip stability. Whether they were wise or justified in awaiting the National Coal Board's pleasure as time passed and nothing emerged is a matter we shall consider elsewhere (*vide* "Merthyr Tydfil" paras. 244–251).

152. From the National Coal Board side, indeed, all that happened was their adoption of a defensive attitude in relation to the complaints of flooding which persisted in the years now under consideration. We have dealt with this particular topic in more detail elsewhere (*ante*, paragraphs 35–41), but even where there was no room for doubt that tip rubbish carried down from the mountain was silting up and causing (or at least aggravating) the flooding, the comment of the National Coal Board was that culverts were mal-aligned, as though this assertion *ipso facto* relieved them of all responsibility. Indeed, even when there were those in the Board who were prepared to act properly in the matter, they were obstructed. For example, on 11th December, 1964, Mr. Young (Assistant Area Estates Manager) advocated to Mr. Wynne (Colliery Manager) that a culvert at Pantglas be cleared out "as soon as possible", but added "I have spoken to Mr. Roberts, the Area Mechanical Engineer, who refused to make any men available to do the work".

153. On 15th December, 1964, an official of the Glamorgan River Board wrote to Mr. Wright, Area General Manager, regarding "a very dirty discharge . . . taking place to the River Taff at Pantglas, Merthyr Vale, [which] appears to arise from the tip used in connection with the Merthyr Vale Colliery. I understand a *spring* flows adjacent to the tip, with the result that tipped material is carried down the watercourse, and I am wondering whether it is possible to pipe or culvert this water to prevent the access of the polluting solids". Mr. Wright therefore called on 31st December, 1964, for a joint report on the matter from Mr. Stiles (Area Estates Manager) and Mr. Exley (Area Civil Engineer). Mr. Stiles accordingly visited the tip complex and found that a "fairly large" quantity of tip material had slipped some 2–300 yards "comparatively recently" (which he defined as meaning within the previous two years or so) covering a stream and leaving a large bowl-shaped depression in the side of Tip 7, from the base of which a small trickle of water issued in runnels which he thought indicated that at times the flow would be of a considerably greater quantity.

154. Although the evidence of Mr. Stiles was strongly attacked by the National Coal Board (pursuant to the attitude they were then maintaining that there had been no slide in 1963), we regarded him as a reliable witness—and he was later convincingly corroborated in a manner which led the National Coal Board to concede that in fact there had been such a slide. No longer in the employment of the National Coal Board, he wrote to the Ministry of Power only 48 hours after the disaster, giving many details regarding Tip 7 which were later strikingly confirmed by the aerial and other photographs, the very existence of which must have been entirely unknown to him. He proved a much more credible witness than Mr. Exley, who also visited the tip complex in his company and who said that he saw no such depression, although he was surprised by the amount of tailings mixed with washery shale which had slipped away. The importance of Mr. Stiles' evidence is obvious. As Mr. Tasker Watkins, Q.C., put it,

“If Mr. Stiles saw that hole of dimensions 70 to 80 feet in height, how does it come about that other visitors from Area and Group and Colliery to the mountain in 1965 during the “swearword” strike and at other moments failed to observe the same feature?” (see plate 3).

Absolutely no answer to that highly pertinent question was forthcoming, despite the fact that in cross-examination Mr. D. L. J. Powell agreed that the depression “was easily observable by anyone looking at the tip during the years 1963 to 1966”, and that it “called for, by any standards, urgent attention during those years”.

155. At a Public Works Sub-Committee held on 21st January, 1965, to discuss flooding at Pantglas and the Grove, Mr. Stiles (then No. 4 Area Estates Manager), who was in attendance, accepted that a measure of liability attached to the Board in relation to the silting-up of the stream to the north of Pantglas Road, but not elsewhere. On 18th March there was a meeting in the flood area between Council officers and others, including Mr. Roberts (Area Mechanical Engineer), Mr. Exley (Area Civil Engineer) and members of the Area Estate Manager’s staff.

156. When again there was a limited admission made on behalf of the Board, the resulting memorandum which Mr. Stiles later sent to Mr. Wright (the Area General Manager) is of some importance. Dated March 30th, 1965, it described an attached plan (H.27) as “showing . . . the approximate area of tipped material which has slipped across the course of the stream.” In fact the plan (which is based on the 1957 Ordnance) shows that tipped material had slipped across *two* watercourses, and Mr. W. L. Evans, an impressive witness, stated that this occurred “during the past three years or so”, which would be well after Tip 7 started. This led to the cutting by the National Coal Board of two trenches below this tip between 5th May and 4th June, at a cost of £300, in order to prevent or at least reduce the washing down of slurry into the Pantglas Brook. Meanwhile, however, on March 29th, 1965, there occurred the big flow of tailings at Tymawr (*vide* “Tymawr” *post* 159) which caused Mr. Wright to send Mr. Exley (his Area Civil Engineer) and Mr. Lloyd (Acting Area Chief Surveyor) to investigate it. This led in its turn to the issuing of the Powell Memorandum (see Appendix D) and the consequences thereof *insitae* No. 4 Area are considered elsewhere in this report (*vide* “Tymawr and the 1965 Memorandum”). It is said that the big explosion which occurred at the Cambrian Colliery on May 17th, 1965, and which caused several fatalities, demanded the full attention of Divisional officials for some time and resulted in less regard being paid to the Powell Memorandum than its importance deserved. This may well have been so.

The Ryan Project

157. On July 7th, 1965, Mr. Lawrence Ryan, the Managing Director of Ryan Industrial Fuels Ltd., paid the first of his three visits to the tip complex with a view to setting up a washery to reclaim coal. On this occasion he was in the company of Mr. Roberts, Mr. Church (Group Mechanical Engineer), Mr. Wynne (Colliery Manager) and others. All told the Tribunal that they saw nothing unusual or any indication of instability. Yet the photographs of November 1964 and June 1965 demonstrate beyond doubt that an extremely unusual state of affairs existed, which deserved immediate investigation. Mr. Ryan’s lack of appreciation of the situation is understandable; his sole interest,

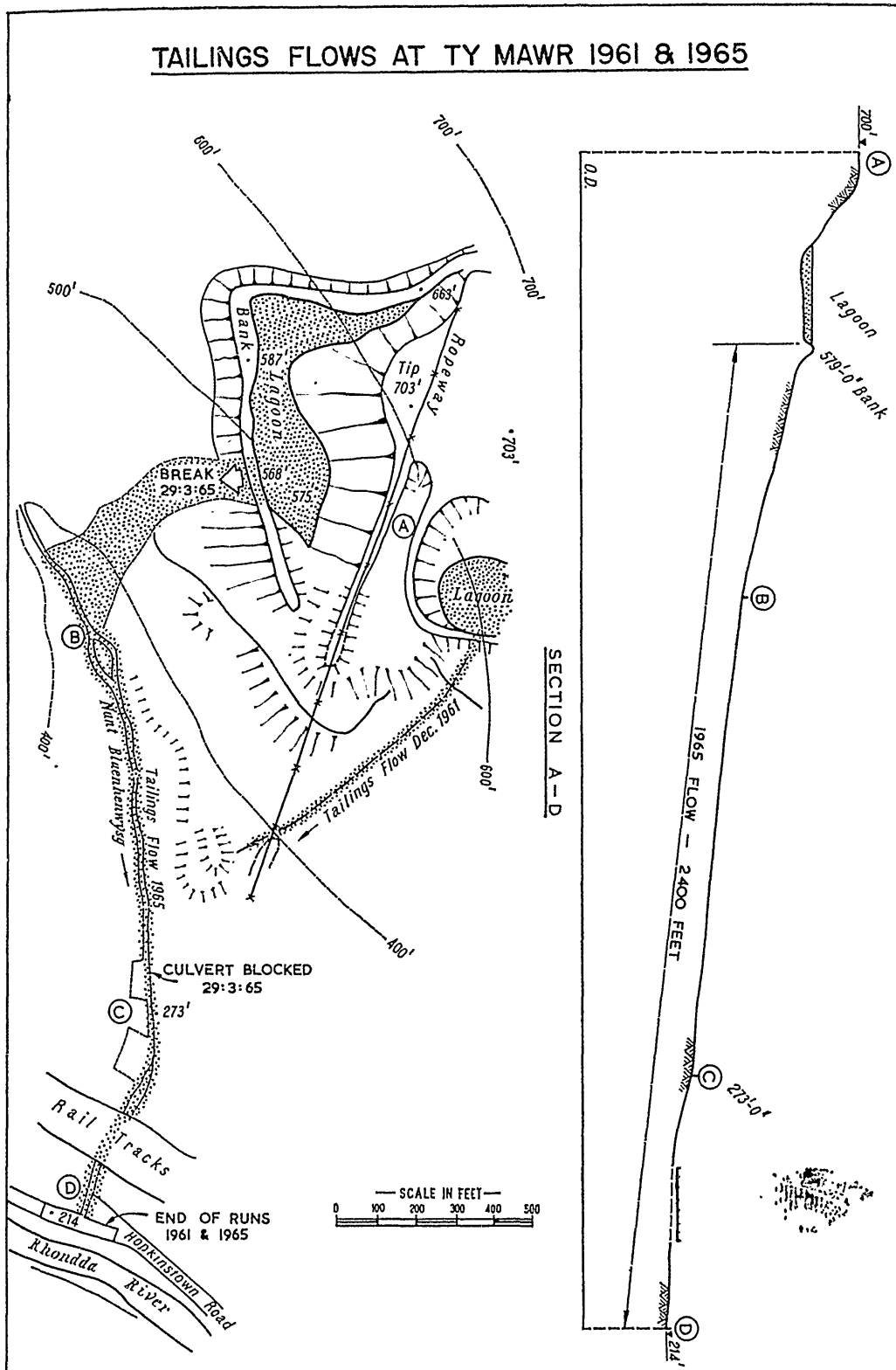
he declared, was in the carbon contents of the tips, he did not have the matter of stability in mind, and he, therefore, paid no attention to their condition. But what of the total failure of the National Coal Board officials to detect the warning signs? What, especially, of Mr. Roberts and Mr. Wynne, both of whom knew of the fears regarding stability which had in the recent months been expressed to them? These are questions which we consider hereafter (see paragraphs 222–223 and 212–213).

158. During 1965, after the trenches already referred to were cut in the mountainside, there was a discussion between Mr. Wynne and Mr. Vivian Thomas as to starting another tipping site and stopping Tip 7. They knew where the new site was to be—that is, in the valley between Tip 4 and Tip 7—before they proceeded up the mountainside in August, 1965. The Tribunal feel that the truth as to why a new tip was then being contemplated did not emerge at the Inquiry, and they are not satisfied with Mr. Wynne's explanation that it was solely because this would enable economies in man-power to be effected. Mr. Wynne denied that the matter arose because he considered that Tip 7 was getting too big. Indeed, he asserted that in his judgment it was "totally satisfactory" at that time. The chargehand, Mr. Leslie Davies, on the contrary, testified that he personally was considerably relieved to hear about the new tip because he knew that, despite the fact that no drainage had been laid down beforehand, Tip 7 had by that time been extended over streams and he appreciated the danger of having water in a tip. But, save that no tailings were deposited there after February, 1965, tipping continued unabated on Tip 7 right up to the disaster. Why was this? According to Mr. Wynne, it was because a new Maclean tippler (which had been delivered in about December 1965 for the purpose of starting up the new tip and which could have been working by March 1966) proved to be one of the wrong gauge and had to be returned. Here again we do not feel that a really satisfactory explanation was adduced as to why this matter was not pursued. Had a suitable tippler been obtained, the probability, according to Mr. Vivian Thomas is that the new tip would then have been started and Tip 7 stopped. But it was not, and, as Professor Bishop established, between November, 1964 and June, 1965, there were further slipping movements and these, according to the tipping gang, continued right up to the disaster. Indeed, between the major slip of November, 1963 and the disaster the point of the tip advanced no more than about 8 feet in all, while its toe was advancing ever downwards and across the mountainside.

9. Tymawr and the "Powell" Memorandum of 1965

159. In March, 1965, there was an alarming incident at Tymawr Colliery, Rhondda, in No. 3 Area, which for some time was erroneously regarded as due to a tip-slide. High-ranking officials agree that, although before it occurred there was no general awareness or apprehension within National Coal Board circles about the stability of tips, its reverberations were loud and strong enough to have promoted awareness and to have created apprehension. At Tymawr tailings had been tipped in a lagoon formed at the foot of a tip and were there kept in place by a bank formed by pushing up colliery waste material. As water collected in the lagoon, the excessive burden placed on the supporting bank caused it to be breached, and on 29th March, 1965, the tailings were washed down the hillside. When Mr. D. L. J. Powell, the Divisional Chief Engineer saw what had happened he was greatly concerned, for, as he himself expressed

Figure 7



it, “. . . it did not take a lot of imagination to see that serious consequences could have resulted. The main road was flooded for some hundreds of yards, and it could have adversely and dangerously affected traffic, and there were some houses adjacent to the flow where children and people could have been involved. It smashed up two or three cars in the colliery car park, and if the incident had occurred at a different time there might have been fifty men in the car park. The other thing that struck me very forcibly was that if the water had not flowed, if it had gone to the right instead of to the left, it would have been down the shafts at Tymawr”. See figure 7.

160. Being thus concerned, and believing at that time that the Tymawr incident was a tip-slide caused by ground failure due to springs, he determined to issue some written warning of what could occur. Having mentioned this to Mr. Clifford Jones, the latter recalled the Powell Duffryn memorandum of December 1939 (see *ante* paragraph 81) and produced it. Liking what he saw, Mr. Powell adopted it entirely, made additions to deal with tailings, and then proceeded to issue it. This memorandum, together with its illustrations, is set out in full in Appendix D, and its importance is such that it should be considered in its entirety. It is, however, sufficient for us at this stage to set out its concluding paragraph, which summarises the effect of the lengthy observations and recommendations which precede it:

“Precautions to Prevent Sliding

1. The height of a tip should be limited to avoid overloading the supporting ground.
2. Where a slide would cause damage to property, no tip over 20 feet high should be placed on a hillside unless the ground is a compact gravel or of better quality than this.
3. The advancing tip should be so aligned, along a sloping surface, that water draining off the ground above it can be collected, if necessary, by a system of drains cut in the ground, and led past and clear of the tip. Along the uphill edge of the advancing tip, no bays or recesses should be formed in which water can collect.
4. On the dip side of the tip, deep drains (not less than 18 inches) should be cut leading downhill to prevent water accumulating and to keep the ground *dry*. A herringbone system is illustrated in Appendix VII, as well as the method of packing the drains with flat stones placed on edge.
5. Tipping should never be extended over springs of water, whether continuous or intermittent, or over bogged and water-logged ground.
6. *The composition of the tip material must be carefully watched for variation and the disposal of materials such as ‘tailings’ must be carried out separately, preferably into redundant shafts or similar enclosures where the failure to maintain a good angle of repose is of no consequence”.*

¶ 161. One of the most striking discoveries emerging from our investigations has been the degree of extent to which the views expressed by the experts in relation to the causes of the Aberfan disaster were anticipated 27 years earlier by the Powell Duffryn memorandum of 1939. If that document had remained

in circulation and dispersed throughout the South Western Division—and heeded—the probability is that there would have been no disaster. In particular, the memorandum stressed that tip stability is dependent on water pressure, and a long section on the action of water gives an accurate description of how the Fennant sandstone absorbs rainfall, and how, why and where springs are likely to appear. It goes on to describe the Pennant sandstone as much fissured, readily permeable, covered with soil and subsoil, and with boulder-clay covering the lower slopes. This is an exact description of the site of Tip 7 and it empties of all meaning the Board's reference to a "coincidence of geological factors" on Merthyr Mountain, (see paragraph 189), for such a combination of factors is commonly to be expected in many South Wales valleys. Although the memorandum, both as issued in 1939 and in its amended 1965 form, was criticised by some witnesses, their criticism lacked conviction, and there is no real room for doubt that had it been properly circulated, studied and applied, due attention to tip stability would have resulted.

162. Mr. Powell distributed his memorandum under cover of a letter of April 12th, 1965, addressed to the Area Chief Engineers, Mechanical Engineers and Civil Engineers, but not, most curiously, to Area General Managers or Production Managers. The letter was in these terms:

Date: 12th April, 1965

SUBJECT: Control and Management of Colliery Rubbish Tips

An incident occurred recently within a Colliery of this Division involving the slipping of the rubbish tip resulting in severe financial loss. I should be pleased, therefore, if you would arrange with your colleagues, for a detailed examination of every tip within your Area, and to take the necessary action for its immediate safety and ultimate good management.

A copy of a report is attached, indicating certain conditions that should be borne in mind during this examination, and I should be pleased if you would let me have a report by Friday, the 30th April, 1965.

I would like to draw your attention specifically to the dangers of including materials such as "tailings" in the general rubbish for disposal, and in particular, to the serious adverse affect this type of material has on the angle of repose that can be expected.

Signed D. POWELL."

163. The Tymawr occurrence, which incidentally cost the National Coal Board some £20,000, was clearly such that (in the view of Mr. Geoffrey Morgan, the Divisional Production Director) the memorandum should have received the widest circulation. Yet in No. 4 Area it never reached the General Manager (Mr. Wright) or the Merthyr Vale Manager (Mr. Wynne), and at the London Headquarters of the National Coal Board nothing was ever heard of the Tymawr incident. Mr. Powell said he had it in mind that there would be collaboration between colleagues in Areas in making "a detailed examination of every active tip". He knew that in No. 4 Area there was no Chief Engineer, but he said he expected that Mr. Exley, the Area Civil Engineer, would take a leading part in the investigation. What in fact happened, however, is beyond dispute—Mr. Exley played no part at all, made no investigation and never saw the report which Mr. Roberts eventually on May 13th, 1965, sent to the Divisional Chief Engineer. *Why* this happened is, on the other hand, much in dispute.

164. A contributory factor may have been that when Mr. Exley was first appointed in 1958 he did not receive, as he should have done, notice defining his duties as required by Section 1 of the Mines and Quarries Act, 1954. He received his notice in this behalf three years later, in May, 1961, and it informed him that he was responsible for “technical engineering control of all surface buildings and structures at mines in the No. 4 Area . . .”. When, Mr. Roberts, however, joined the Area as Mechanical Engineer in 1960 he received his notice in August of that year. It informed him that he was responsible for “technical engineering control of all mechanical apparatus *and of all surface buildings and structures* at mines in the No. 4 Area . . .”. Although Mr. Exley had been longer in post in the Area, Mr. Roberts was the first to receive his notice under Section 1 and he was given no amending notice when Mr. Exley received his notice. Each, therefore, had reason to believe that he was responsible for “civil engineering matters”: indeed that very phrase occurs in the notice issued to Mr. Roberts, and also in that issued to Mr. Exley, who was designated Area Civil Engineer.

165. Mr. Roberts, who said that at times he and Mr. Exley were “at loggerheads”, asserted that he assumed that he and Mr. Exley would be sending in independent reports. Mr. Exley, on the other hand, denied any estrangement and claimed that Mr. Roberts expressly told him that he would himself see to the report and so Mr. Exley left it at that. We do not believe either of these versions. We think that the truth is that, it being traditional that tips were the responsibility of mechanical engineers at the various levels, Mr. Roberts deliberately ignored the fact that Mr. Exley was one of the addressees of the Powell letter of April 12th, 1965. Mr. Exley, on the other hand, heavily overshadowed by the far more dominant Mr. Roberts, never consulted him about the matter at all, and took it for granted that his assistance was not welcome to Mr. Roberts, whatever Mr. Powell intended.

166. Be that as it may, there is unanimity of views among the higher officials of the National Coal Board (Mr. Gareth Jones and Mr. Powell included) that collaboration between mechanical and civil engineers was essential to the checking of tip stability. As Mr. Tasker Watkins, Q.C., observed, Mr. Roberts and Mr. Exley thwarted “in Area No. 4 the only attempt ever made at a general inspection of colliery tips, in South Wales at any rate, since 1947”. The absence of their collaboration was literally disastrous in its consequences, for, as Mr. Geoffrey Morgan agreed, had they co-operated the disaster of 1966 would probably never have happened. This view, expressed by a responsible official of vast experience, cuts through much of the massive and distracting detail which occupied a great deal of the Tribunal’s time. It amounted to a frank recognition of the fact that in April 1965—18 months before the disaster—there existed on Merthyr Mountain a situation which, had it been examined by a competent civil engineer, must have led to proper investigation. In the result, as Mr. Geoffrey Morgan put it, tipping on No. 7 might well have stopped, and so (whatever its precise cause) the disaster might well have been avoided. In the light of the state of affairs revealed by the aerial photographs and the general history of Tip 7, we are firmly of the view that, had this been done, not only would tipping have been stopped but that such a state of affairs would have been revealed as would have led to steps being taken to remedy the threatening situation which even then existed.

FIGURE 8

Explanatory Diagram of Plate 1.

PLATE 1

Tips from directly overhead, May 1963.

PLATE 2

View of Colliery and tips shortly before disaster.

PLATE 3

View of tips, 1964.

PLATES 4 & 5

Aerial photograph from the East on day of disaster.

PLATE 6

View of tips after disaster, showing drainage works.

PLATE 7

View down slope three hours after disaster, showing flow-slide with central mud-run.

PLATE 8

Tips from directly overhead—two days after disaster.

FIGURE 9

Explanatory diagram of Plate 8.

Figure 8

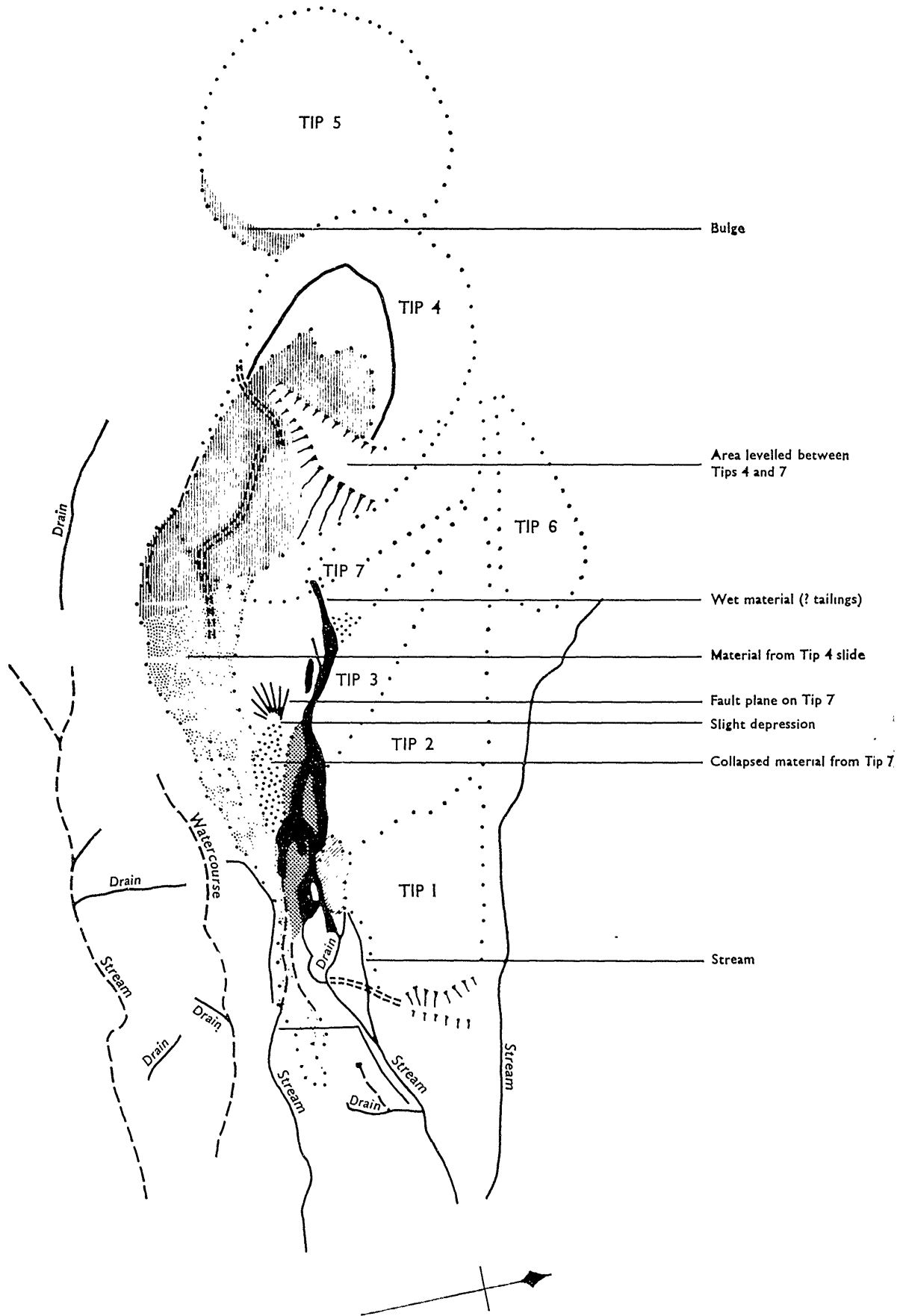
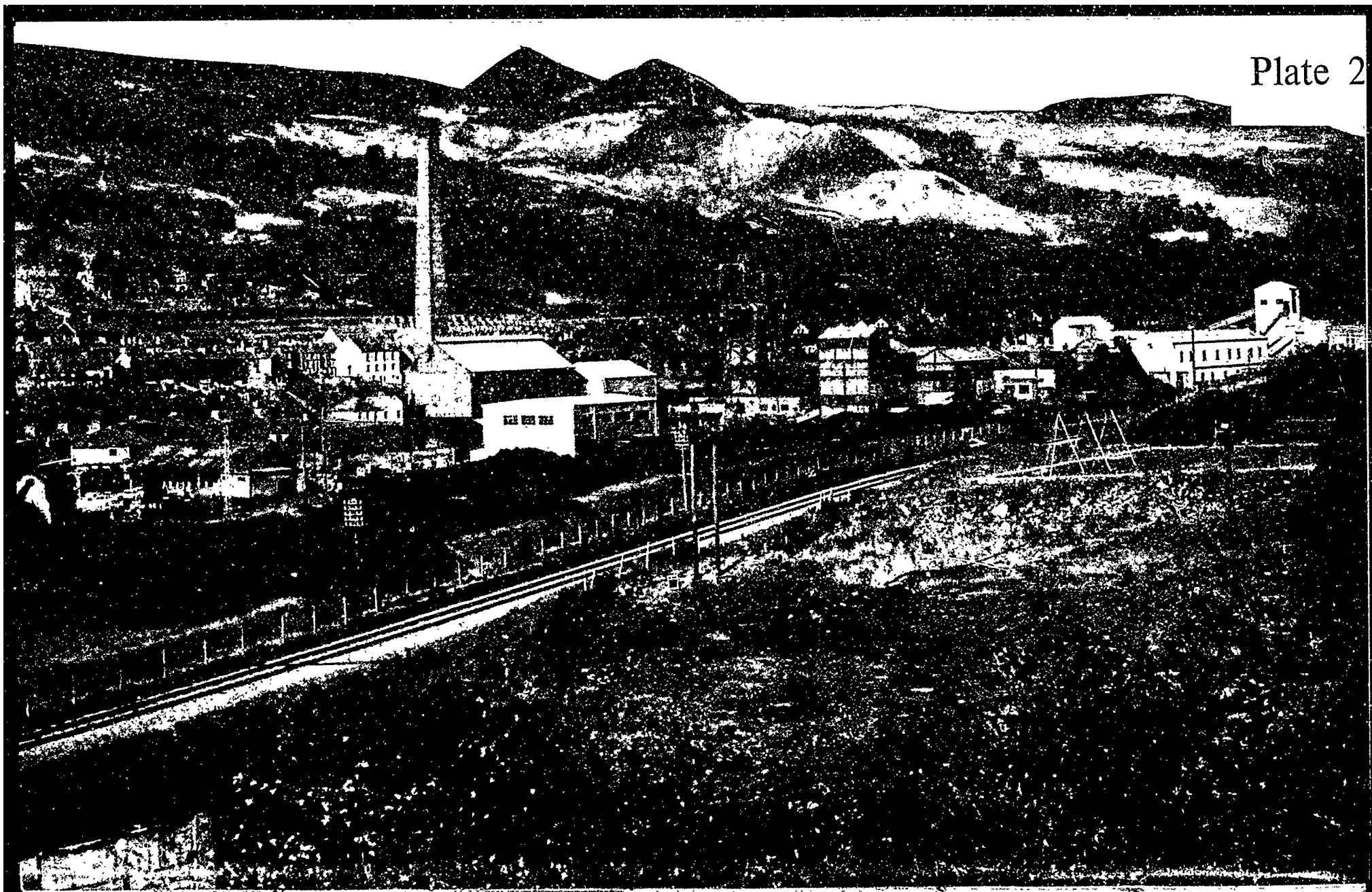




Plate 1



House of Commons Parliamentary Papers Online.
Copyright (c) 2006 ProQuest Information and Learning Company. All rights reserved.

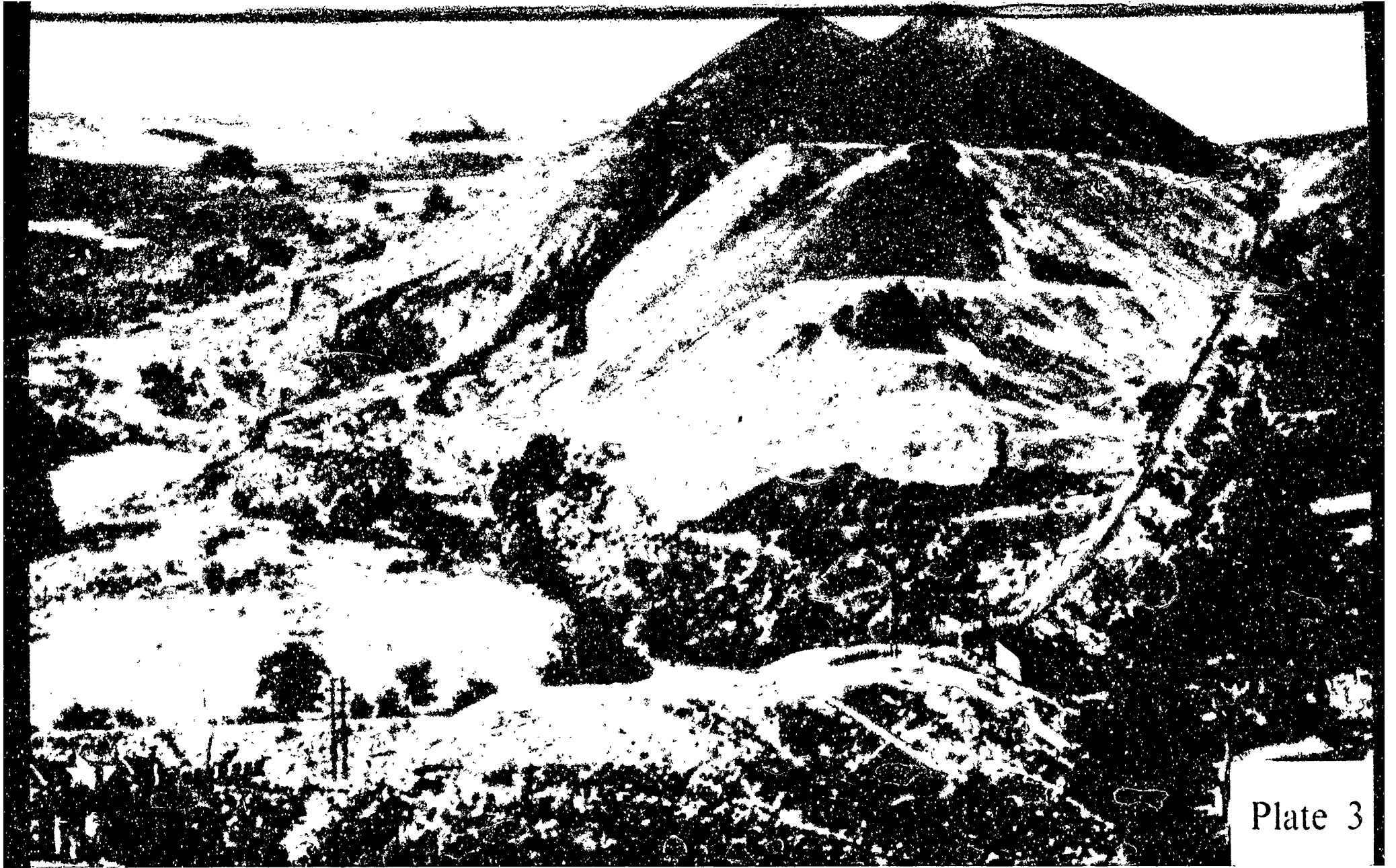


Plate 3



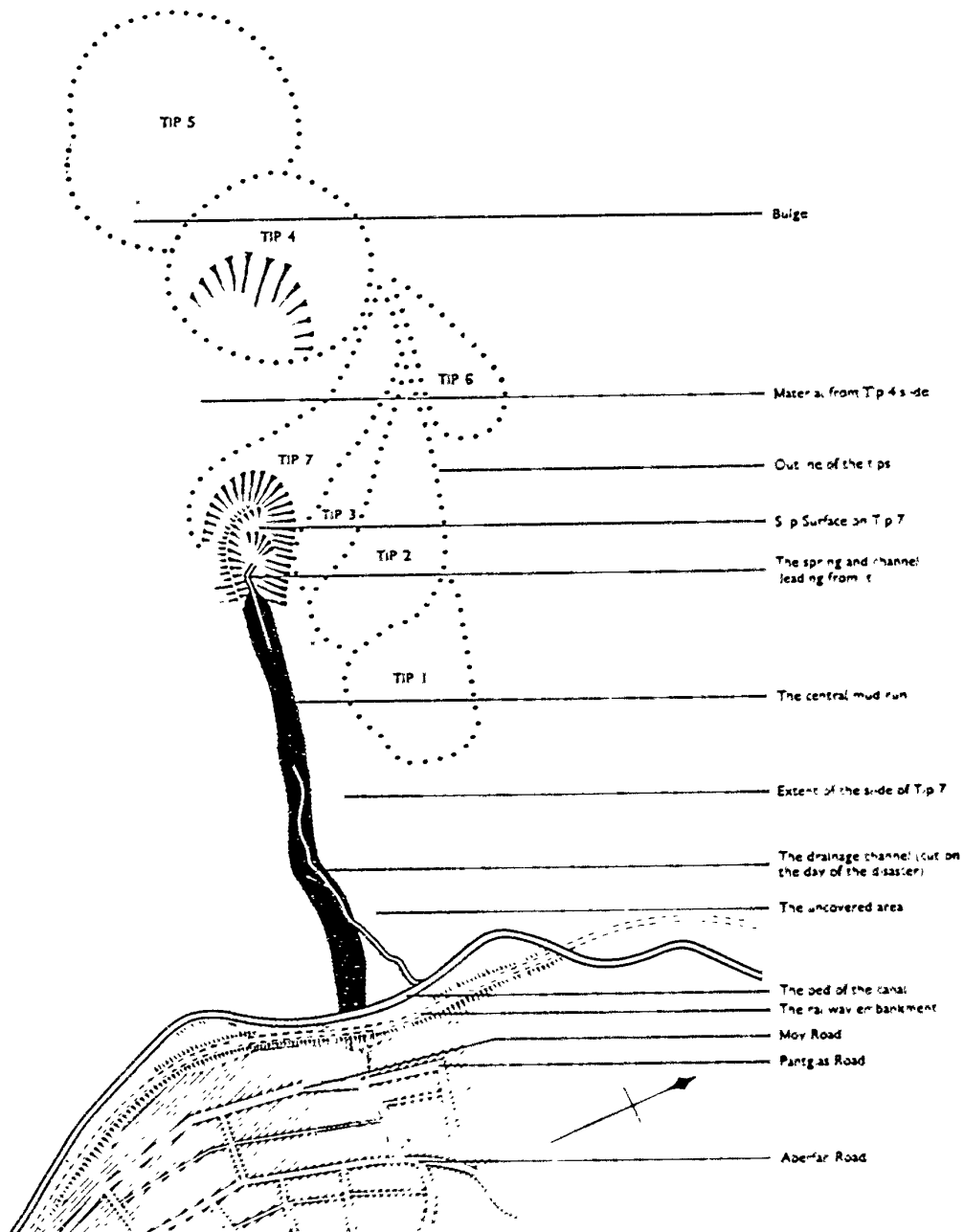




Plate 7



Figure 9



ACKNOWLEDGEMENTS

We are grateful to the following for making available to us the Plates and for giving permission for their reproduction:—

Plate

- 1 Fairey Air Survey, Ltd.
- 2 “TOPIX”/Thomson Newspapers, Ltd.
- 3 C. J. Lloyd, Esq., of Aberfan.
- 4 & 5 Devon News Service, Ltd.
- 6 Chief Constable, Merthyr Tydfil.
- 7 Western Mail and Echo, Ltd.
- 8 Director-General, Ordnance Survey.

167. Contrary to the view expressed by many witnesses that the Powell memorandum constituted a useful guide, Mr. Exley told the Tribunal that he found it rather difficult to take seriously, for,

“Although it makes several good commonsense points, to my mind it does not begin to tackle the problem of the stability of tips, and in fact the inferred recommendations on tip heights are to my mind both irrelevant and misleading.”

168. We wholly disagree with this assessment of the memorandum and we feel quite sure that, in any event, no such low assessment played any part in Mr. Exley's failure to act upon it. He agreed that in 1965 he “would have been obliged, on the basis of that memorandum, to have awarded 0 marks out of 10 to Tip 7”. What he or any other competent civil engineer would have done had he complied with the Powell request for a report on each active tip, and the inevitable outcome of his doing it, was well stated by one of the expert witnesses, Mr. G. M. J. Williams:

“I would expect an experienced civil engineer when faced with this task with respect to Tip No. 7 to commence by walking over the site, talking to the men who were concerned with the tip from day to day, and consulting the available plans and records, including the Ordnance Plan and the Geological maps. . . . In the course of such a visit to Tip No. 7 in 1965 he must have seen signs of the previous slips in 1944 and 1963, he would see the irregular shape of the tip (as indicated in photograph D.6), he should have learned of the creep of wet material down the hill in front of the tip and of the repeated settlements of the top. The evidence of the Ordnance Plan and Geological maps should have suggested to him that there was probably a source of water under the tip, and this would have been confirmed by the wet nature of the material in front of the tip and the manner in which fine material was being washed down by the streams. These observations should have made him conclude that the tip was in a potentially unstable and dangerous condition, and I would have expected him to require a detailed investigation to be made by experts *urgently*. Such an investigation would certainly have confirmed the dangerous condition that existed in the tip.”

That view is in accordance with the evidence of Mr. Grant who, called by the National Coal Board, accepted that in 1965 there were so many dangers staring any competent and industrious civil engineer in the face that he would have no need to resort to the science of Soil Mechanics before concluding that a thorough investigation was necessary to determine the stability of Tip 7. The tragedy is that no civil engineer ever examined it and that vast quantities of refuse continued to be tipped there for another 18 months.

169. That Mr. Roberts should in the ordinary way regard himself (being Mechanical Engineer) as solely responsible at Area level for all tips is no fault of his. It was part of such tip policy as existed in the National Coal Board. But, departing from the existing practice, the Powell letter called for his collaboration with the Civil Engineer and this Mr. Roberts quite deliberately rejected. For that rejection he must be blamed. What, unaided, he then proceeded to do must remain a matter of conjecture. Notwithstanding that as recently as April 13th, 1965 he had (in the company of Mr. Exley) visited the Merthyr Mountain, he

claimed that on May 4th he paid another visit which lasted 1-1½ hours, inspected the whole tip complex, found nothing unusual and, on May 13th, reported to the Divisional Chief Engineer in these laconic and inadequate terms:

Merthyr Vale

Rubbish disposal is both by lorry and tram—the lorry disposal is to the old flat site at Plymouth Colliery, where no slipping is likely to take place, and by tram to the old tip on the mountainside—a certain amount of slip has taken place at this point with the taking of tailings to the tip over the past three years. Tailings disposal at this site has ceased and are now being disposed of at Plymouth Colliery site, otherwise the tip remains stable.”

No-one making a proper examination of Tip 7 at that time could have rendered such a report had he borne in mind the six “Precautions to Prevent Sliding” contained in the Powell memorandum which Mr. Roberts had so recently received.

170. Although he was closely cross-examined on the point, there was no express evidence to contradict Mr. Roberts’ assertion that he again visited the tips on May 4th, and we have not found it necessary to arrive at any conclusion on this issue. But, assuming an inspection was indeed made, it was remarkably inadequate. It was purely visual; Mr. Roberts had no plans or surveys with him and he made no notes; he reported to no-one that he was making the visit; not only did he not inform the Colliery Manager of his intention, but he never sought out the Unit Mechanical Engineer so that he could accompany him; and he never climbed to the top of Tip 7 to see conditions for himself or to seek information from the tipping gang. In these circumstances, it is not surprising that National Coal Board officials themselves criticised before us the inadequacy of such a method of inspection. We have not, however, overlooked that many witnesses both inside and outside the National Coal Board testified that they too noticed nothing wrong with Tip 7 before the disaster. But they were, at least for the most part, casual observers. Here, on the other hand, was a specially designated official who had taken it upon himself to dispense with all help in making his inspection, and that fact of itself should have increased his vigilance. There was in truth much for him to note—the extent of the 1944 slip, the results of the incident of 1963, and the deep bowl-like depression, to mention but some of the unusual features which the aerial photograph (taken only a month after the alleged inspection of May 1965) amply illustrated. Had these obvious features been noted and properly enquired into, it seems inconceivable that there would have been a disaster.

171. Mr. Roberts, the Area Mechanical Engineer, however, claims to have seen nothing which called for noting beyond his laconic report of May 13th. Had he used his eyes and had he learnt from the gang, as he would have done had he bothered to ask them, that the top of the tip was not advancing, despite the onward sweep of its foot, he would inevitably have discovered that, as Mr. Powell—who had initiated the inspection—expressed it, there was urgent need of investigation by properly qualified experts. In the course of his evidence Mr. Roberts himself conceded that such inspection as he made provided no reliable guide to the stability of Tip 7. Honourable though his ascent on the mechanical engineering side of the coal industry has been from his apprenticeship at the age of 15, duty compels us to say that Mr. Roberts must be blamed

for failing to exercise anything like proper care in the manner in which he purported to discharge the duty of inspection laid upon him. The dreadful consequences of that failure have already been indicated.

172. By way of a post-script to the Tymawr incident a contrast may be drawn between what happened in No. 3 Area after that incident with what happened in No. 4 Area after the 1963 slide. In the latter case, as we have seen (*ante* paragraphs 136 and 148) complaints were made and fears were expressed to the Colliery Manager (Mr. Wynne) and to the Area Mechanical Engineer (Mr. Roberts) and to no others, and we have already described such limited action as each of these two men thought fit to take. But in No. 3 Area, where there had been previous trouble at Tymawr in 1961, the 1965 incident led to an immediate protest by Mr. Arthur Pearson, M.P., direct to Mr. A. H. Kellett, the Chairman of the South Western Division, and through him to the Area General Manager, Mr. Blackmore. Swift action resulted, for Mr. Blackmore promptly set up a team of investigation headed by the Area Civil Engineer, Mr. Grant. As a result, remedial action was taken, reassurances expressed to the Pontypridd Urban District Council, and the Council representatives, having themselves examined the tip, ultimately expressed satisfaction with the preventive work done.

10. Last Days

173. Two convincing witnesses, Mr. D. T. Jones and Mr. M. W. Maybank, testified that they were able to judge by reference to a dead tree (known locally as Hangman's Tree) on the mountainside that during the last six months before the disaster the toe of Tip 7 advanced downwards by some 20–30 feet. There is credible evidence that in the last three to four months there were frequent sinkings of the top of the tip of up to four feet and that a few times during that period the sinkings were of 10–12 feet. These occurred right across from one side of the tip to the other at the point where a ridge had existed ever since the major slide of 1963. We are satisfied that the sinkings were frequently, though not invariably, reported by Mr. Leslie Davies either to Mr. Pierce (his foreman) or, more often, to Mr. Vivian Thomas. Both denied receiving such reports, the former saying that . . . “sinkings of anything from 10 feet or more would have caused me quite a bit of concern if they were frequent”, the latter saying that the deepest sinking reported to him was 4–5 feet, which he regarded as an ordinary settlement.

174. We think the truth is that, although such reports were made, they did not take in their full significance, even although Mr. Thomas now concedes that (if made) they would have merited investigation. Yet that he regarded such reports as were made to him as indicating something quite different from the normal settling-down of recently tipped material is, in our judgment, demonstrated by the action he took on the morning of the disaster. It is important enough to be repeated. Shortly after 8 a.m. Mr. Leslie Davies reported to him “that the tip was sinking pretty bad”, that it had sunk by 10–12 feet, and asked “What were they going to do about it?”. Mr Davies testified that he was thereupon told “. . . to go to the tip, take a burner with me, and get the crane back as far as I could, for we were to start another tipping site later on in the week”. That was a momentous decision to announce, for (as we learnt from Mr. R. N. Lewis, the previous Colliery Manager) to stop the tipping process even for a few days is a serious and unusual step, involving the disruption of colliery output

and therefore necessitating consultation between Colliery Manager and Group Manager. Yet the decision was announced by the unit mechanic immediately he learnt of the 10–12 feet sinking. How came this about? We find irresistible the submission of Mr. Ackner, Q.C.,

“ . . . that Thomas’ decision to stop tipping and to decide to start a new tip indicated that a policy decision had already been taken before that date. The implementation of that policy was left to the discretion of Thomas *to make the decision when he observed anything which gave rise to anxiety.*”

175. To leave such a decision to the mechanic alone seems, in the light of the evidence to which we have just referred, extraordinary. Mr. Wynne accepted that “ . . . it would be totally wrong, if questions of stability were being considered, to leave it to Mr. Thomas to make the final decision when the moment had come for tipping to stop because it was unsafe”. He claimed that all that had previously happened was that,

“I told him (Thomas) that he would stop tipping when the road haulage would no longer serve the tip. I refused to give him any more men to carry on with that tip,”

and added,

“I do not think Mr. Thomas upon that morning stopped No. 7 Tip because of his suspicion of instability. I believe Mr. Thomas stopped the tip that morning due to the fact that he knew he had come to his ultimate run (of haulage rope) and he was taking the opportunity of moving the crane back over the weekend.”

In truth, as we find, no-one thought that Mr. Thomas’ decision to stop tipping had anything at all to do with the length of the haulage rope. Although Mr. Wynne denied that during the three months before the disaster he received information that subsidences at the top were becoming more frequent and that he thereupon told Mr. Thomas “that, if he thought the tip was reaching a really dangerous state, he must stop it”, no other sort of explanation has been proffered for the Unit Mechanic’s taking it upon himself to make so important a decision without even troubling to go up to the tip and examine its condition for himself. Fear of the safety of the tipping gang because of the reported sinking of 10–12 feet does not explain it, for when in 1963 Mr. Thomas received a report of as much as 12–15 feet sinking of this same tip he nevertheless decided, *having first examined the tip*, that tipping could continue, as it did.

176. The conclusion to which we have been forced is that sinkings of Tip 7 of an unusually frequent kind had reached the ears not only of Mr. Thomas but also of the Colliery Manager during the last three months before the disaster; that they correctly diagnosed these as indicating some degree of instability; and that Mr. Wynne delegated to Mr. Thomas the right to make up his own mind to stop the tipping process should this appear to become necessary. This conclusion is in accordance with the view adopted by the Group Manager, Mr. R. N. Lewis, that Mr. Thomas’ decision to stop tipping and to decide to start a new tip indicated that a policy decision had already been taken before October 21st and that “the actual implementation of the policy had been left to the discretion of Mr. Thomas”. This is not to say, however, that either Mr. Wynne or Mr. Thomas anticipated a slide of substantial dimensions, and still less one which might threaten the village. On the contrary, we are quite sure that they anticipated nothing of the sort. But the evidence strongly points to

their having entertained for some weeks before the disaster doubts about stability—and they had ample grounds for entertaining such doubts. Even during those last weeks tragedy could have been averted had the Manager then alerted higher authority.

SECTION B—CONCLUSIONS AS TO LIABILITY

1. National Coal Board

177. Blameworthiness for the disaster of 1966 remained an issue strongly contested by the National Coal Board for the greater part of the Tribunal's sittings (see *post* "The attitude of the National Coal Board", paragraphs 189–197). But, as witness followed witness, the answer to the question—Should anyone be blamed for the disaster?—became crystal clear as far as concerned the National Coal Board. It was finally enunciated in this way on Day 74 during the closing speech of counsel for the Board:

"Need it have happened? . . . There is a very short answer to that one. It need not have happened and should not have happened if proper site investigations had been carried out beforehand. The failure to have any site investigations beforehand must be attributed to lack of instructions from the Coal Board."

Mr. Wien then went on to adopt as a "very neat" answer to this same question a passage from the closing speech of Mr. Brian Gibbens, Q.C., appearing for the National Union of Mineworkers, in which he said:

"The real fault here, in my submission, was *not* anything unforeseeable, nor anything which could not have been prevented by ordinary, economic, sensible precautions . . . The trouble basically arose from the lack of communication between those who possessed the knowledge of the existing facts and those who possessed the knowledge of the potential facts. The experts in the Coal Board knew of the potential facts and the potential danger. If they had got someone at the other side of the bridge who could have served them with the day-to-day facts, to which they could have applied their knowledge, then of course there would have been no disaster."

178. However belatedly, it was conceded by the National Coal Board that the Aberfan disaster stemmed from their failure to initiate any policy in relation to the siting, control, inspection and management of tips. As Mr. Wien expressed it during his closing speech on Day 74:

"I wish to say in unequivocal terms that blame for the disaster must rest upon the National Coal Board. Responsibility begins with management. Clear instructions were not given. Nor was any procedure laid down, so that both officials and workmen were left without proper guidance".

And in the words of Mr. Geoffrey Morgan, Production Director:

"Prior to the Aberfan disaster there was no general policy in the South Western Division dealing with safety and stability of spoil tops . . . I did not address my mind to the desirability of advising the Divisional Board to formulate such a general policy".

179. The absence of any tipping policy or system affected the course of events at innumerable points. Mr. Wien put it in this way on Day 74:

“Had such a policy—if policy be the right word to use—been initiated, then lots of things would have flowed from it. I think it right to say that the Strong plan (H.27) probably would not have come into existence at all, because if you have got a policy about tipping you do not have plans drawn freehand—you have got complete specification. And you have the probability, so far as Mr. Baker is concerned, that he would not have been allowed to start the tip at all. And if he had been allowed to start a tip, or if someone had been authorised to create a tip where Tip No. 7 was, it would not have gone on beyond (say) two years, which at most seems to have been the safe period—that is, before it ever began to go on to the Tip 4 slide material, which is where Mr. Baker thought the limit should be in any event. Then it would not have been left to him to forget that matter, and he would have been given proper instructions. And if there had been a policy Mr. D. L. Roberts would not have been the one, perhaps, to advise on tip stability in 1965 as the Area Mechanical Engineer—there would have been others. And Mr. Exley would not have been in a position where he could ignore the Powell memorandum. So that all these things flow from a lack of instructions from the Board”.

Many other examples of the tragic result of the complete absence of any system in relation to tip stability could be given. When Mr. Ackner, Q.C., spoke of the National Coal Board’s “quite overwhelming responsibility for eight years of folly and neglect”, in our judgment his choice of words was justified. The foregoing clear recognition of the crucial part played by the absence of any such policy has (*inter alia*) had the result of curtailing the length of this Report, for a number of issues which were explored at length can now be ignored or treated far more briefly than would otherwise have been proper.

180. Nevertheless, that is by no means the end of the matter as far as the responsibility even of the National Coal Board is concerned. At what level and upon whom should blame be cast for the absence of a tipping policy? Counsel for the Board submitted to the Tribunal: (a) That the Headquarters of the Board in London should not be blamed for the absence of any policy directed to tip control and stability, as,

“There is no reason why anything should have triggered off a policy at National Board level”.

(b) That while it had been demonstrated that “a policy directive should have been issued by the South Western Division, . . . the responsibility for the absence of such a policy instruction was really so diffuse that it was impossible to lay the blame at the feet of any one man”.

181. In other words, it was submitted that, while blame should be laid at the feet of the South Western Division of the National Coal Board as a body, it should be laid nowhere else, and certainly not at the feet of any of those individuals who, because of the lack of any policy directive or system, had been left in ignorance of all matters relating to tip stability. It was not entirely clear to us how high in the official scale Mr. Wien, Q.C., was contemplating when he commented:

“How unfair it would be to criticise any one of those officials as being in any degree blameworthy when they are left, as it were, to their own resources”.

But Mr. Howe, Q.C., left us in no doubt about whom he was speaking. Describing the conception of the idea that a tipping policy would be a good thing as “an intuitive flash”, he said:

“Now in this case from beginning to end that intuitive flash has never come with clarity sufficient to force itself upon the mind of any individual inside or outside the industry . . . and it would be wrong to impute to any man, least of all to those at the Divisional level with whom I have just been dealing, a degree of fault for not making that jump in comprehension, that leap in awareness, sufficient to lead to the alteration in that system”.

182. The course which both these learned counsel invited us to adopt has its attractions. The *basic* cause of the Aberfan disaster was that for many years in the coal-mining industry little or no attention has been paid to the siting, control, or management of spoil-tops. It might be said that, for this reason, most of the men whose acts and omissions we have to consider have had, as it were, a bad upbringing. They have not been taught to be cautious, they were not made aware of any need for caution, they were left uninformed as to the tell-tale signs on a tip which should have alerted them. Accordingly, if in the last analysis, any of them must be blamed individually for contributing to the disaster (and that, unhappily, is the conclusion we have been drawn to regarding some of the National Coal Board employees and staff who appeared before us), for all of them a strong “plea in mitigation” may be advanced. As Mr. Tasker Watkins, Q.C., rightly expressed it, “. . . personal responsibility is subordinate to confessed failure to have a policy governing tip stability . . . It is in the realm of an absence of policy that the gravest strictures lie, and it is that absence which must be the root cause of the disaster”.

183. Again we have, from the inception of our labours last October, constantly reminded ourselves—and, at times, certain witnesses—of the danger of hindsight. All we can say is that we have been most alive to the existence of this danger and zealous in our endeavours to arrive at conclusions unaffected by it.

184. But, having said that the absence of any policy or system regarding tips must operate strongly in favour of all National Coal Board employees whose conduct falls to be considered by us, it does not logically or necessarily follow that all must therefore be entirely absolved from personal responsibility. Nor (despite Mr. Wien’s reference to the unfairness of blaming any one official) (see *ante* paragraph 181) was this at one time the view of the National Coal Board itself, as is demonstrated by the following extract from the examination-in-chief of Mr. Geoffrey Morgan, Production Director, by none other than Mr. Wien:

Mr. Wien: Mr. Morgan, do you now consider that it would have been advisable to have initiated such a general policy relating to stability of tips?

A. Having regard to the Aberfan disaster, I feel it would.

Q. *Despite the absence of any such general policy*, do you consider by May, 1965 there should have been a full investigation of what was happening to Tip 7?

A. Yes, I think so.

Q. For what reason or reasons?

A. A number of senior engineers and others had been in the vicinity of Tip 7 between 1963 and the incident and I think there were some features which warranted further investigation.

185. It has accordingly been a necessary and inseparable part of the Tribunal's duty to consider whether, granted the blameworthy failure of the National Coal Board at one level or another to devise any proper tipping system, any of its employees can be said to have personally contributed in any significant degree to the disaster by his individual acts or omissions. Our conclusions on this aspect of the matter will be found at Section B.2. of Part IV.

186. Reverting to the National Coal Board, the need for a system dealing with tip safety having found common acceptance at the Inquiry, what explanation is there for the complete absence of any such system in the past? And ought we to conclude that the whole blame for failing to devise and implement such a system should be cast upon its South Western Division and hold the Headquarters Board blameless? Mr. Sheppard, Director-General of Production, the official responsible ultimately for all matters of safety, testified that the question of stability of spoil-heaps had never been considered at Board level before Aberfan and that no incident had been brought to their attention which might have "triggered-off" the formulation of a policy relating to their stability. We have not overlooked the fact that this topic received no mention in the report of the Royal Commission on the Safety of Coalmines (1938) or in the Mines and Quarries Act (1954). But the safety of workmen is fundamental and the stability of tips is vitally important to the men working upon them, if to no-one else. Mr. Sheppard accepted that that aspect of safety was completely neglected at the London Headquarters of the National Coal Board. Asked whether he considered the stability of spoil-heaps an aspect of safety, he replied, "With hindsight, I do". But is this really a matter simply of hindsight? In our view, clearly not.

187. Literature available in the London Headquarters dealt with tip stability—for example, as recently as 1959 this problem was discussed in "Colliery Engineering", a publication which was circulated among the staff at national Headquarters. Again, in 1963 the work of Professor Sinclair on "Ground Movement and Control at Collieries" contained the following passage, which, although Mr. Sheppard said that it came "as a surprise" to him, was accepted by other National Coal Board witnesses as expressing something which they had appreciated before the disaster ever occurred:

"Where pit refuse is deposited on steep hillsides, as is common practice in the valleys of South Wales . . . hill creep can lead to alarming slipping of such dirt heaps. Particularly is this likely to happen if drainage is bad in the vicinity of the heap and if soft strata (such as clay bands) occur near the surface under the heap. These may become saturated, squeeze out and form a lubricated slippery surface on which the refuse commences to move and quickly accelerates. Such occurrences are fraught with extreme danger and can cause severe damage by sweeping down transmission and telephone lines, pipe ranges and blocking roads, railways, rivers and canals".

188. Does it really lie in the mouths of the members of the National Board to say that they were wholly ignorant of such a possibility, and are therefore to be excused for having paid no attention to tip stability? And is Mr. Sheppard, in particular, entitled so to shield himself from all responsibility? Such questions (which are wholly different from the question of whether they should have foreseen a slip of the magnitude which occurred at Aberfan) calls for only one answer: They cannot be so excused. If, as reasonable men, they had given thought to the matter, they could not fail to have known and realised that, unless proper

steps are taken, spoil heaps can and do collapse and that, if they do, they may imperil not only the safety of men working upon them but also the persons and property of others. Mr. Tasker Watkins, Q.C., observed at one stage that:

“It may be that the Tribunal will not be attracted to the proposition that, because South Wales had a special problem, that problem should be investigated only in South Wales and that no investigation [need be] initiated from headquarters.”

That is a proposition which indeed holds no attraction for us. While doubtless officials of the South Western Division, with their local knowledge and their awareness of slips which had actually occurred in the past, were more at fault, we cannot escape the conclusion that the Board must at national level also be blamed for its neglect of the stability of tips. Indeed, to hold otherwise would involve rejection of the admission of none other than Lord Robens himself, referring to the alleged impossibility of people on the site knowing of the existence of water in Tip 7, that “. . . we had failed as a Board to provide the necessary regulation (*sic*) to enable them to know”. Theirs was the overall responsibility for the initiation of policy, which involved that at national level there should have been due consideration of the proper methods to dispose of the waste of the coal-mining industry.

ADDENDUM

THE ATTITUDE OF THE NATIONAL COAL BOARD

189. In accordance with a recommendation of the Royal Commission on Tribunals of Inquiry* at a preliminary meeting held on November 8th, 1966, we intimated that all interested parties would be afforded an opportunity, before any evidence was called, of making a statement to the Tribunal. The National Coal Board chose to avail themselves of that opportunity immediately after the Attorney-General's opening. From beginning to end their statement gave no hint of acceptance at any level of any degree of blame for the disaster. The key passage is this:

“The Board's view is that the disaster was due to a coincidence of a set of geological factors, each of which in itself is not exceptional *but* which collectively created a particularly critical geological environment.”

190. The Tribunal is in no doubt that this was the starting-point of an attempt, persisted in for many weeks by the National Coal Board, to persuade acceptance of the view that the concatenation of geological features on Merthyr Mountain was such as could not reasonably have been expected to exist. The observation quoted at first sounded impressive, but it turned out that it explained nothing. It might conceivably have had some bearing on our task had there ever been an attempt to ascertain what the geological features were; but, since there was no investigation and no thought devoted to the subject, the claim carried one nowhere. Yet it was not until Day 51 that Mr. Wien, in his examination-in-chief of Mr. Sheppard (the Director-General of Production of the N.C.B.) elicited that in fact *all* the geological features “could have been previously appreciated”. And not until the cross-examination of Mr. Piggott (the Board's expert) on Day 65 did we learn that it was not even going to be contended that there was anything exceptional about the so-called “coincidence” of geological factors, and that the only exceptional feature about Merthyr Mountain lay in the fact that it

* Cmnd. 3121

had been used as a tipping site. But, even at that late stage and notwithstanding the preceding evidence, the attempt was not wholly abandoned. Two days later junior counsel for the Board sought to elicit acceptance by a geologist (Dr. Woodland) of a suggestion that a certain feature on Merthyr Mountain was “a *unique* occurrence in the present state of the knowledge of geology in South Wales”, only to be told that the witness would be very surprised if he failed to find similar examples elsewhere had he looked for them. Finally on this point, while on January 17th, 1967, at Cardiff the Tribunal was holding its 20th sitting, there was a meeting of National Coal Board Production Directors in London, presided over by Mr. Sheppard and attended by Mr. Geoffrey Morgan. The Minutes of that meeting record that Mr. Sheppard explained that, “The results of the investigations into the disaster and evidence so far given had exposed problems relating to geology, soil mechanics and other factors which had not previously been widely appreciated. It was clear, as a result of detailed enquiries which had been carried out by Divisions, that conditions which had led to the disaster were rare”. Nothing that the Tribunal heard or read throughout its 76 days of sitting tended even remotely to support such a conclusion.

191. Over and beyond this special matter of geology, for long the conduct of the Board’s case was consistent only with the view that, in their submission, a slide of Tip 7 was not foreseeable and could not have been prevented by reasonable care by them or their employees. Mr. Tasker Watkins, Q.C., was perfectly correct in making the following observations during his closing speech on the penultimate day of the Inquiry:

“Yesterday my learned friend Mr. Wien gave clear acceptance of the fact that the instability of Tip No. 7 *was* foreseeable. Without, of course, passing any personal reflection whatsoever upon him, I have to submit that that was not the original attitude. One of the mainstays of the arguments put forward by the National Coal Board . . . was that water had *not* affected the stability of Tip No. 7 before the disaster, and there had before that time been *no* untoward movements of Tip No. 7 other than normal settlements and runs of tailings. In particular, it has been contested before the Tribunal over many days and through a number of witnesses that there had been a 1963 slip of Tip No. 7. One of the prominent aspects of the evidence from officials within No. 4 Area . . . all of whom visited the site at various times, and at material times of course, was that they persisted in saying that to them there was nothing unusual in the appearance of the tip. This was done although they were presented with the photographs taken in 1963 and afterwards”.

192. In his closing address, Mr. Ackner, Q.C., for the Parents’ and Residents’ Association had this to say:

“ . . . We have been subjected day after day to the farce of hearing National Coal Board witnesses examined first of all by their counsel, at the end of which they would have appeared to a stranger as if the Board had no more blameworthy connection with this disaster than, say, the Gas Board. Then, as cross-examination succeeded cross-examination these obvious admissions emerged—admissions which were unavoidable well before this Inquiry started.

I submit now without fear of contradiction that when one considers that this disaster has been concerned with a tip built by and on a publicly-

owned Corporation's land, a slip of that Tip which killed 144 persons, and a Public Inquiry thereafter ordered, that Corporation owes a clear three-fold duty in relation to that Inquiry: firstly, to avoid unnecessary wastage of time; secondly, to avoid any possibility of giving any misleading impression; and thirdly, to admit at the earliest opportunity any errors which clearly have been committed."

Later he said:

"For the Coal Board to have conducted its contribution to this Inquiry in the manner I have indicated inevitably involved giving a misleading impression, and studiously avoided admitting at the earliest possible (or perhaps any) time the errors which loom so large throughout this Inquiry".

193. We do not have to adopt every turn of pungent phrase employed in Mr. Ackner's vigorous condemnation by accepting in the main, as we do, his description of the manner in which, up to a late stage, the case for the National Coal Board was conducted. In none of the many statements taken by the Treasury Solicitor from National Coal Board officials—including Mr. Sheppard, whom the National Coal Board themselves nominated as their spokesman regarding tip policy and control—was there the slightest hint of acceptance of any blame for the disaster. Indeed, regarding these statements furnished by their employees to the Treasury Solicitor it is important to note that in his closing address on Day 74 learned counsel for the National Coal Board himself said that:

"From none of the statements available could it be spelled out, even by inference, that the causes of the disaster were foreseeable."

194. Referring to the Attorney-General's opening address, Mr. Philip Wien, Q.C., observed on the second day of the Inquiry:

"... When it is said, as it has been said, that one of the questions before the Tribunal is whether the National Coal Board should have considered the slides or slips that had occurred in the past, *such lessons as could have been learned from those slides would not have led to the discovery of anything that could have prevented this disaster.*"

That clearly was an invitation to the Tribunal to hold that (despite previous slides in the locality) a slide of Tip 7 could not have been foreseen. Such unforeseeability being, beyond any possible doubt, the main plank in the National Coal Board case for so long, it was really nothing short of audacious for the Board to tell the Tribunal, as it did on Day 74 in the course of the closing speech of its learned counsel, that:

"It was already clear by Day 1, when the Attorney-General opened his case, that tip safety arrangements were inadequate, and it really did not require Lord Robens to come here and tell the Tribunal so when it was perfectly obvious."

Certainly there was nothing to indicate for several weeks that the Board accepted the inadequacy of such arrangements or any measure of blame of any kind. The Tribunal is not unmindful of the fact that in that same closing speech Mr. Wien adverted to his examination-in-chief of Mr. Geoffrey Morgan (Production Director, South Western Division) as recognising the advisability of a general tipping policy. But that evidence was not given until the 49th day,

or two-thirds of the way through the 76 sittings of the Tribunal. And it was not until he was cross-examined by Mr. Tasker Watkins, Q.C., that Mr. Morgan somewhat negatively expressed the view that he did not “feel justified in denying” that the absence of such a policy played a crucial part in the disaster. Even this concession, such as it is, was extracted only after a number of National Coal Board witnesses (beginning with Mr. Exley on Day 36) admitted under cross-examination that the manifest condition of Tip 7 before the disaster revealed its highly vulnerable state.

195. Certainly up until Day 49 there was no indication on behalf of the National Coal Board that they recognised the important effect of the absence of any general tipping policy. And yet on Day 65 Mr. Piggott, the National Coal Board expert, an impressive and helpful witness, admitted two important points under cross-examination:

- (1) That during 1965 the instability of Tip 7 could clearly have been foreseen by employees of the National Coal Board who should have applied their minds to the problem; and
- (2) *that he had arrived at that conclusion “even before the formal sitting of the Inquiry started”, a conclusion which he appreciated was “the very antithesis of what was expressed by the Chairman of the National Coal Board on television”.*

196. If this is indeed so, it is incomprehensible why acceptance of the fact that the disaster was preventable by reasonable care on the part of the National Coal Board was not made clear from the outset. It certainly was not, and indeed as early as Day 9, when the Chairman enquired of Mr. Wien whether the existence of certain water-courses was conceded by the National Coal Board, he evoked the reply that:

“ . . . it is not, in my submission, for the Coal Board to concede anything before a Tribunal which is enquiring into these matters.”

Nothing could be clearer than that. Such was the attitude maintained by the National Coal Board throughout until it became insupportable in the light of the accumulation of adverse evidence.

197. In his closing address Mr. Wien sought to explain his refusal to make concessions in the following way:

“ . . . Had concessions been made about any facts, it would have meant the Board’s adopting one witness or a group of witnesses and perhaps rejecting others. This would involve the Board’s judging in advance that one witness was reliable and another unreliable. This might have been done in private litigation, but not in an Inquiry of this nature, for at least two reasons. Firstly, it would have been manifestly unfair as well as utterly disloyal for the Board to condemn in advance any witness who was an employee without his evidence being tested; and secondly, every employee of the Board was a member of some Union and was represented by other Counsel whose hands could not possibly be tied in advance.”

The Tribunal was far from unmindful of the magnitude of the task which throughout confronted Mr. Wien. But, despite his skill and persuasiveness, this will not do. It will not do at all. Acceptance at the outset by the National Coal Board of responsibility for the disaster on the ground that they had failed to provide and implement a tipping policy, and so denied their official and working

personnel essential information, would have condemned in advance no individual employee and tied the hands of no other counsel. The truth is that much of the time of the Tribunal could have been saved if, in the words of Mr. Ackner:

“ . . . the National Coal Board had not stubbornly resisted every attempt to lay the blame where it so clearly must rest—at their door— . . . An opportunity was given to the National Coal Board right at the outset of this Inquiry, that is on the second day, immediately after the learned Attorney’s opening, to make the position clear, to have stated what was admitted by Mr. Sheppard after some 50 days of the Inquiry and by Mr. Morgan (Production Director of the South Western Division) on the 49th day, two most senior representatives of the Coal Board that, and I quote ‘The instability of the Tip No. 7 as at 1965 . . . could clearly have been foreseen by members of the National Coal Board who should have applied their minds to this problem’

Let it be clearly stated that these admissions . . . were not frank admissions made spontaneously . . . They were admissions extracted in cross-examination by me, by the slow and wearying process of obtaining admissions from more junior officials which, when added together, made this ultimate admission unavoidable.”

Lord Robens

198. We must at this stage consider the evidence of Lord Robens (Chairman of the National Coal Board) and the circumstances which led to his being called as a witness. It was adduced in evidence that, in the course of an interview at Aberfan two days after the disaster, he told a Television reporter:

“It was impossible to know that there was a spring in the heart of this tip which was turning the centre of the mountain into sludge”.

On Day 11, Mr. Philip Brown (a 60 year-old Aberfan resident) challenged this statement and asserted that Lord Robens was completely wrong. What then ensued can be taken from the words of Counsel for the Board itself in his closing address:

“On that same day the Treasury Solicitor telephoned the legal adviser to the Coal Board in London and he referred to the evidence that had just been given by Mr. Philip Brown who had been critical of Lord Robens’ statement about the unknown spring. The Treasury Solicitor enquired whether Lord Robens in giving the interview was acting on information from National Headquarters, or from Divisional, Area or other officials on the site at the time that it was visited by Lord Robens. The legal adviser to the Coal Board said he would speak to Lord Robens personally.

Later that day the legal adviser telephoned the Treasury Solicitor and told him that Lord Robens confirmed that when interviewed by the news reporter, he was merely repeating what he had picked up when visiting the site; that he could not identify anyone who gave him the information, and that it was not treated as firm information, but only personal. Lord Robens had been round the whole site and had talked to many people. The statement about the unknown spring was something he had picked up when touring the site.

The Board’s legal adviser and the Treasury Solicitor, therefore, quite independently took the view that the evidence that Lord Robens could give

would be of no assistance to the Tribunal, a view that was clearly shared by the Tribunal.”

199. Such a decision was, in our judgment, the only possible one in these circumstances, any testimony which Lord Robens could give on the matter being based on hearsay. Thereafter, as the Inquiry was reaching its late stages, several National Coal Board officials said under cross-examination that they regarded as “untenable” the view expressed by Lord Robens as to the impossibility of knowing of the existence of the spring—in other words, they said that by using available means the true state of affairs *could* have been discovered before the disaster. This served to confirm (rather than to undermine) the rightness of the decision that Lord Robens was unable to render the Tribunal any assistance.

200. There the matter rested until, in the course of his closing address, Mr. Ackner (for the Parents’ and Residents’ Association) strongly commented upon the absence of Lord Robens from the witness-box, saying:

“It is a public scandal that Lord Robens . . . stated on television on October 23rd, two days after the disaster occurred, that no one could have known that there was a spring in the heart of the tip which was turning the centre of the mountain—no doubt, he meant tip—into sludge. That statement was untrue . . . Of course that statement made by Lord Robens was made by him believing it to be true. But it was in my submission without proper advice and . . . without proper thought. *But by the time this Inquiry commenced it was known to be false. This we were not told until the cross-examination of Mr. Piggott . . . Day 65.*

At no stage throughout this Inquiry has the National Coal Board taken the initiative to correct that statement . . . It was only under cross-examination that Mr. Morgan, Mr. Sheppard and Mr. Powell (the National Coal Board’s most senior witnesses) and finally Mr. Piggott, made some sort of repudiation of its validity. No explanation has been proffered by or on behalf of Lord Robens and his absence, therefore, and in this regard has been conspicuous.”

201. In the light of these strictures, the Tribunal concluded that fairness to Lord Robens demanded that he be given the opportunity of appearing at the Inquiry, notwithstanding that Lord Robens had, as already related (paragraph 198), informed the Treasury Solicitor that he had nothing but hearsay to impart. The Chairman observed:

“We would not have it said hereafter that he (Lord Robens) has had no opportunity of meeting the criticism levelled against him. The Tribunal, therefore, desires to make it clear even at this late hour that should Lord Robens seek an opportunity to explain why and in what circumstances he made his statement, we shall readily afford him that opportunity.”

Lord Robens availed himself of that opportunity forthwith. Regarding his television interview, he said:

“I think it would have been apparent to anybody that what I was saying is that *the people on the site* did not know, and it would have been impossible for *them* to know, because we had failed as a Board to provide the necessary regulation [*sic*] to enable them to know . . .”

That this interpretation was placed on his words by no other National Coal Board witness who was asked to deal with them and, furthermore, had not

occurred even to learned counsel appearing for the National Coal Board, emerged clearly in the course of the Inquiry. Nor did we accept it for one moment. Ultimately, even counsel for the National Coal Board invited the Tribunal to ignore it. By his words, read in their entirety, Lord Robens had conveyed to no-one that he was accepting that any measure of blame lay with the National Coal Board.

202. During his further cross-examination by Mr. Ackner, Lord Robens gave inconsistent answers. After saying that at the time he spoke to the television interviewer he thought the causes of the disaster were unforeseeable, he later said that he considered they *were* foreseeable, but that, as there were no proper measures for tip control, “. . . I could not myself accept that people whose responsibility it was here could have foreseen it, and that was my personal conclusion”. Then came an important series of questions and answers, the crucial ones being these:

Q. (by Mr. Ackner): “Does it come to this, that by the time the Inquiry started on 29th November you were by then satisfied that the causes were reasonably foreseeable?”

A. That is so.”

A little later, the matter was taken up by the Tribunal Chairman:

Q. “Was it your considered view and those in the Coal Board with whom you had discussions *before the sittings of this Tribunal began* that the cause of the disaster was that the National Coal Board had failed to utilise means of knowledge which had existed for some years?”

A. I think the answer must be Yes, sir; and I would like to add that the possibility is—in fact I am almost sure of this—that the reason why this knowledge was not used was because no one had ever apprehended a pit slide of this character.”

203. As Counsel for the Tribunal pointed out in his closing address this was in conflict with the attitude which the National Coal Board had adopted in their opening statement on Day 2, and thereafter for many weeks. Furthermore, *if the position really was as Lord Robens said* (viz. that before ever the Inquiry opened the National Coal Board realised that the instability of Tip 7 was reasonably detectable before the disaster) it followed that a vast amount of time had been unnecessarily spent on issues which were directed at establishing that very point.

204. How then, in the last analysis, ought we to assess the evidence of Lord Robens? That question was answered by Counsel for the National Coal Board in his closing address in this way:

“. . . I invite the Tribunal to say that nothing in his evidence assisted the Tribunal at all, and that the position is exactly the same as if he had given no evidence at all, without any sort of first-hand information.”

For the National Coal Board, through its counsel, thus to invite the Tribunal to ignore the evidence given by its Chairman was, at one and the same time, both remarkable and, in the circumstances, understandable. Nevertheless, the invitation is one which we think it right to accept. In our view, Lord Robens, an administrator who expressly disclaimed any technical knowledge, under cross-examination laid claim to having already possessed by the time the Inquiry opened a degree of knowledge which in all probability he later acquired only by

that assiduous reading of the daily transcript of evidence to which he himself testified. Had he been called at an earlier stage he would probably have been in no position to express a worth-while opinion or define an attitude in relation to foreseeability or as to any of the other issues which occupied so much time.

205. But as Lord Robens himself knew nothing beyond what he was told by others in the calamitous circumstances then prevailing, it was unwise of him to imply at Aberfan that he had knowledge, and it is understandable that his statement was bitterly resented by the residents, who possessed the intimate local knowledge which he lacked. In all the circumstances, as invited by counsel for the National Coal Board, we have come to our conclusions independently of the testimony of Lord Robens.

206. On the other hand, if it really be the case that those with expert knowledge advising the National Coal Board had, even before the Inquiry began, come to the conclusion that the Board was to blame for the disaster—and that is precisely what Mr. Piggott under cross-examination admitted (see paragraph 190 *ante*)—it is vastly to be regretted that the Board did not make this clear at the outset. So far from this being done, it is noteworthy that even Mr. Piggott's report, furnished by the Board to the Treasury Solicitor before the Inquiry opened, contains no hint of blameworthiness on the part of the Board. Indeed, the same observation applies to all the many statements furnished by the Board to the Treasury Solicitor in the course of his investigations, as well as to the opening statement of their learned counsel on Day 2.

2. INDIVIDUAL N.C.B. OFFICIALS

207. We turn from the National Coal Board to consider whether other organisations or any individuals should be singled out for blame. The accusing finger of counsel for the Parents' and Residents' Association pointed at many. In the course of this Report we have already made critical references to a number of individuals (such as Mr. McInnes and Mr. Strong) who failed to measure up to a proper standard of responsibility, but who are nevertheless very much on the periphery and ought not to be blamed for the disaster. Again, Mr. Church (No. 4 Group Mechanical Engineer since January 1965) and those surveyors who visited the mountainside later than the 1963 Slide will doubtless have felt seared by the evidence of Professor Nash that the fact that a big volume of material had slipped would inevitably have been observed on any proper inspection of the tip. Whether or not named or adversely referred to in this Report, there must be many today with hearts made heavy and haunted by the thought that if only they had done this, that or the other the disaster might have been averted. Of these, some will blame themselves needlessly; others, while blameworthy in some degree, will condemn themselves with excessive harshness; yet others must carry the heavy burden of knowing that their neglect played an unmistakeable part in bringing about the tragedy.

208. The responsibility is, as Mr. Wien properly said, "diffuse", and we would willingly have left the matter there did not our duty, as we see it, clearly prohibit such a course. We have thought it right to confine our specific findings to those who had responsibility for tip stability or who, by reason of fears of a slip being expressed, took it upon themselves to deal with such fears and unreasonably failed to discharge their task. After critical examination of the acts and omissions of a number of people, we have found many degrees of blameworthiness, from very slight to grave.

209. We later single out only those whose conduct was such that our duty constrains us to do so. But, having learnt that the tipping gang and its chargehand (Mr. Leslie Davies) have all been bitterly reviled in Aberfan and treated as pariahs, we must make it clear that we absolve them from all blame for the disaster. As their counsel, Mr. Brian Gibbens, Q.C., rightly stressed:

“ . . . not one of them had had any experience of any tip except on the Aberfan complex and at those tips subsidences were usual . . . The tip gang, including Mr. Davies, were . . . wholly untrained and quite incapable of observing the significance of what they saw.”

That these untrained men were faced with a difficult situation was the unanimous view of such experts as were asked about the matter. Thus, Mr. Piggott, called on behalf of the National Coal Board, pointed out that:

“some sinkages . . . would occur because of rapid weathering of the mine shales. Now, how one could dissociate that sinking from any sinking of the tip . . . into, say, the under-clays or the drift or head which had its bearing-capacity exceeded, I do not know . . . It is obviously prudent to keep track of any sinkage so that this can be watched, but then it would be for someone very expert in all the circumstances to adjudicate on this.”

With this view not only Professor Bishop, the Tribunal's expert, was in agreement but several others, including Mr. Sheppard, the National Coal Board Director General of Production. Further, we do not consider that any distinction can be drawn between the chargehand, Mr. Leslie Davies, and the rest of his gang. Like them, he was entirely untrained and equally uninstructed. He manifestly entertained much apprehension about the state of Tip 7, particularly in the last few months, and told the rest of the tipping gang, “There is a river underneath, that must be why it is sinking”. Nevertheless, his explanation for continuing to tip is wholly understandable—“I am just a working chargehand”, he said, “I am not an official of the colliery”. He added, “All I was paid for was tipping muck and getting rid of it. I wasn't paid for anything else”.

210. We turn from absolute to the vastly disagreeable task of censure, though in varying degrees:

1. *Mr. Vivian Thomas*

Mr. Thomas, it should be recalled, was Unit Mechanical Engineer from September 1952 until the disaster. He had, as it was put, “an immense parish”, being responsible for the efficient working of all mechanical appliances, both underground and on the surface, and we accept as entirely well-founded the tribute to his competence paid by the Colliery Manager (Mr. Wynne). He, in common with all the mechanical engineers, had been left wholly uninstructed as to methods of ensuring tip stability and detecting the signs of instability, a factor which now speaks loudly in his favour. Although present with Mr. R. N. Lewis and Mr. Baker when the site of Tip 7 was being selected, he cannot be regarded as responsible in any way for that selection. Like the tipping gang, he had worked only on the Merthyr Mountain tips, and with his multifarious duties he had to rely very largely on such reports as were made to him by Mr. Leslie Davies. He manfully did not seek to avoid responsibility for the tips, but, although he was aware that water could create danger, he never inspected Tip 7 with that in mind. He visited the complex about four times a year at irregular intervals, and he never inspected the toe of the tip. Like other

officials to be mentioned later, he was extremely unsatisfactory about the big slide in November, 1963, (*ante* paragraphs 128–145) and we are satisfied that in relation to this matter he could have been more candid with the Tribunal. He spoke of a sinking of the crest by about 12–15 feet in 1963, but asserted that no material went down the mountain, adding that had it done so he would have reported this fact to Mr. Wynne and would have stopped tipping. As to the incident of November, 1963, he claimed that this was no more than an unusually heavy run of tailings. But had he looked, as he claims he did, he could not have failed to observe the many striking features which we have already described. Trusted implicitly as he was by the Manager, he could then have expressed himself vigorously and possibly to good effect.

211. Mr. Vivian Thomas has further to be judged in the light of the evidence of Mr. Leslie Davies that during the last few months before the disaster he reported to Mr. Thomas sinkings of 10–12 feet in Tip 7 on some three to five occasions. Mr. Thomas denies this, claiming that the only reports made to him were of sinkings of not more than 5 feet, which he regarded as ordinary settlement. But it is common ground that, if sinkings of 10–12 feet were being reported, Mr. Thomas should have investigated the position and that he never did. The question, accordingly, is: Did Mr. Leslie Davies render the reports as he claims? We believe that he did. If Mr. Thomas received no such reports of earlier sinkings we are unable to understand why, with such alacrity and apparently on his own responsibility and even without visiting the site, he ordered a cessation of tipping on the morning of the disaster and forthwith announced the decision to tip elsewhere. Having received the reports, we believe that he in turn must have informed the Manager of at least one of them and was then vested with the discretion to take such action as he thought fit. But Mr. Thomas knew perfectly well that at Unit level he was solely responsible for the tip and that the Manager relied entirely upon him in that respect. Accordingly, his action on receiving the reports and his failure, despite their nature, to inspect the tip at all during the last few months was blameworthy in the circumstances. In our judgment, therefore, despite his excellent work record and industry and his lack of instruction and knowledge in matters of tip stability, Mr. Vivian Thomas cannot be wholly absolved from a measure of blame for the disaster of 1966.

2. *Mr. Thomas James Wynne*

212. Mr. Wynne became manager of Merthyr Vale Colliery in September, 1962, but he should be judged not simply because, like the captain of a ship, he must be held vicariously responsible for any neglect by those under his command. Can he *personally* be said to have been blameworthy? This is the question which, in respect of him as of all individuals, we are here considering. Submitting that in the present case that question demands an affirmative answer, Mr. Ackner, Q.C. went on to say:

“ . . . I very much regret having to make the strong criticisms which I have made of Mr. Wynne . . . I would accept that he is, and probably always has been, a sound and reliable mine manager. The folly and indifference shown by his actions is again readily excusable in the light of the absence of any leadership from above”.

The safety record of the Merthyr Vale Colliery under Mr. Wynne is excellent and we readily accept that he is a most diligent and humane official. He was

left in ignorance of Mr. Roberts' correspondence with the Merthyr Tydfil Council regarding "Danger to Pantglas Schools" (*ante* paragraphs 116 *et seq.*), of the Powell memorandum of 1965 (*ante* paragraph 162), and of any inspection of the tip complex by Mr. Roberts in consequence of the circulation of that memorandum (*ante* paragraph 169). In these circumstances, he may well recall with some bitterness the observation in the National Coal Board "Guide to Consultation in the Coalmining Industry" (1948, reissued in May, 1963) that, "It is surprising that many people who work in a pit do not know what goes on in all the parts of it". His training was solely in mining engineering, and, since blame is being apportioned, it should be borne in mind that, as the Fleck Report, paragraph 282, rightly expressed it:

"... the Colliery manager's job is a most responsible one. Nationalisation has tended to increase rather than to lessen its scope. The Colliery Manager has not only heavy statutory responsibilities for safety and health in his colliery. He is also held to account for the day-to-day operations of the colliery and has to deal with a thousand and one things besides. By tradition, every sort of problem that arises in and about the pit during the twenty-four hours is more than likely to find its way to him for solution. Normally he lives on or near the job. He is on call—and is called on—morning, afternoon, and during the night".

213. Although Mr. Wynne appears to have made visits about twice a year to the tip complex for the purpose of inspecting its shape, the angle of repose, any movement of the toe, its drainage, and so on, he told the Tribunal that he saw nothing which caused him any disturbance of mind. Granted that he had no civil engineering training, the appearance of Tip 7 certainly from 1963 onwards was such that we regard it as inconceivable that Mr. Wynne should have failed to detect a most unusual state of affairs had he taken proper care to do those very things which he claimed were the purpose for which he paid such visits. Particularly is this the case after the big slide of November, 1963. The highly unsatisfactory manner in which he dealt with this and the consequent complaints made at the Colliery Joint Consultative Committees over which he presided in November and December, 1963, has already been extensively referred to (*ante* paragraphs 136–138). Again we do not feel that Mr. Wynne treated the Tribunal with complete candour regarding reports of abnormal sinkings. He asserts that none were made to him and there is no direct evidence to gainsay him. And yet, as we have already remarked (*ante* paragraph 158), during 1965 he and Mr. Vivian Thomas had discussed stopping Tip 7, and on the morning of the disaster it was indeed stopped by Mr. Thomas without inspecting the tip or reference to his Manager. We think the truth is that, while Mr. Wynne did not for a moment fear any slide reaching the village, he had either seen for himself or had had reported to him such matters as made him apprehend a degree of instability in the tip. He is not by any means the only official who failed to appreciate what stared him in the face. But, as manager of the mine, he was directly and personally involved in responsibility, and the vigilance he should have displayed was correspondingly higher. To do nothing at all (except to contrive that the tipping of tailings be diminished and finally terminated) was in all the circumstances a blameworthy omission.

3. *Mr. Joseph Baker*

214. Mr. Baker was No. 4 Group Mechanical Engineer for many years—from 1947 until July, 1964. Now 63 years old and prematurely retired because of ill-health, he began work at 14 years of age as a colliery apprentice fitter. He was mechanic at Albion Colliery when there occurred nearby at Cilfynydd the big slide of 1939 of an Abercynon Colliery tip. He became Group Mechanical Engineer on nationalisation. His experience was, therefore, exclusively in practical mechanical engineering, he had no knowledge of civil engineering or of soil mechanics and he was “not very good with maps”. Although all along the line it was the mechanical engineer who was responsible for tips, he agreed that he had never given even a fleeting thought to the matter of their stability, and he had been contemplating buying for his personal occupation one of the Moy Road houses which were destroyed in the disaster.

215. Like so many other witnesses, Mr. Baker is a decent, hard-working man who found himself suddenly and painfully confronted with the necessity of explaining to the Tribunal his acts and omissions over a long period of years. As mentioned at paragraph 93 *ante*, he prepared the scheme for tipping higher up the mountainside beyond Tip 5 which was inexplicably not proceeded with. With Mr. R. N. Lewis (then manager of Merthyr Vale Colliery) he selected the site of Tip 7 in 1957, a topic referred to at length elsewhere (*ante* paragraphs 96–108). Notwithstanding Mr. Baker’s lack of expertise, he had chosen the sites for four other tips, and although he could see for himself the result of the 1944 slide, he did not trouble to discuss or even consider its cause. Having regard to the geographical features, he, like the manager Mr. Lewis, must be blamed in some measure for starting Tip 7 where they did—simply because it was the most convenient place—without taking any steps to limit the extent to which it was to be allowed to proceed. Yet they did not even discuss the matter among themselves and neither concerned himself about it at all thereafter. Despite his lack of formal education, it is important to note that, on Mr. Baker’s own showing, although he had retired before the Powell memorandum came out in 1965, he regarded as matters of “commonsense” the first five of the six precautions against sliding there laid down and was ignorant only of the advice regarding tailings.

216. On July 20th, 1960, there was a meeting between National Coal Board officials and a Sub-Committee of the Merthyr Tydfil Borough Council at which, “The Council side expressed the concern that had been expressed of the potential danger of slipping the Tip [*sic*]”. Mr. Baker, who regarded them as referring to Tip 7, apparently took it upon himself to reassure the Council representatives that no danger existed, despite the fact that he had made no investigation of the locus. All he did thereafter was to put a few pegs in the mountainside and visit it about four times in the following two months. Although he noticed that during that time the pegs became covered and that the toe advanced some 4–5 feet, he assumed that everything was normal. How frequently thereafter he visited the tip complex is not clear, save that he himself said that the last occasion was in 1962 and that from then on until his retirement in 1964 no report was made to him regarding it. He specifically denied ever hearing about the big slide of 1963, whereas Mr. D. L. Roberts claimed that it was from Mr. Baker that he personally learnt of it. But Mr. Baker did learn that on September 16th, 1963, the Merthyr Tydfil Borough Engineer had written the

letter headed "Danger from coal slurry being tipped at the rear of the Pantglas School" to Mr. D. L. Roberts (*ante* paragraph 117). Whether or not Mr. Baker was told of the 1963 slide he ought, with reasonable diligence, to have known all about its occurrence. Although prevented by ill-health from going up the mountain after 1962, he could see all the tip complex from the vicinity of his office near Merthyr Vale Colliery and the effect of the slide must have been striking. Furthermore, having regard to his confessed familiarity with the type of information contained in the Powell memorandum, he should have realised that the site chosen for Tip 7 presented particular problems. He should have accordingly given Mr. Vivian Thomas special instructions to report to him on its progress, particularly as he himself was unable to make personal visits. But he gave none and took no steps to inform himself of what was happening as the tipping progressed during the six years until his retirement in 1964.

217. Much can be said in favour of Mr. Baker and it is with very real regret that we find ourselves unable, for the reasons indicated, to acquit him of a degree of blame.

4. Mr. Ronald Neil Lewis

218. Mr. Geoffrey Howe, Q.C., reminded the Tribunal that Mr. Lewis "...had the same background of purely practical mining experience as most of the other people", and lacked civil engineering qualifications. Starting work at fourteen as a collier's helper, by industry and ability he had risen to become manager of Merthyr Vale Colliery in 1951 and so remained until 1959. After two years as No. 3 Group Manager, he went back to Merthyr Vale in 1961 as No. 4 Group Manager. We have previously discussed those features of the landscape which were clearly visible when he and Mr. Baker selected the site for Tip 7, such as the nature of the slope, the signs of the big 1944 slide, the bulge in Tip 5, and the evidence of watercourses. Despite his lack of knowledge of civil engineering, ordinary intelligence should have alerted him to the fact that the new tip must be kept within a strictly limited area unless drainage and other problems were attended to.

219. On his return to Merthyr Vale in 1961, Mr. Lewis' main duty concerned the production of coal from the five collieries in his charge and he agreed that the last thing he wanted to do was to interrupt the tipping process, which in its turn would have involved a disruption of output. We cannot avoid the conclusion that this was the overriding consideration in Mr. Lewis' mind. He never inspected the tip complex or made any enquiries about it. But it was clearly visible from the Colliery yard and he therefore could not fail to see that tipping had been and was proceeding apace and that as the years passed Tip 7 was becoming huge.

220. Although he said that no slip was reported to him in 1963, Mr. Lewis did receive a copy of the Minute of the Colliery Joint Consultative Committee of November 26th, 1963 (see *ante* paragraph 136), over which the Colliery Manager had presided, and he was particularly unimpressive in the way in which he dealt with this in the course of his testimony. Accepting that the minute clearly recorded that "many people residing in the neighbourhood of the rubbish tip were very disturbed that a further slide would take place" and that Mr. Wynne had, by way of reassurance "... stated that tenders were out

for an aerial ropeway which would be tipping on the top of the mountain”, he took absolutely no action. Again, he did nothing when he received the later Minute of December 17th, 1963 (*ante* paragraph 138), ending “It was anticipated that a new aerial flight would be installed on the rubbish tip starting next May”. He must, as Group Manager, have known whether tenders were out for the aerial ropeway, and although in his judgment it would take “far longer” to instal than the six months Mr. Wynne had promised, he took no steps to speak to Mr. Wynne or to correct the inaccuracy. His excuse was that he regarded the minutes as referring solely “. . . to the flooding danger at Pantglas and the washing down of tailings” and that he assumed “. . . that these matters were being handled by the staff at pit level”. This attitude may be contrasted with that of Mr. Wright, the Area General Manager, who said that, had he received copies of these Minutes he would have seen to it that they resulted in immediate investigation. Nor was Mr. Lewis frank about what he claimed was the condition of Tip 7 after the big 1963 slide. Agreeing that he could see it from the Colliery yard, he asserted that it “always looked normal” and that it had “the normal angle of repose”, but he did concede that “a part of the tip had gone down the mountainside” and that this was not “normal . . . in relation to the activity of a tip”.

221. We cannot think that a Group Manager with a due sense of responsibility would have acted—or, rather, wholly failed to act—in all the circumstances as Mr. Lewis knew them to be. He was one of the joint instigators of Tip 7, and there were sufficient unusual features in its inception, its growth, and its history to have demanded at least some attention from him. Had he even gone to the tip complex he would, in our judgment, have found himself confronted with such strange features that, despite his lack of knowledge of civil engineering, he could not reasonably have left the matter unexplored. And even slight exploration of the situation by someone with knowledge must surely have led to remedial action. For these reasons, Mr. R. N. Lewis certainly cannot, in our judgment, be absolved from all blame.

5. *Mr. David Lewis Roberts*

222. Mr. Roberts, No. 4 Area Mechanical Engineer from 1960, joined the Powell Duffryn Company in 1935 at the age of 15. He obtained by part-time study the degree enabling him to become an Associate Member of the Institution of Mechanical Engineers. We accept the description of him given by Mr. Wright, the Area General Manager, as a very good mechanical engineer and such a glutton for work that he spent 90 per cent of his weekends at one pit or another. During the six years before the disaster he controlled directly some 2,000 men, he was involved in vast schemes of engineering work, and we can readily understand that he, in common with other mechanical engineers, was becoming over-strained. Mr. Wien is, we think, right in suggesting that he “took too much on his own shoulders”. He again, although charged with the responsibility for tips within his Area, had no training in tip safety, and he was left without instructions from above. These, and possibly other matters, speak strongly in mitigation of Mr. Roberts. But, assessing them at their highest in his favour, they do not enable him to escape all blame for the disaster.

223. We have already referred to Mr. Roberts frequently in this Report and we now content ourselves with the main grounds upon which, in our judgment, he must inevitably be criticised: (a) being the recipient of letters from the

Merthyr Tydfil Council expressing fears as to tip stability, he failed to give them the attention which the gravity of their language demanded. And if he were not prepared to do this himself, then, as Mr. Wien observed:

“Whether the many letters from the Corporation amounted to warnings of tip stability or not they should have been referred, within the Coal Board organisation, to the Area General Manager. . . . What he (Roberts) ought to have done was to pass (the complaint) on to higher authority. And there seems to be little doubt (in view of what Mr. Wright has said) that had that been done some investigations would have been made.”

(b) When, consequent upon the Corporation’s expression of fears, Mr. Roberts visited the tip complex he treated the matter so cavalierly as to render his visit useless. He did nothing to inform himself of the tipping history; he never told Mr. Wynne that he proposed visiting his colliery; although he knew that the Unit Mechanical Engineer was charged with responsibility for the Aberfan tips he made no effort to contact Mr. Vivian Thomas; and he did not exchange a single word with the tipping gang. And all this at a time when there were such alarming signs of something seriously wrong with the tips. (c) Above all, Mr. Roberts must be blamed for the manner in which he reacted to the Powell Memorandum in 1965. We have already dealt with this matter so extensively that further exposition of our views is superfluous. The very first time that a general report on tips in the South Western Division was called for, Mr. Roberts disobeyed the instructions that he should collaborate with the civil engineer, Mr. Exley, in examining the tip complex. Had they collaborated and been reasonably diligent in that collaboration, the overwhelming probabilities are that there would have been no disaster. All things considered, and although he is doubtless a good, overworked and conscientious man, Mr. Roberts must shoulder a heavy portion of the blame for its occurrence.

6. *Mr. Robert Edwin Exley*

224. Mr. Exley was No. 4 Area Civil Engineer from 1958 to August 1965. He holds the degree of Master of Engineering at the University of Liverpool and is a Member of the Institution of Civil Engineers. But by tradition civil engineers were not charged with responsibility for tips. On any view, that was a most unhappy arrangement, for, unlike Mr. D. L. Roberts, Mr. Exley had both practical experience and University training in civil engineering, as well as what he described as a “fundamental knowledge” of soil mechanics.

225. On April 13th, 1965, Mr. Exley went up the Merthyr Mountain with Mr. Roberts and Mr. Church in connection with complaints of pollution of the Pantglas brook—a visit which led to a trench being cut in the mountainside—and it is impossible to understand how, with his trained eyes, he could have failed to detect those unusual signs visible in the photographs and described by Mr. Stiles with whom Mr. Exley had visited the mountain just a week before (see paragraph 153). Indeed, Mr. Exley himself said that *if* they were there he could not have failed to notice them. Yet that they were there clearly to be seen is now beyond doubt. But Mr. Exley is far from unique in this seeming blindness, and we should not single him out for mention among the many if the matter had stopped there. The point which demands that blame be cast on him is his conduct in relation to the Powell memorandum. This we have dealt with elsewhere. The truth is that, in disobedience to his instructions, Mr. Exley did nothing.

He had no discussion with Mr. Roberts about an inspection, although he wrongly told the Tribunal that by expressed arrangement he left the matter to the Area Mechanical Engineer.

226. There was a faint attempt by Mr. Exley to demonstrate that the Powell memorandum was “irrelevant and misleading”, and, indeed, with his superior academic training Mr. Exley would be in a better position than its own author to assess its merits. But we feel that this was not the reason why he failed to act upon it. Nor would he accept the suggestion, put to him by the Tribunal, that possibly he did not bother about the memorandum because he had too much civil engineering work on hand, this being a time of major reconstruction. Such explanations as he gave for his failure to inspect, or even to ask to see Mr. Roberts’ report before it was sent off to Division, are wholly unconvincing. The truth, we think, is that personal relations between Mr. Exley and Mr. Roberts were so strained and the dominance of the far stronger personality of the latter so great that Mr. Exley took the line of least resistance and did nothing. Following as it did upon his examination of the alarming tailings slide at Tymawr so shortly before, this total failure to carry out the instructions accompanying the Powell memorandum undoubtedly played a decisive part in the events leading up to the disaster. Mr. Exley must, like Mr. Roberts, be blamed in that (to repeat the words of Mr. Tasker Watkins, Q.C.) between them “they thwarted . . . in Area No. 4 the only attempt ever made at a general inspection of colliery tips . . . since 1947”.

7. Mr. Clifford Jones

227. Mr. Clifford Jones, a University graduate in engineering, started his working life in 1935 with the Powell Duffryn Company, and said that for the last 25 years he had been intimately connected with the care of tips. He had become assistant mechanical engineer at their Nantgarw Colliery when in 1939 his father (who was then Chief Engineer of the Rhymney Valley area) was summoned to the scene of the great slide at Cilfynydd. Father and son went there together, Mr. Clifford Jones being placed in charge of the machines used to clear the main Cardiff-Merthyr road, a task which took some 5–6 days to complete. He agreed that “the (Cilfynydd) slide could have been disastrous if there had been traffic or people upon the road across which it swept in 1939”. Some months later his father handed him a memorandum on tip stability to read. This was the one which was later amplified by Mr. Powell by a reference to Tailings, but he says there were no illustration in the memorandum. He knew that for some 12–18 months after the Cilfynydd slide a system of monthly examinations of all working tips in the Rhymney Valley area was conducted by two men, but the practice then ceased because, as he assumed, “the tips stabilised”. He knew of no other system of tip inspection ever being set up. By 1954 he had become No. 9 Area Mechanical Engineer, and in 1958 he was appointed Divisional Mechanical Engineer for the South Western Division, thus becoming (under the Divisional Chief Engineer, Mr. Powell) head of the mechanical engineering hierarchy.

228. Mr. Clifford Jones said he regarded the method of disposal of waste as one of the most important functions of mechanical engineers at all levels, and yet, although he presided over meetings of Area Mechanical Engineers every 2–3 months, there had not been during the eight years since his present appointment a single Minute dealing with that topic. In all his service as a

mechanical engineer, the 1939 memorandum was the only document which taught him anything about tips, but it never occurred to him before the Tymawr incident to take steps to have it circulated. He had had "certain doubts" before the disaster about the capacity of mechanical engineers to select sites and to control or manage tips if their stability was in question, and these doubts had been confirmed by and since the disaster. Indeed, he regarded them as even unfit to understand and put into practice the Powell Duffryn memorandum.

229. Nevertheless, and notwithstanding that no-one had been made responsible "for approving a site on the basis of safety", Mr. Clifford Jones never consulted on such matters the civil engineers who had been available at Division from 1956 onwards. Despite some fencing by this witness, it became clear during his cross-examination that, not only did he regard mechanical engineers as having "plenty to do without having to deal with tips", but also that he considered they lacked the knowledge to be able to deal with tip safety. He personally visited tips about six times a year, but never examined the Aberfan tip complex. He said that until after the disaster he had no knowledge of the 1944 slide, which he now recognises was "something like" the Cilfynydd slide of 1939. This we find difficult to understand. He visited the Merthyr Vale Colliery Manager's office many times and could see the whole tip complex from there. In March, 1963, Mr. Clifford Jones was asked for his views on the project of an aerial ropeway to make it possible to tip higher up the Merthyr Mountain. For this purpose, on March 29th he and Mr. D. L. Roberts (Area Mechanical Engineer) went no nearer the locus than to a point across the valley on the Cardiff-Merthyr road opposite the incline. It was from that vantage point that he formed the view which led the Divisional Chief Engineer a few days later to lend his strong support to the project. From that place he had an excellent view of the whole tip complex, yet he told the Tribunal that he did not notice that there had been any slide of Tip 4, nor that Tip 5 bore marks of having been on fire. Although he accepted that, as Divisional Mechanical Engineer, one of his functions was to consider the safety of tips, when asked whether it ever occurred to him to go to the complex and see for himself whether it was safe to tip there, he nevertheless gave the reply, "No, sir, it was on the mountain and I thought it was O.K."

230. Mr. Clifford Jones visited the locus of the Tymawr incident in 1965 and it is to his credit that he forthwith unearthed the Powell Duffryn memorandum and gave it to the Divisional Chief Engineer. But the astounding thing is that thereafter he took no action, not even discussing the resultant reports with Mr. Powell. He was aware that immediately after Tymawr Mr. Blackmore, General Manager of No. 3 Area, set up a scheme which called for the examination of all tips under the direction of Mr. Grant, the Area Civil Engineer, and he said he approved of this, "Because it brought the civil engineer into the examination of tips". But he took no steps at all even to suggest that such a system should be adopted in all Areas. When he saw the report submitted by Mr. D. L. Roberts regarding the Aberfan tip complex (*ante* paragraph 169), he realised then that it was the work only of the Area Mechanical Engineer and that Mr. Exley, the Area Civil Engineer, had not been brought into it, but did not consider it necessary to pursue that point in any way, as he regarded the report as "adequate". The statement in the report that ". . . a small slip occurred during the latter part of last year" did not disturb him. True, he said, it indicated "a certain amount of instability", but he did not consider it merited

a visit from him or even a discussion with Mr. Roberts. On the other hand, he did consider that thereafter periodic examinations of the tip were called for, but he made no later enquiries of Mr. Roberts to ascertain whether these had been conducted, as he was preoccupied with other work. Although between the summer of 1965 and the Aberfan disaster of October 1966, he held several of his regular meetings with Area Mechanical Engineers, he never raised the matter of the Powell memorandum with any of them, or had any discussion even then about tip stability.

231. Consideration of the position of Mr. Clifford Jones cannot be confined to the spring and summer of 1965, which was undoubtedly a time of stress and strain for Board officials. Although he lacked frankness towards the Tribunal, it emerged clearly that he had long had doubts about the capacity of mechanical engineers to site, manage and control tips. He had vivid memories of the Cilfynydd slide of 1939 and fully realised how easily it could have led to fatalities. He knew of the availability of civil engineers to assist in matters of tip stability. He appreciated that the 1965 report on the Aberfan tip complex was the unaided work of the Area Mechanical Engineer. Yet none of those factors, even in combination, prompted Mr. Clifford Jones to take any steps to remedy a situation which even then he must have realised was unsatisfactory. He initiated no discussion with the Divisional Civil Engineer (Mr. Gareth Jones), or with the Divisional Chief Engineer or with the Divisional Production Director. Apart from producing the 1939 memorandum, this official who headed the hierarchy of mechanical engineers charged with responsibility for tips, did nothing towards curing the situation. In our judgment, it is not hindsight which calls for censure in his case.

232. Mr. Geoffrey Howe, Q.C., submitting that Mr. Clifford Jones was deserving of no criticism, observed:

“ . . . He was one of a team of people at Divisional level, any one of whom it might be said after Tymawr could have sprung to the Blackmore conclusion, all of whom after Aberfan have really accepted that that certainly would have been, with hindsight, a desirable thing to have done. But none of them did so and they all are inter-dependent and inter-connected—Mr. Morgan, Mr. Powell, both the Joneses (Mr. Gareth Jones and Mr. Clifford Jones). They stand as a team, and it would be hard and wrong . . . to identify any one of them as the man who ought to have jumped this hedge of comprehension and reached the conclusion that a change of system was called for and should himself have taken the initiative in bringing it about”.

We have already indicated that in our judgment one of the four in the “team” mentioned by Mr. Howe cannot be acquitted of blameworthiness. What of Mr. Gareth Jones? Highly qualified as a civil engineer both by academic training and by experience, he has been Divisional Civil Engineer in the South Western Division since 1956. From time to time he was consulted regarding landslides, and on two occasions had been asked to inspect proposed tipping sites. But it is important to remember that he was never charged with the responsibility of looking after tips. Immediately after the Tymawr incident he inspected the locus at the request of Mr. Blackmore, No. 3 Area General Manager, and concluded that it was not attributable to ground movement. He received a copy of the Powell memorandum, about which he had not previously been consulted, but which in the main he regarded as “first-class for

the intention that Mr. Powell had in mind". He saw the reports which arrived in response, but apparently did not discuss them with the Chief Engineer, and this is probably a source of regret to him now. But tips were not his responsibility and he lacked knowledge of many matters appertaining to Aberfan. Thus, he did not know of the long-standing and grievous complaints of flooding, nor of the 1944 slide, as to which he said that unless and until its cause had been discovered his advice would have been "Do not tip here at all". That far greater use could have been made of the knowledge and experience of Mr. Gareth Jones is beyond doubt, and having seen and heard him, we feel sure that much good would have resulted. The only question is whether, although his services were not utilised, he should now be blamed for not taking upon himself, as it were, to initiate a new system to secure the proper siting, management and control of tips. As they never were his responsibility, in our judgment it would be wrong to blame Mr. Gareth Jones on that account.

8. *Mr. Daniel Lewis John Powell*

233. Mr. Powell, a University graduate in science and a member of the Institutions of Mechanical Engineers, of Electrical Engineers, and of Mining Engineers, joined the National Coal Board in 1949, later became an Area Chief Mechanical Engineer, and in 1961 was appointed Chief Engineer of the South Western Division. Although possessing some knowledge of soil mechanics, he said that he would employ outsiders for any specialist investigations. He agreed that he was directly and wholly responsible for all tips in the South Western Division and added, "My responsibility is to advise on . . . the tip management and the tip control and to prompt action which I consider necessary". This, he accepted, involved him in the duty of advising the Divisional Production Director on tip policy, so that the Divisional Board could thereafter instruct Area General Managers. He appreciated that from Areas downwards it was mechanical engineers who were responsible for tips. Although the Divisional Board would look not only to him, but also to its own Advisory Committee for advice regarding the initiation of a policy relating to tip safety, in none of the Divisional Advisory Committee minutes was there any reference to that topic.

234. A Divisional Civil Engineer (Mr. Gareth Jones) was appointed in 1956, and by 1959 there were some 12 civil engineers at Division and 14 in Areas. Mr. Powell said that at Division he attached great importance to discussing all matters relating to tips with both the Divisional Civil Engineer (Mr. Gareth Jones) and the Divisional Mechanical Engineer (Mr. Clifford Jones) and he understood that the Chief Engineers at Area level similarly consulted with both the civil and mechanical engineers. He realised that expertise was "absolutely necessary" in selecting a tip site and that, while he was content for the day-to-day management of tips to be left to the unit mechanical engineers, it was advisable that civil engineers should inspect them regularly. Yet to his knowledge no instructions to that effect had been issued by Division and, apart from a vague reference to some such system existing in No. 5 Area, there was no system of inspection in Areas. The only thing that happened was that, at the instigation of the Divisional Mechanical Engineer (Mr. Clifford Jones), Mr. Powell amended and then circulated the old Powell Duffryn memorandum of 1939 after the highly alarming Tymawr incident of 1965. He appreciated that in No. 4 Area there was no Chief Engineer to bring about that liaison between the civil and mechanical engineers to which he attached so much

importance. On the other hand, he did send the memorandum both to Mr. D. L. Roberts and to Mr. Exley, requested their collaboration and says he had no reason to suspect that they would not, and did not, collaborate in carrying out the task of inspecting and reporting enjoined upon them.

235. There is nothing to gainsay Mr. Powell's assertion that he was ignorant both of the Tip 4 slide of 1944 and of the Nantgarw site investigation of 1958. But, although he said he had "no personal knowledge whatsoever" of the Cilfynydd slide of 1939, there must inevitably have been discussion regarding it when Mr. Clifford Jones produced the 1939 memorandum and this cannot fail to have augmented the alarm which the Tymawr incident had already created in Mr. Powell's mind (see *ante* paragraph 159). Then, if not before, was surely the time for him to go direct to his Production Director and point out that absolutely no system to ensure tip safety existed and to discuss what he had in mind. Had he done so, Mr. Geoffrey Morgan could have made a valuable contribution culled from his own reading and his own knowledge of the big slides of 1939 and 1944. Furthermore, the probability is that there would have been drawn into the discussion both the Civil Engineer (Mr. Gareth Jones) and the Mechanical Engineer (Mr. Clifford Jones), each of them having his own part to play. The form of the directive to be sent out could have been discussed, arrangements made for its proper circulation so that (*inter alia*) the Area General Managers and Area Production Managers would receive copies, and machinery set up for the proper scrutiny and analysis of the reports when they arrived at Division. Mr. Powell did none of these things.

236. Although Mr. Powell supplied the Production Director with a copy of the memorandum not later than April 14th, 1965, Mr. Morgan did not read it until June. By that time the alarm created by Tymawr had virtually ceased, it having been recognised that it was not a tip-slide, and there was no discussion between Mr. Morgan and Mr. Powell to bring out the fact that the general problem regarding tip stability still remained. Mr. Morgan received a summary of the various reports submitted, but said that Mr. Powell gave him no advice regarding them, and added:

"I also had not received a specific suggestion from the Engineering branch that time was opportune to take any further action. I felt satisfied with the action that had been taken and I was definitely not aware, of course, that the Board's normal procedure for communications had *not* been followed out in this Area in respect of informing the General Manager of, first, the notes of guidance, and, later, the exercise to be carried out."

237. Mr. Gareth Jones knew nothing of the memorandum until after its circulation, and his views were not sought either then or when the reports came in. And Mr. Wright, the No. 4 Area General Manager and his Production Manager were both left wholly unaware of the memorandum and of the reports called for. Had they known of them, the earlier correspondence in which the Merthyr Tydfil Borough Council expressed its fears of a tip slide to the Area Mechanical Engineer, Mr. D. L. Roberts, might well have come to light and, in consequence, an investigation ordered at Area level. Finally, it is impossible to accept that Mr. Powell gave to the reports the attention which they deserved. Whether in fact Mr. Gareth Jones saw all the reports is not clear from the evidence but it is right to recall his saying that:

“If I had seen anything in these reports that made me think that Divisional action was required, I would not have hesitated in speaking to him (Mr. Powell) about it. . . . All Mr. Powell had done was to remind Areas of their responsibilities, give them some notes for guidance, and urge some immediate action following Tymawr. Whether the Board should have thought a directive was appropriate at this stage is not for me to judge”,

to which the witness added that it had not appeared to him that the summary and such reports as he saw called for his advising “any further outstanding action”.

238. But, just as the alarm created by the Tymawr incident and the theory as to its cause entertained by Mr. Powell led to his circulating the memorandum (an act for which he must be given full credit), so, at the same time his failure to deal adequately with the need for a tipping policy or system when its complete absence stood revealed brings with it censure in some degree. Just as Mr. Morgan, the Production Director, has to be blamed for failing to initiate a tipping policy (see *post* paragraph 239), so also, although on different grounds, must the Divisional Chief Engineer share the responsibility by his failure to review the existing tipping system (such as it was) and advise his Production Director on the urgent need for its overhaul. Indeed, a simple provision that from that time onwards there must be regular inspection of all working tips by civil engineers and a requirement that they submit a written report after each inspection would have sufficed, for throughout 1965 Tip 7 presented such an appearance that any inspection by any civil engineer of reasonable diligence would have revealed the dangerous state in which it then was.

9. *Mr. Geoffrey Sibbering Morgan*

239. Mr. Geoffrey Morgan has been Production Director of the South Western Division of the National Coal Board since 1952. “For him”, we were eloquently reminded by Mr. Geoffrey Howe, Q.C., “surely above everybody else, it is right to remember the nature and scale of the responsibility that he had upon his shoulders. The bare figures scarcely indicate that: an industrial organisation of more than usual complexity, with a turnover of more than £100 million a year, with more than 60,000 employees, three times as many people (roughly speaking) as the Steel Company of Wales. He is, indeed, a man with an enormous rôle of responsibility, who must depend, as must anyone like that, upon help, advice and guidance from his experts of all kinds”. Every word of this is true and we have sought to bear all of it in mind in our assessment of the responsibility of Mr. Morgan for the disaster.

240. Now 61, a member of the Institution of Mining Engineers and a man of high intelligence, his knowledge of the coal-mining industry is vast and he is now, as Mr. Tasker Watkins, Q.C., reminded us “. . . in the twilight of a distinguished career in the South Wales coalfield”. From 1940 to 1942 he was manager of Merthyr Vale Colliery, at a time when No. 4 was the sole working tip. From 1942 to 1947 he was the agent of several collieries, including Merthyr Vale. On Vesting Day (January 1st, 1947) he became Area General Manager of No. 4 Area, and so remained until his appointment in October, 1952, as Divisional Production Director. At that time he had under his charge 178 collieries, employing 109,000 men; by the time of the disaster the numbers had been reduced to 75 collieries and just under 60,000 men.

241. The question for our consideration, as far as Mr. Morgan is concerned, was rightly posed by Mr. Tasker Watkins, Q.C., as being:

“Whether or not he can now bear any responsibility for failing to initiate a policy at Aberfan, because it is only in the realm of *policy* that he can figure, as he had no direct personal attachment to Aberfan at the relevant time.”

That no system existed for dealing with the problem of tip stability in the South Western Division was not challenged by Mr. Morgan, a good witness who faced up manfully and with a considerable degree of candour to the difficulties with which he was confronted in the course of his cross-examination. He accepted that, as Production Director, he it was who bore the responsibility for devising such a system, that a system should have been devised, and that it could not be denied that this might well have prevented the disaster. But he resisted blame, on the grounds that all this depended upon hindsight, that hitherto the risk of serious injury from tip instability was “infinitesimal”, and that nothing had happened in the past to call for the formation and implementation of any tipping policy.

242. We find it impossible to accept the argument thus advanced by Mr. Morgan. He knew from his student days of the Professor Knox lecture of 1927. He knew of and was impressed by the great slide at Cilfynydd in 1939. He knew of the fears of a slide of Tip 4 which had been expressed in 1944 by representatives of the Merthyr Tydfil Borough Council and of the reassurances which he and other representatives of the Powell Duffryn Company then gave, despite which the big slide occurred later that year which “greatly concerned” him. On the other hand, his last visit to Merthyr Vale was not later than 1960 and, remarkable though it is, no record of the 1963 slide of Tip 7 was made and he said that no news of it reached him. The big explosion at Cambrian Colliery occurred soon after the tailings run at Tymawr and took up all his time. He learnt of the Powell memorandum and of the reports it produced in about June, 1965, and he “. . . felt that the exercise carried out by the Divisional Chief Engineer had had the effect of concentrating Area personnel’s minds on tip stability, especially in relation to changed circumstances where tailings disposal was involved”.

243. Few men, if anybody, in the South Wales coalfield knew more than Mr. Geoffrey Morgan about the capacity of tips to slide when placed on hill-sides. In the light of what he had read and what he had seen for himself, he could not reasonably have regarded the risk of danger therefrom as “infinitesimal”, and it ought not to have needed hindsight to bring this home to him. Assuming that up until 1952 he was never in a position to initiate a new tipping policy which embraced consideration of the matter of stability, he must by that time have become aware of its importance, and we have been unable to avoid the conclusion that it should have received his attention once he was in the saddle. While we accept that he had never seen the Powell Duffryn memorandum of 1939, the need for some such directive should have been present to his mind and he should have taken steps to see that the need was filled. Had this been done with reasonable promptitude after his appointment as Divisional Production Director, it could and should have transformed the whole attitude in the South Western Division towards the matter of tip stability. It was urged upon us by Mr. Geoffrey Howe, Q.C., that:

“He knew that in consequence of the Powell memorandum and of the accompanying letter that the Areas were alerted to the risk, that the Area Engineers of both kinds had been told of the risk and were, so far as he could tell, dealing with it.”

But in our judgment, even accepting this, it cannot be said that the slate was thereby wiped clean, that from that point onwards any blameworthy omission by Mr. Morgan can properly be said to have had no operative effect in bringing about the disaster. On the contrary, the knowledge which Mr. Morgan possessed of the capacity of tips to slide and his experience of actual slides were, in combination, such that it required no such “intuitive flash” as his counsel spoke of to make him realise the gravity of the risk involved if the problem did not receive the consideration it merited. But it received none from the Production Director, and his failure in this respect undoubtedly contributed materially to the disaster.

3. THE MERTHYR TYDFIL COUNTY BOROUGH COUNCIL

244. We have seen that as early as January, 1944, the Borough Council was concerning itself with the stability of the Merthyr Mountain tip complex (see *ante*, paragraphs 86–88).

It has also been observed that in September, 1950, in response to an enquiry by the Borough Engineer, the Board gave the assurance, “We are . . . constantly checking the position of all these tips” (see *ante*, paragraph 92). Again, in 1959, just a year after Tip 7 was begun, the Town Clerk sought a meeting with the Board regarding “. . . the potential danger of the above tip at Aberfan”. In 1960 he informed them that, “Concern has been expressed that the Tip could slide after heavy rainfall” and the Board again gave assurances that no danger existed but undertook to consider the matter and write later.

245. On July 24th, 1963, there began the correspondence between the Borough Engineer’s Department and Mr. D. L. Roberts headed “Danger from Coal Slurry being tipped at the rear of the Pantglas Schools”, which continued up to March of the following year (see *ante*, paragraphs 112–127). We have considered at length elsewhere the contents of these letters, the circumstances which gave rise to them, and the manner in which they were regarded by author and recipient alike. Mr. Wien, Q.C., rightly conceded that the language employed in the letters sent by the Council was such that they should have led to some investigation by the Board. On the other hand, as we have said, we are satisfied that when they were sent their author, Mr. Bradley, entertained real fears that Tip 7 might slip for a substantial distance and that there was even a risk that it might invade the village. On March 11th, 1964, at a meeting of the Town Planning Committee when the question of a projected aerial ropeway was discussed, the fears expressed by Council representatives that tipping higher up the mountain might induce instability in the existing tips was met by the ridiculous tier-tipping plan there and then advanced by Mr. McInnes for the National Coal Board which we have felt it right to denounce elsewhere in this Report (see *ante* paragraphs 148–151). And it must not be overlooked that the Committee was insistent that no further tipping of tailings would be permitted.

246. The Attorney-General invited the Tribunal to consider *three* questions in relation to the Borough Council:

- I. Why did its officers not themselves inspect the Tip and, if necessary, obtain expert advice on the problem?
- II. Why did the Council not press its complaints higher than merely to Area level in the National Coal Board, "and why did they not press their complaints elsewhere where such pressure might have been effective"?
- III. Did the Council make full use of their powers under Town and Country Planning legislation or by way of High Court proceedings, "so that a situation which they thought dangerous to their burgesses could have been dealt with"?

247. Mr. Ackner, Q.C., urged upon us that each of these three questions should be answered in a manner adverse to the Borough Council. He submitted that, apart from a couple of letters during 1965, they did nothing after the "Danger" correspondence ended on March 19th, 1964, to keep in touch with the Board over the question of stability of the tip. He sought to explain this alleged failure of the Council by saying that, "... as the tips overshadowed, towered above, and indeed dwarfed the village, so did the National Coal Board the Council. Those whose function and duty it was to look after the welfare of the inhabitants of Aberfan no doubt discharged that function admirably in all other respects, but in regard to this matter, in relation to the National Coal Board, they were not big enough for the job". Assuming that further action was called for from the Council, there can be no doubt of its capacity and ability to take it. This is in no sense restricted to the power of prosecuting and defending legal proceedings for the protection of the interests of inhabitants conferred by Section 276 of the Local Government Act, 1933. Without ever resorting to law, a Borough Council has an enormous capacity to express itself in effective protest in a wide variety of ways if it considers that the safety or health of its inhabitants is endangered.

248. We are not here concerned to consider the respective attractions or defects of proceeding by way of a relator action, or by invoking the Town and Country Planning legislation, or by a summons for nuisance, topics which took up much time during the Inquiry. We repeat, if more were indeed properly called for by the circumstances than the Council did, there was more that it could have done. Indeed, this was to an extent conceded by Mr. Alun Davies, Q.C., in saying:

"Naturally, the local authority can make representations to whomsoever it pleases, but in making those representations it is governed by the fundamental character of its being, namely that it is an elected body. In doing so it mirrors the feelings and expressions of the people it represents. If there is no further demand for a certain course of action not prescribed as a legal duty, the local authority takes this course at its peril, and particularly when such a course may—or may not—jeopardise the daily bread of its people".

But the absence of popular demand for action, or the fear that action might lead to economic hardship, cannot either singly or in combination justify inaction if thereby health and safety were, in the opinion of the Council and its officers, imperilled. The only relevant questions are: In all the circumstances as they were known to the Council and its officers, ought they to have done more

than they did about the Aberfan tip complex? And, if they ought, did their inaction contribute to the disaster?

249. These questions have been anxiously considered by the Tribunal. The Council would look to its officials for guidance and it is the conduct of the Borough Engineers which has mainly concerned us. Mr. Alun Davies, Q.C., goes too far when he says that, "To each criticism, however trivial, a full and proper answer has been made". With fears of a slide being expressed so strongly to and by Council members, with the impact of these fears upon Mr. Bradley (the Deputy Borough Engineer) being so weighty that he in turn shared them and therefore initiated in the name of the Borough Engineer the strongly-worded correspondence with the Area Mechanical Engineer which we have already considered, it is to be regretted that neither he nor the Borough Engineer took the trouble ever to inspect the Aberfan tip complex even when the flooding problem was being discussed a few hundred yards away in the village. Their inactivity is to be contrasted with the activity of an earlier Borough Engineer, Mr. Marshall. When fears of tip stability arose in 1944, he not only corresponded with the National Coal Board but twice visited the locus, and so secured some action by the Board. Both the Borough Engineer and his Deputy are professionally qualified (Mr. Jones a municipal engineer, Mr. Bradley a civil engineer) and had they inspected at any time after the November, 1963, slide they could not have failed to see on the mountainside such stigmata of danger as fully justified the fears which had been expressed. By such an inspection they would have been reminded that nestling on the slope of the mountain just below the tip were the Hafod Tanglwys cottages, the very existence of which each of them in turn told the Tribunal he had overlooked, but which were later to contain the first victims of the disaster. Both are obviously able and conscientious men and doubtless each now bitterly regrets his failure to inspect.

250. But they must not be condemned on hindsight, either by themselves or by the Tribunal. Granted that they did not act with the highest diligence, did they fall so greatly and so inexcusably short of it that, in the light of the circumstances as they saw them, they should now be held to have played a blame-worthy part in bringing about the disaster? Having reflected upon this question with the care demanded by its gravity (both from the public and the private points of view) the conclusion we have come to is that the question should be answered in the negative. As early as 1957 they had written to the Welsh Office of the Ministry of Housing and Local Government expressing the Borough Engineer's opinion "that both on the grounds of amenity and stability the tipping area should not be extended", and they received no enlightening help from that quarter. They gave strong and repeated warnings to the Board and they received assurances that all was well and that their complaints were being attended to. Believing, as they were justified in believing, that tailings made for tip instability, they secured a promise that the tipping of tailings would be stopped, and (though with some delay) it was indeed stopped. The continuance of the years-old flooding of Aberfan should have aroused their suspicion that all was not well, but again they had the assurances of high-ranking National Coal Board personnel that nothing was wrong with the stability of the tip. When asked whether he thought that the tips had been examined by anybody other than a mechanical engineer, Mr. D. C. W. Jones told the Tribunal:

“I had assumed that they would be examined by people competent to examine tips and even the Inspector of Mines. I took it for granted that this was so”.

He added that he had it in mind that the National Coal Board were using experts, such as civil engineers, to inspect the tips. Of this assumption, Mr. Alun Davies, Q.C., had this to say:

“... Perhaps the natural mistake made by the Merthyr Corporation was that it accepted the opinions of the experts of this organisation at their own valuation. Little did the Corporation realise how empty were the assurances given by their experts, but in my submission this cannot be blameworthy conduct as between responsible men”.

251. Three elected members of the Council, Messrs. Tudor, McGinty and J. Williams, gave evidence about the complaints which they had received and the action which they and their colleagues had taken. We also heard from many witnesses of the considerable part played by the late Councillor Mrs. Gwyneth Williams and of the vigour with which she expressed the fears which she and her husband entertained of the tip's sliding down into the village. That their fears were somewhat allayed in the way described by learned counsel serves not only to underline the blameworthiness of the National Coal Board but also to indicate, as we think, the right attitude to adopt in relation to the Borough Council and its officers. In all the circumstances, we do not think that it should be said that by blameworthy omissions they contributed to the disaster.

4. THE NATIONAL UNION OF MINeworkERS

252. Mr. Lynden James, head of the Safety Department of the National Union of Mineworkers in the South Wales Coalfield and stationed at Cardiff, prepared for the Tribunal an excellent symposium of material (published over a period of years) relating to tips which, it is to be noted, he had obtained through the Institution of Mining Engineers. When asked whether in the past the Union had relied upon the National Coal Board for such matters as the siting of tips and their stability, Mr. James frankly told the Tribunal, “Well, as far as *siting* tips, it is the function of the Board. As far as relying on the Board for tip *stability*, I must be perfectly honest here—we have not considered tip stability until this (disaster) occurred”. That was the position judged from the standpoint of Union officials 20 miles away in Cardiff.

253. But what of Union representatives at Aberfan? The broad criticism levelled against them by counsel for the Parents' and Residents' Association may be thus summarised: After the big slide of November, 1963, they realised for themselves that there was obvious danger of a further failure and, in addition, fears of this were expressed to them by Aberfan residents. They thereupon raised the matter at two meetings of the Colliery Joint Consultative Committee (presided over by the manager, Mr. Wynne), but, although nothing was thereafter done by the National Coal Board except to stop the tipping of tailings, they just “... sat and watched the tip being put back into its pre-slide condition without taking any further action”. Regarding such inactivity, Mr. Ackner, Q.C., said:

“The National Union of Mineworkers are ... a powerful and energetic Union, and it is my submission that there must surely be some rational explanation for this inactivity; and the only rational explanation which is

available is that the Union feared, rightly or wrongly, that a demand for action would involve substantial expenditure and that that would give rise to the risk of the pit closing”.

We have previously (*ante* paragraphs 61–62) expressed the view that such a fear may, and probably did, subconsciously colour the attitude and affect the judgment of many at Aberfan. Indeed, if Mr. S. O. Davies, M.P., is accurate in his recollection of events, a passive attitude was not unknowingly adopted by the Union, but was one deliberately taken up after weighing the arguments for and against action. Mr. Tasker Watkins, Q.C., said that:

“If this evidence is accurate, the local officials of the Union preferred to overlook the *appreciated* danger of a tip slide lest complaint should place in jeopardy the livelihood of a large number of men in the Taff Valley. This attitude Mr. Davies either condoned by his failure to take his fears to other, more influential, quarters, or if, condoning it, he did no more than repeat his fears from time to time to the local men”.

254. Mr. W. R. King, Lodge Secretary of the Merthyr Vale Colliery since July, 1962, strongly denied that any such fears of pit closure had been expressed to him by Mr. S. O. Davies or by any Union members, or that there had been any balancing of the fears of a tip slide reaching the village against the fear of closure. But he had seen the result of the 1963 slide and we have quoted elsewhere (*ante* paragraph 129) his vivid description of the large cavity in the face of the tip which he then saw. According to him, Mr. W. J. Williams, the former headmaster of Pantglas Secondary School was most concerned, and of others he said that, “The fear they expressed to me was that the tip would come away again, and it would run over the remaining 150 yards of the Coedcae and it could overwhelm the school and the houses . . . What they told me was that the tip could advance and engulf the school and houses”. He was present at the two meetings of the Colliery Joint Consultative Committee in November and December, 1963, when Alderman Tudor voiced the concern which had been expressed to him “about the tip tumbling over”. It was at these meetings that Mr. Wynne (the manager) gave his reassurances about the arresting effect of “the big banking” and the installation of an aerial ropeway in about six months time and that the tip had “dried out”.

255. The real attack made upon the National Union of Mineworkers is that thereafter they did nothing. Ought they to have done something? Mr. King told the Tribunal that during 1964 it appeared to him that the tip had consolidated. The contemporaneous photographs demonstrate that such a conclusion could not have been arrived at had he directed anything like close attention to the tip. It is also complained that, although tipping continued unabated and there was no sign of the promised aerial ropeway, the National Union of Mineworkers did not pursue the matter of stability any further, an omission which Mr. King (with the benefit of hindsight) now candidly regrets. But, on the other hand, if he or any other Union member had protested to the National Coal Board, what sort of a response would they have been likely to evoke? When Alderman Tudor told Mr. Wynne after the Consultative Committee meeting on November 26th, 1963, that he was not altogether satisfied regarding the stability of the tip, the manager told him that he did not know what he was talking about. It is also to be remembered that the minutes of these two meetings found their way to the Group Manager, Mr. R. N. Lewis, and that, for all the Union knew, they might

well in due course have found their way to Area or even Divisional levels. There is great force in the following answer made by Alderman Tudor to the question as to how he reacted to the reassurances given to the Colliery Joint Consultative Committee by the colliery manager:

“Remember, I was a layman with limited knowledge of tips. I had raised the matter of the tips in the Consultative Committee and I was compelled to accept what Mr. Wynne told me, recognising that he had far more ability than I had. And I thought that he was capable enough of making a decision. If he was not capable enough of making a decision, well then, he should have called someone else in. As a layman I could not argue with him, because he could have blinded me, because he knew more of the tips and he knew more of the pit work than I did”.

256. All the Union members could know was that, having made their protest and received reassurances from the colliery manager, the tipping of tailings thereafter greatly diminished and finally ceased. In our judgment, they were entitled to assume that tip inspections were being conducted by duly-qualified officials and it is relevant to recall that even after the disaster the Board were maintaining—although quite wrongly—that they had a system of regular inspection of all tips, whether in active use or not. It seems to us that Mr. Gibbens, Q.C., put the position of the National Union of Mineworkers fairly and accurately when he said:

“In the perspective of this matter there is to be borne in mind that the National Union (of Mineworkers) had no-one, and was not expected to have anyone, with the necessary qualifications to enable a critical assessment to be made of tip stability. But the National Coal Board had . . . Short of going outside the industry and employing a civil engineer or someone with knowledge of soil mechanics, hydro-geology, and all the rest, the Union could not have contested that matter”.

Lacking easy access to such expert knowledge, completely reassured by men whom they were entitled to look to and rely upon, and doubtless influenced (though unconsciously) by the thought that their livelihood was involved, in our judgment it would be unrealistic and unfair to blame the Union for doing no more than they did. We accordingly refrain from such a course.

PART V

HOW AND WHY DID THE DISASTER HAPPEN ?

“Tip 7 should never have been allowed to go over unsuitable ground without proper site investigation.” (Counsel for the National Coal Board on Day 74)

257. As soon as we were constituted as a Tribunal we arranged for a series of scientific investigations to be started under the general direction of Professor A. W. Bishop, Professor of Soil Mechanics in the University of London. The National Coal Board brought in expert members of its own staff and also independent experts and the Aberfan Parents’ and Residents’ Association likewise engaged independent expert advisers. Other parties represented before us submitted memoranda and invited our attention to relevant bibliography. In addition we received a large volume of helpful correspondence, not only from this country but also from abroad. To all those who assisted in this way we are deeply grateful.

258. A pleasing feature of the scientific investigations was the spirit of harmony which prevailed and the mutual help which the experts retained by the different parties gave to each other. No less remarkable is the almost complete identity of their findings: such differences of opinion as were revealed seemed rather to lie in the field of semantics than in that of basic points of view. At the end of the day the views of the Tribunal’s own experts were generally adopted by all parties, although in some small matters some sought to put a gloss upon them or to make some minor shift of emphasis.

259. The names of those who gave expert evidence are to be found at Appendix C and some of their memoranda will appear in a separate volume. For present purposes it is enough to say that we heard or read evidence relating to the following scientific fields:

- A. Surveying and map-making,
- B. Photogrammetry,
- C. Meteorology (especially rainfall),
- D. Seismology,
- E. Mining (especially subsidence),
- F. Geology (including hydro-geology),
- G. Soil Mechanics.

We deal here briefly with each of them in turn.

A. *Surveying and map-making*

260. We began by assembling all the Ordnance Survey maps of the Aberfan tipping area. We also commissioned a post-disaster contour map of the same area. We were kindly provided with two pre-disaster contour maps by the staff of Messrs. Hunting Surveys Ltd., who, in their own time and at their own expense prepared them from aerial photographs taken for other purposes. Altogether sixty-one maps and plans were submitted in evidence and two scale models showing the mountainside before and after the disaster were constructed.

B. *Photogrammetry*

261. Examination of the aerial photographs taken over the period of years 1945–66 revealed the chronological series of events occurring on the tip complex and this was of immense assistance in evaluating the evidence of eye-witnesses

on the ground. It was also found possible by measurement from photographs, and especially from the 5 foot interval contour maps made from the last four aerial photographs, taken between May, 1963, and the disaster, to estimate volumes of portions of the tips and of the material that slid from them from time to time (see Fig. 10).

C. *Meteorology (especially rainfall)*

262. Evidence was given of the rainfall in the Aberfan area over more than fifty years. It appeared that the rainfall in the three weeks preceding the disaster, though heavy, was by no means unusual. It also appeared that the incidence of rainfall in that period bore a considerable resemblance to that experienced in November 1944, when there was a slide from Tip 4 at Aberfan, except that the total rainfall in 1944 was appreciably greater.

D. *Seismology*

263. Inquiries were made to ascertain whether there were any earthquake tremors experienced in South Wales at or about the time of the disaster. None were recorded and this factor may therefore be ignored as a cause. Enquiries also showed that no supersonic aircraft were in the vicinity.

E. *Mining (especially subsidence)*

264. A report on the effects of mining subsidence on the tipping area was submitted jointly by Mr. Piggott of the National Coal Board and Mr. Wardell for the Parents' and Residents' Association. This report concluded that mining subsidence was not a prime cause of the disaster but went on to explain that certain effects of such subsidence as had taken place would tend to facilitate the collection of water in the rocks under Tip 7, while tending to inhibit its collection elsewhere in the tip complex. This is because the fissures in the rocks were under extensional strain under Tip 7 and so widened, while elsewhere they were compressed and so made narrower.

F. *Geology (including hydro-geology)*

265. Because it was apparent from the outset that it was crucial to know what lay under the tip complex on Merthyr Mountain, we appointed Dr. Woodland of the Institute of Geological Sciences (formerly the Geological Survey of Great Britain) to make a map and section of the area. Dr. Woodland had already in 1945 revised the Geological Survey map of that part of the South Wales coalfield which includes Aberfan and, on the basis of the programme of borings carried out in the vicinity of the tips, was able to give a more detailed description than was previously known. He conferred with Professor Moore of Sheffield University on behalf of the National Coal Board and Mr. Price, the Board's geologist in South Wales, and was able to produce a map and section of the area which were agreed by all parties before us. (They are reproduced as Figures 2 and 3; Dr. Woodland's report is included in a separate volume.)

266. A brief description of the fundamental geology was given, *ante*, paragraph 25, and here it is enough to recall that Merthyr Mountain consists mainly of fissured Pennant sandstone overlaid by drift material and intersected by layers of relatively impermeable mudstones. One such layer, associated with the Brithdir coal seam, gives rise to a line of springs and was located under Tip 7. The lower part of the drift material was composed in part of a tongue of boulder clay extending up the hillside from the valley bottom. Behind this impermeable

clay there was water under artesian pressure which varied with recent rainfall. On this mountain a time-lag of about two days occurs between the fall of rain and the associated rise in water pressure.

G. *Soil Mechanics*

267. Soil Mechanics has been defined as "The scientific study of the behaviour of those materials that consist of an aggregation of discrete particles, and particularly of their interaction upon each other, and upon the fluid filling the voids between them." A colliery spoil heap, tipped loosely from above and uncompacted, is an eminently proper subject for this study, though it appears that it has not often been considered in that light before this disaster.

268. Some further terms need to be defined in non-technical language.

Liquefaction. This can occur in a heap of loose sand or in an uncompacted tip of mine rubbish. If the lower part of the tip contains water, filling the spaces between the particles, and if a sudden load or shock is applied (such as the slipping of the upper part) the water then supports the particles and the whole saturated body behaves as if it were a liquid.

Flow-Slide. If liquefaction occurs in such a heap on a slope, the mass will rush down the slope as if it were a liquid, though actually a mass of wet solids. When it stops, it immediately reverts to a relatively dry heap.

Mud-Run. This term is usually applied to incidents of common occurrence in mountainous districts. Torrents of water, rushing down a mountainside, collect and carry with them all available loose material in their path—in a "run of mud".

Water Pressure.

269. When loose particles are tipped from above, as they are in a crane-tip or a child's sandcastle, they come to rest in a regular conical shape. The angle at the base of the cone (the angle of repose) varies with the composition of the material. In the case of the material forming the tip at Aberfan this angle was about 35° – 37° to the horizontal. When the particles are dry or only slightly moist they do not stick together, as even children building sand-castles soon learn. If the material is wet—but not too wet—the particles will stick together and may stand up at an angle of repose greater than that taken up by dry material; if the material is very wet the angle of repose will be reduced, and perhaps greatly reduced. This is because the space between the particles is filled with water. This water is under pressure which varies with the height of the heap and the volume of water within it. The effect of the presence of this water is to reduce the dead weight of the heap downwards and this also reduces the resistance to lateral movement. Water is almost incompressible and if it cannot escape from the heap it acts much as a hydraulic jack in tending to lift the heap upwards. When the heap is on a deep slope the effect of gravity is to pull the heap not only downwards but also sideways. If the material starts to move on a slope it will continue downwards with less friction than normal, becoming almost fluid. The effect of adding very fine grained material (such as "tailings") to a heap is to permit the material, when dry, to stand at an angle of repose greater than normal. But if additional water is added, whether from above by rainfall or from below by a spring or watercourse, there will be a collapse, just as a sandcastle collapses when a child empties its bucket of water on it.

270. We asked Professor A. W. Bishop to head a team of investigators into the behaviour of the tips at Aberfan. An intensive programme of boring at the site and of laboratory testing of samples at Imperial College, London, and University College, Swansea, was carried out in collaboration with Professor Nash of King's College, London, and various officials on behalf of the National Coal Board. As a result a report was prepared (to be reproduced in full in a separate volume) which Professor Nash was able to tell counsel for the National Coal Board he agreed with "almost entirely". It later transpired that the only point on which Professor Nash differed was that he drew a distinction between the expressions "liquefaction slide" and "flowslide" whereas Professor Bishop equated them. If any difference does in fact exist between the connotation of these two terms it seems quite immaterial for the purposes of this Inquiry. Counsel for the Parents' and Residents' Association indicated that Professor Bishop's report was accepted and the expert witnesses called on behalf of that Association did not seek to contest any part of it.

271. The report was the result of many months' work by a number of eminent scientists, engineers and others and we do not attempt to summarise it here. We content ourselves with referring to some extracts from its conclusions, which may usefully be compared with the summarised evidence of eye-witnesses of the disaster (see *ante* paragraphs 49–57). After describing how the excavations had disclosed that there existed a slip surface within Tip 7 for a substantial time before the disaster the report then proceeds to deal with the part played by water in the disaster: "WATER has contributed to the disastrous slip of October, 1966, in four principal ways:

I. WATER issuing beneath the tip has caused back-sapping* and led to recurrent movements over the years since 1963.

II. WATER under pressure acting in the tip material and in the limited area of the foundation where the slip surface was adjacent to the natural ground reduced the effective stresses in the fill and initiated a shear displacement. In view of the presence of pre-existing slip surface, this pressure need not have been very large.

III. WATER filling (or nearly filling) the voids of the loose fill comprising the tip and covering the area of mountainside below it made it susceptible to a catastrophic flow slide, since a shear displacement or shock wave could result in the transfer of most of the load on to the relatively incompressible water in the voids, thus reducing the frictional strength to a very low value.

IV. WATER released by the slip and consequent flow slide caused a 'mud run' of tip rubbish."

272. The report then goes on to describe the mechanism of the disaster:

"The information now available to us indicates the following sequence of events on 21st October, 1966:

(a) Overnight the rise in water pressure in the ground immediately beneath the tip and in the lower part of the tip re-activated sliding movements of the pre-existing slip surface. A slow onward movement of the toe took place

* Back-sapping was defined by Professor Bishop in evidence as "the removal of material from the toe (sc. of a tip), by an issue of water or a spring, the removal of this material leading to intermittent slips of progressively increasing size."

accompanied by a 10 foot settlement of the crest. This settlement was observed by the tipping gang to have taken place at about 7-30 a.m.

(b) This settlement increased to about 20 feet by about 8-30 a.m. The accompanying shear strains in the lower and most saturated part of the tip were by this time approaching the critical condition for a flow slide.

(c) The flow slide commenced in the central steep section of the toe of the tip at about 9-10 a.m. After the initial slow movement, the flow slide accelerated down the mountainside to the village taking with it saturated material lying downslope from the tip. Following on, and possibly carried by, this semi-fluid material, the bulk of the slightly less wet tip material slipped down, removing in the process both tip material and drift to release the water impounded in the fissured sandstone.

(d) The estimated initial flow of water from the vicinity of the spring thus formed (based on the evidence given before the Tribunal) was of the order of 20 cubic feet per second and is compatible with the size of the open joints of fissures identified by raking boreholes in this area. This led to a "mud run" which carried down more material, which extended the central part of the flow slide further into the village and finally scoured a deep channel in the flow slide material (i.e. the deep channel was scoured by the "mud run" rather than by water).

It is difficult to establish objective criteria for assessing how much of the damage was due to the initial flow slide, how much was due to the subsequent "mud run" and how much to the additional water released by the fracture of the two water mains in the canal behind the railway embankment. **An examination of the various photographs and the statements of witnesses about the consistency of the material and of the depth to which it accumulated after passing over the embankment, suggest that the flow slide was the primary cause of the destruction, in particular of the Junior School.** This view is supported by a detailed examination of the evidence from the Abercynon flow slide in 1939, which was not accompanied by a significant outflow of water but was as potentially destructive as that at Aberfan in 1966."

273. In his opening address the Attorney-General referred to certain preliminary views formed by the experts appointed by the Tribunal:

"The primary cause of the slip of No. 7 Tip was due to the fact that it was made upon an area containing streams and springs which was unsuitable for the purpose of tipping, as they think the whole behaviour of the Aberfan tips from 1944 onwards clearly demonstrated."

This view came ultimately to be accepted by the National Coal Board and on Day 68 Mr. Wien, in cross-examination of Professor Bishop, said:

"The real trouble, Professor Bishop, is having a tip which goes over an emergence of water; is that right?"

A. "Initially I would say the real trouble was having a tip which goes over ground under which there is artesian water. This I think is the initial thing and the essential problem: the emergence of water probably a consequence of the first."

This was not the view held by the Board at the commencement of the sittings of the Tribunal. In his opening address the Attorney-General referred to the

memorandum by Mr. R. J. Piggott, Chief Surveyor and Minerals Manager of the South Western Division of the National Coal Board. This was already in the hands of the Tribunal, and the Attorney-General summarised Mr. Piggott's views in this way:

“The geological structure of Merthyr Mountain above Aberfan, had, by the time of the disaster, been so disturbed by mining subsidence as to subject it to extensional strain which he thinks had the effect of opening up the fissures in the sandstone.

This introduced a tendency for the water emergence points to move lower down the mountain and for large quantities of water to collect within the mountain behind the mantle of drift and boulder clay.

This situation, in the opinion of Mr. Piggott, directly produced the slip because it is his view that the collection of water within the mountain had reached a pressure which acted upon the mantle of clay and caused it to fail.

Accordingly, in his view, the tip slipped and further tore away the clay, thus releasing the water held under pressure within the mountain.”

But the matter obviously could not stop there, for, as the Attorney-General continued:

“Even if Mr. Piggott's explanation were found to be the most acceptable, could an incident of the kind described by Mr. Piggott have been foreseen by suitable persons appointed to select the site for tips? In this event would Tip No. 7 have ever come into existence?”

274. We turn to consider the views presented by the National Coal Board. In his opening address, their learned counsel said:

“The Board's view is that the disaster was due to a coincidence of a set of geological factors, each of which in itself is not exceptional, but which collectively created a particularly critical geological environment. Our investigations to date, although there are further data to come, lead to the conclusion that the cause of the dreadful disaster was as follows, that water tended to collect in fissures or joints in the sandstone underlying the tip, and by the tip I mean Tip No. 7. This water was generally contained from below by fireclay under the Brithdir coal seam and from above on the slope by a layer of glacial boulder clay and overburdened by extremely low permeability extending upwards to an exceptionally high level from the valley. Water thus built up and eventually seeped under pressure through or possibly over the edge of the boulder clay and drift lying beneath the tip and into the tip itself and emerged from the base of the tip.

Just before the disaster—and quite how long before one does not know—a slip at the base of the tip occurred and dragged with it the mantle of boulder clay on which it rested and water which had built up in the fissures in the hillside was suddenly released, and the addition of this water under pressure to the sliding material enabled it to travel extensively; in other words there was not only a slip but a mechanical forward movement was imparted by the outrush of water which converted the slip and slipping into a mud flow.

The prime cause of the disaster was therefore geological and mining subsidence played no part in the cause.”

But in his closing address Mr. Wien said:

“Both Professor Moore and Dr. Woodland say that the prime cause of the failure of Tip 7 was geological . . . My submission is they are only telling half the story. They are correct as far as they go, but the plain answer to the Tribunal’s question (*sc.* Why did it happen?) is that Tip 7 should never have been allowed to go over unsuitable ground without proper site investigation . . . My lord, that is a much better way of putting it than saying the primary cause of the disaster was geological.”

275. Finally Mr. Ackner in his closing address neatly and accurately summarised the cumulative effect of the experts’ evidence on how and why the disaster occurred in words that we are content to adopt. He said:

“Firstly, water pressure in the ground immediately beneath the tip, that is Tip No. 7, re-instigated (along a pre-existing slide surface) movement in the tip. A 10-foot settlement had taken place on the top of Tip No. 7 by 7-30 a.m. on the day of the disaster and this had increased to about 20 feet by 8-30 a.m.

Secondly, this movement reduced the stability of this mass to a critical stage where liquefaction or a flow slide occurred and a portion of the lower part of the tip fell, assumed a pseudo-liquid condition, moved with great speed down the slope of the mountainside into the village of Aberfan in disastrous proportions, causing the majority of the damage, namely the engulfing of the junior school and the houses close to it.

Thirdly, as a result of this movement the boulder clay which (together with the overlying tip) had confined the underground water was stripped off the mountainside and water was able to flow out. The mains were fractured near the old Glamorgan Canal and this water in somewhat larger volume issued into the slide material.

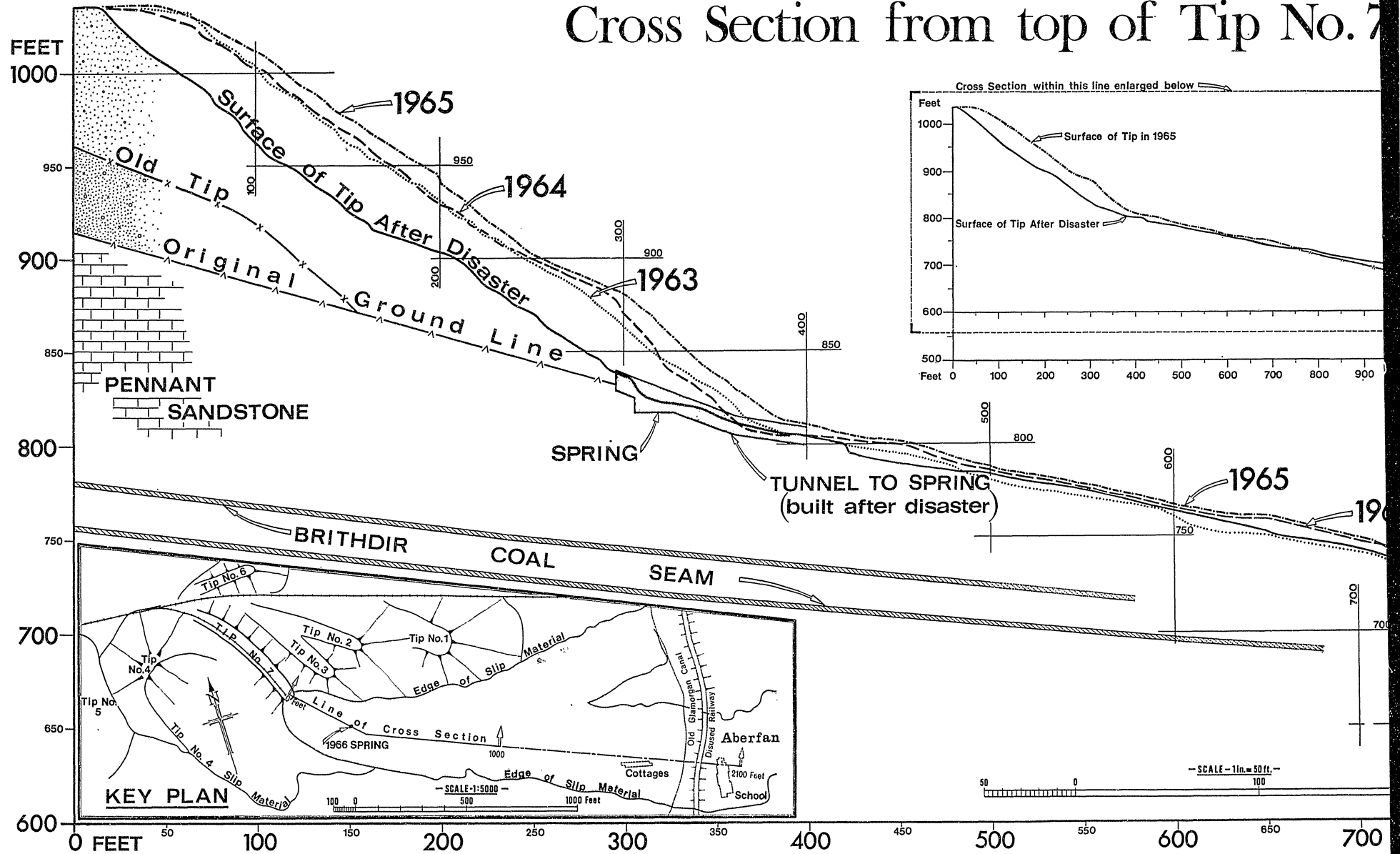
Fourthly, and lastly, the combination of these two latter events resulted in the formation of a mud flow subsequent to the liquefaction slide which added to its disastrous proportions and which caused serious flooding in the village.”

276. Faced with the almost complete unanimity of the experts and the acceptance of their description of events by counsel for all parties in their closing addresses, the Tribunal has little difficulty in making its findings of fact in relation to this part of the Inquiry. We find that:

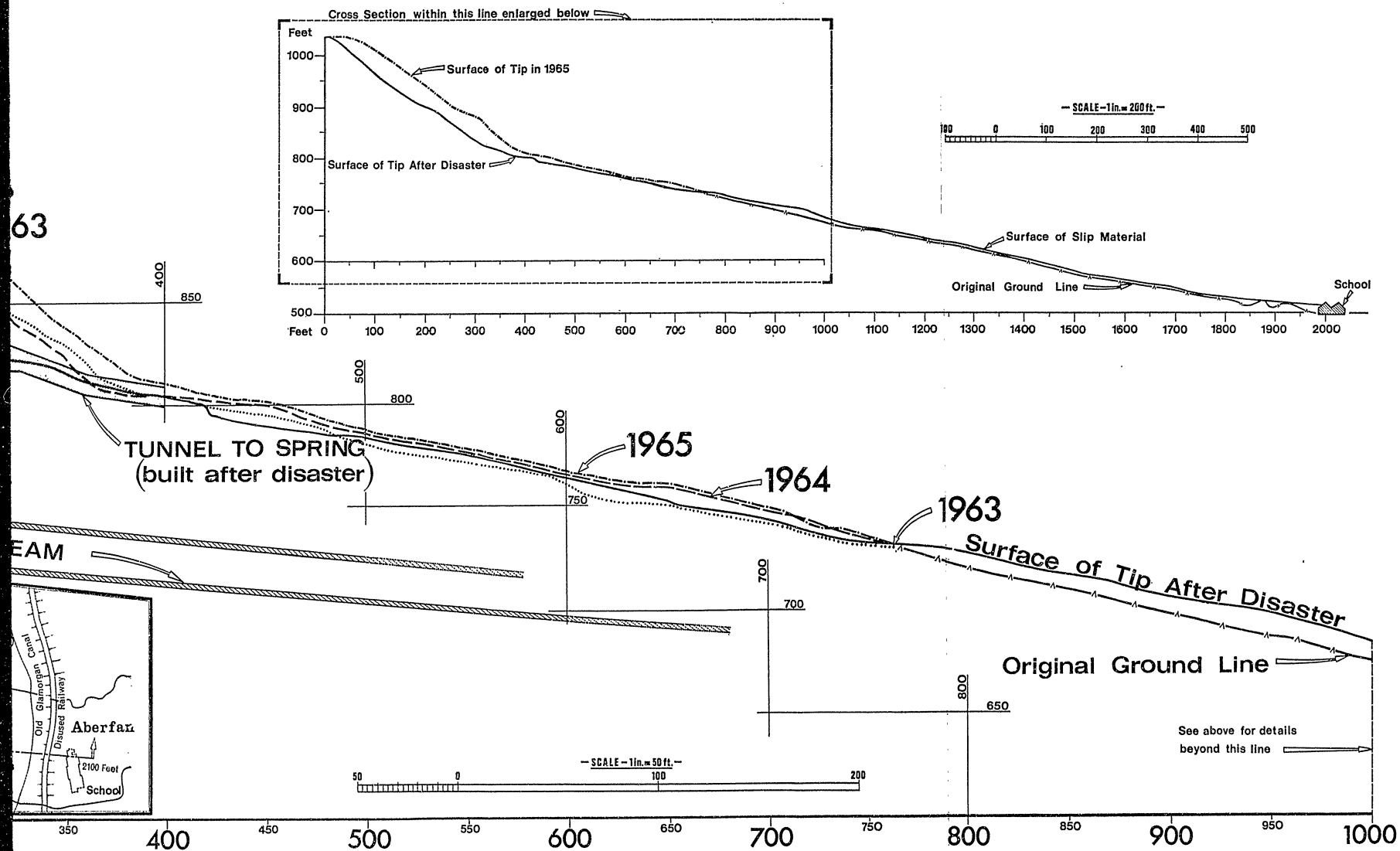
- I. In 1944 there was a rotational slip on Tip 4 followed by a flow slide.
- II. Between 1947 and 1951 there was a rotational slip on Tip 5.
- III. In 1963 there was a rotational slip on Tip 7 followed by a flow slide, but one smaller than the Tip 4 slide in 1944 or the disaster slide in 1966.
- IV. Between November 1964 and the disaster there were further slipping movements on Tip 7.
- V. On 21st October 1966 there were a number of slipping movements of a rotational kind accompanied by settlements of the crest of the tip. These movements gave rise about 9-10 a.m. to a flow slide, the relatively dry material in the flow slide pouring down the mountainside and into the village. *It was this flow slide which engulfed the school and houses in Moy Road.*

- VI. As a result of the rotational slip and flow slide, top material and some natural ground were removed from the mountainside and permitted the escape of a quantity of the water which was under pressure in the fissured sandstone.
- VII. This water flowed down the mountain, cutting a channel in the material deposited by the flow-slide, and bringing down more material in the form of a "mud-run" (See plate 7).

Cross Section from top of Tip No. 7



Section from top of Tip No.7 before & after disaster



PART VI

LESSONS AND RECOMMENDATIONS

277. The violent deaths and destruction which will forever be associated with Aberfan occurred in a matter of minutes. How and why the disaster occurred has been our imperative inquiry both because of the duty owed to the dead and so that future generations may be spared so dreadful a tragedy. Setting out this aspect of the task of the Tribunal in broad terms, the Chairman said at the preliminary meeting:

“... The fourth question will be—what lessons are to be learnt from what happened at Aberfan? This last question, like the others, is vitally important, for, there being so many tips, not only in South Wales but in other parts of the country, every lesson that can be learnt must be clearly considered so that never again can such an appalling calamity occur”.

We accordingly address ourselves, firstly, to the lessons taught by the Aberfan disaster, and, secondly, to the matter of recommendations for the future.

LESSONS

278. Mr. Ackner, Q.C., rightly submitted that the question of the lessons to be learnt has to be considered under two separate headings:

- (1) The local question—What measures are required in relation to the tip complex at Aberfan in order to ensure that no further slides happen from that mountainside?
- (2) The general question—What lessons are to be learnt in relation to the selection of tipping sites and the management thereof in future.

As to the first question, relating to the existing Aberfan tip complex, Mr. Wardell, the Parents' and Residents' Association expert, agreed that “there is not the slightest cause for any public anxiety at the present time”.

279. Nevertheless, some action needs to be taken to safeguard the *future* condition of these tips. It became clear—and understandable—that only the entire removal of all the tips would completely quell the fears of a further slide which still haunt the residents. But that would be an immense and prolonged task. Mr. Laurence Ryan, who is an expert on such matters, estimated that, by using the most modern earth-moving plant and so abstracting about 10,000 tons a week, it would take about four-and-a-half years to remove the 2,600,000 tons of waste accumulated over fifty years in the entire tip complex. The estimated cost of about £3,000,000 which we have heard quoted does not appear to the Tribunal to be exaggerated. There has also to be considered the problem of whether or not Tip 5, which is still burning, could be tackled in this way without endangering the safety of men working on it. We are therefore forced to the conclusion that removal of the entire tip complex is not a feasible proposition. What, then needs to be done short of this? In addition to insisting that there be no further tipping in the mountainside above Aberfan, the Parents' and Residents' Association have indicated to the Board that their experts are agreed that complete safety can be achieved if the following action is taken:

A. The drainage of the water-bearing strata above the Brithdir seam by driving one or more drainage tunnels on either side of the tip complex to intersect the water-bearing rocks immediately above the level of the seam. The drilling of

bore-holes from the ends of these tunnels into the water-bearing rocks and possibly blasting from the ends of these holes to ensure the most complete possible passage of water from the rocks to and through the drainage tunnels. These tunnels to be maintained to provide permanent drainage.

B. The construction of permanent surface drainage channels above and around the tip complex. These channels to feed to a common point where appropriate provisions could be made to trap and remove sediment carried from the tips. The outflow of all surface and underground water to be properly culverted to the River Taff without involving any risk of flooding.

C. The re-contouring of the existing tips to give a more natural and uniform appearance and to grass and plant them over so that they will ultimately blend into the natural landscape. . . . It will be necessary to give special consideration to the construction of fire dams particularly between Tips 5 and 4 in order to prevent the spread of combustion which is already taking place in Tip 5.

280. The Board's expert, Mr. Piggott, agreed "in general terms" that work of this kind should be carried out as a proper, permanent measure. So does the Tribunal. We were told on Day 70 that discussions had already begun between the Association and the Board as to the best methods of carrying out the work, and we echo the hopes of Mr. Ackner, Q.C., that "little or no problem arises in that regard". Finally, it is to be observed that on June 6th last (that is, after our sittings were concluded) Parliament was informed (Hansard Vol. 747, col. 173-4) that the Minister of Power had ascertained from the National Coal Board "that all colliery spoil heaps in their ownership have been critically examined and remedial measures taken in any case where there was a possibility of a hazard to the surrounding area."

Underground Stowing

281. An obvious remedy for the dangers inherent in the creation of colliery tips is to avoid bringing them into existence in the first place. We received a great number of letters urging upon us the need to recommend that all mine-waste should be stowed underground and declaring, in effect, that "Underground stowing is the answer to the proliferation of tips on the surface". We, therefore, took evidence from a number of witnesses qualified to express opinions on this subject. These opinions proved to be virtually (if not, indeed, entirely) unanimous. The National Coal Board at our request helpfully and conveniently summarised them in a memorandum which was submitted to us by the agreement of all represented parties. That memorandum is reproduced at Appendix E.

282. Briefly, it concludes:

(a) That the underground stowing of *tailings* is at present neither technically feasible nor economically practicable.

(b) That while the underground stowing of the general run of mine rubbish, is, in broad terms, technically feasible, it is unsuitable for universal adoption because:

- (1) it would render the cost of coal-mining completely uneconomic; and
- (2) it gives rise to a tremendous air-borne dust hazard, with consequential risk of pneumoconiosis, which cannot be controlled with acceptable limits.

Accordingly, we are unable to recommend underground stowing as a solution to the problems of rubbish disposal. Although the depositing of waste down disused mine-shafts provides a partial solution, in general we see no present alternative to the creation of tips on the surface.

283. The disaster teaches several broad lessons relative to tips in general. The first is that they should all be regarded as potentially dangerous. The second is that they should all be treated as engineering structures, and that, accordingly, the procedures of preliminary site investigation and subsequent control customary in other branches of civil engineering should be applied. As we shall seek to show hereafter, a number of vital consequences flow from proper appreciation of these two lessons.

284. The third broad lesson is of a different kind and relates to the National Coal Board administration. It is that a complete overhaul in the system of intercommunication (both vertically and horizontally) between the various departments or levels of the Board is urgently needed. In its "Guide to Consultation in the Coalmining Industry", first issued in 1948 and with a second edition appearing in May, 1963, the Board has a passage, headed in bold capitals "INSIST ON BEING WELL INFORMED". This includes the statement that, "It is surprising that many people who work in a pit do not know what goes on in all parts of it", followed by the question, "How many faceworkers know about coal preparation, for example?" Earlier parts of this Report reveal what a dismal answer would have been forthcoming had a similar question been asked in relation to knowledge—at *any* level—of elementary matters relating to tip stability. One of the strangest features which emerged from the evidence was the frequent absence of adequate lines of communication and of failure in collaboration between Board colleagues with linked responsibilities. In some instances those defects have undoubtedly had literally disastrous consequences. Many examples of the sort of instances we have in mind will be found scattered in various parts of this Report, and at this stage it should serve now to recall only the following:

I. Mr. W. V. Sheppard, Director-General of Production, although head of the department at Board headquarters which was responsible for all tips, told the Tribunal that not only was he wholly without knowledge of the 1939 and 1944 slides (which preceded nationalisation) but also that he had never heard of the 1963 slip or of the 1965 incident at Tymawr, or of any difficulty with tailings, and that he had had his attention drawn to no literature or memoranda dealing with tip slides or similar incidents. No record of any untoward tip happenings in the South Western Division seems ever to have found its way to London.

II. The elaborate site investigation conducted at Nantgarw Colliery in 1958, and the machinery set up by Mr. Blackmore, manager of No. 3 Area in 1965 to investigate the Tymawr incident seemed to have been largely, if not entirely, unknown in other Areas—further examples, as Mr. Tasker Watkins, Q.C., put it, of "the apparent failure to circulate throughout the South Western Division of the National Coal Board news of novel initiatives and experiments".

III. In August, 1963, the Merthyr Tydfil Borough Council wrote expressing to Mr. D. L. Roberts (Area Mechanical Engineer) their fear of the serious position that would arise if the tip on Merthyr Mountain moved. At no time did Mr. Roberts disclose this correspondence to the Colliery Manager, who testified, rightly or wrongly, that, had he known of it, "I would go and get a complete

investigation as to what the letter was alluding to . . . I would have informed the engineers and asked them to join me". The Area General Manager, Mr. Wright, was likewise left uninformed about this correspondence and, having seen and heard him, we think it probable that he would have ordered an immediate investigation had he had knowledge of it. Mr. Wright acted with vigilance in relation to the Tymawr incident by sending his Area Civil Engineer and Area Surveyor to No. 3 Area to investigate it (just as he later did when there was a complaint about a Cilfynydd tip) and we do not think that he would have done less in relation to a situation within his own Area which responsible people were alleging was dangerous.

IV. Although Mr. D. L. J. Powell sent his 1965 memorandum from Division to Area Mechanical and Civil Engineers, he sent no copy to the Area General Manager (Mr. Wright), who had no knowledge of its existence, knew nothing of the tips inspection (such as it was) conducted in purported compliance therewith, and did not see until much later the report which on May 14th, 1965 Mr. D. L. Roberts sent to Division. Had the Area General Manager been kept informed, he might well have realised (at a time when the alarming Tymawr incident remained fresh) that the Area Civil Engineer had made no inspection at all.

V. The breakdown of communication and collaboration between the Area Mechanical and Civil Engineers (Mr. Roberts and Mr. Exley respectively) in relation to the inspection of Tip 7 (see paragraphs 163-4) had dire consequences. As Mr. Geoffrey Morgan accepted, had there been such collaboration, the probability is that there would have been no Aberfan disaster.

VI. According to Mr. D. L. Roberts, on May 4th, 1965, he inspected the tip complex. But he gave no warning to the Colliery Manager or any officials of his intention to do so, and he contacted none of them when he reached the Merthyr Vale Colliery. He did not even ask the Unit Mechanical Engineer (Mr. Vivian Thomas) for information, and never spoke to the tipping gang. This strikes us as astonishing. Compliance with ordinary standards of social behaviour quite apart, we cannot understand Mr. Roberts' failure to do any of these things if he really had it in mind to conduct a worth-while inspection. Nor did he subsequently inform anyone at the Colliery of his visit, nor of the substance of his report regarding the tips.

VII. When the Area reports called for by the Powell Memorandum reached Divisional Headquarters they seem to have been largely ignored. Certainly they were never discussed with Area General Managers, notwithstanding that (as in the case of No. 4 Area) many of the reports did not supply the information sought. So it is that even at that stage Mr. Wright remained ignorant of the memorandum itself, of the tip inspections within his Area, and (above all) of the reports which Mr. D. L. Roberts had rendered. These reports went no higher than to Mr. Geoffrey Morgan, the Divisional Production Director, and they were not discussed with other members of the Divisional Board other than (it would seem) its Chairman, Mr. Kellett.

RECOMMENDATIONS

285. The problem of ensuring safety in tips arises in relation to:
- (a) tips owned by the National Coal Board, whether now in use or disused;
 - (b) tips not owned by the National Coal Board; and
 - (c) the siting and control of tipping operations for all future tips.

286. The Tribunal have had to consider a large number of recommendations put forward by different parties. They have varied from the simple to the extremely complex, and in our view it is the simplest that would be most likely to be successful. The team of experts instructed by the Treasury Solicitor to assist the Tribunal begin their recommendations by insisting on all colliery tips being treated as engineering structures. They therefore suggest that the site investigation for a new tipping area or for the extension of an existing tip complex should be under the direction of a civil engineer experienced in soil mechanics. This approach (with which we entirely agree) is of fundamental importance. From this it would follow that:

(1) Maps prepared by Ordnance Survey and Geological Survey should first be looked at;

(2) A site investigation by using borings, soil-testing and observations of ground-water level should be carried out by a civil engineer, in consultation with a geologist and mining engineer or surveyor (regarding subsidence) where necessary;

(3) On the basis of this data, engineering proposals should be made by the civil engineer for the tip, including (where necessary) drainage and compaction;

(4) While the tipping process is continuing, the stability aspect should be under the control of a civil engineer;

(5) When tipping has been completed, inspection by a civil engineer should continue thereafter and routine measurements and observations made and recorded;

(6) The basic information so obtained should be placed on permanent record and be available to the local authority or to any person reasonably requiring it.

287. Professor Bishop and his colleagues make the important point that, "The present investigation has been concerned primarily with the causes of the failure of *one* particular tip, rather than with the examination of the possible hazards involved under other geological conditions, with rubbish or tailings of different geological origins, and placed by other methods". They therefore recommend that a National Tip Safety Committee be set up by the appropriate Minister to report on (*inter alia*):

(1) the standards of safety to be called for in circumstances varying from large tips near inhabited property to small tips in remote areas;

(2) which of the observations and investigations begun during the present Inquiry should be continued, whether under the sponsorship of the National Coal Board, the Science Research Council, the National Environmental Research Council, or otherwise;

(3) What other lines of investigation should be followed up, involving field observations or laboratory investigations relevant to the safety aspects of both old and new tips;

(4) What hazards (if any) are involved in the present methods of disposing in bulk of industrial waste products of every kind.

288. Professor Bishop further recommended that, in order to ensure that only suitably qualified engineers are employed for site investigation, a Panel of Approved Engineers should be established on lines similar to those set up under

the Reservoirs (Safety Provisions) Act, 1930, as amplified in a Report on Reservoir Safety by the Institution of Civil Engineers in 1966. We place on record this latter representation, but we do not ourselves either endorse or reject it. We had described to us a little of the operation of the 1930 Act, but not enough to justify us in inviting Ministers to follow it as a precedent; indeed, we were told that the Act requires amendment in a number of respects and that the 1966 Report just referred to contains provisions for its revision.

289. Nevertheless, it is to be observed that both Professor Bishop's team and the National Coal Board concur in advocating the establishment of a National Tip Safety Committee upon or before which all interested parties could be represented. We too recommend that the appropriate Minister should consider appointing such a Committee to advise him in the exercise of his responsibility for the safety and inspection of all tips, *whether or not they are connected with mines or quarries*. We do so for the following reason: The problem of tip stability is not by any means confined to coal-tips or even to coal-tips in the ownership of the National Coal Board. We have read that there are some 16,000 acres of derelict land in Wales alone, and that privately-owned tips comprise more than one half of this wasteland. And, as Mr. Philip Wien, Q.C., observed ". . . as regards tips not in the ownership of the Board, there may be several categories; (1) tips belonging to other mining and quarrying interests; (2) tips belonging to industries not concerned with mining at all—for example, electricity authorities, steel works; and (3) the abandoned tips in the ownership of local authorities or private individuals". The proper constitution of the proposed National Tip Safety Committee would fall to be decided by the Ministers concerned after due consideration of the variety of interests involved. No doubt they would draw upon the fund of experience available in the Building Research Station and the Road Research Laboratory and the professional Institutions.

290. Nevertheless, we strongly favour that the National Coal Board should continue to have prime responsibility in respect of all tips in its ownership. It has within its own organisation men of sufficient experience and qualifications to take all steps necessary for securing tip stability. Such dangers as arise are almost invariably in respect of active, working tips, and to take responsibility for their day-to-day management from the Board and vest it in any other body seems to us undesirable and even charged with dangerous possibilities. As the expert witness called on behalf of the Parents' and Residents' Association (Mr. Wardell) said:

"The disposal of refuse and the consequent problem of tip stability cannot be dissociated from the many other problems involved in the production of the nation's coal. The National Coal Board is fundamentally involved, *firstly*, from a policy point of view, because it has to assess the economic consequences of alternative methods of refuse disposal, and, *secondly*, from a technical point of view, in that it has to provide essential information about the nature and quantity of materials which have or may have to be disposed of and (because of possible statutory and Common Law liabilities) to make its own investigations and judgments about refuse-tip stability".

Accordingly, subject to the further recommendations which we hereafter set out, we consider that the public interest is best served by prime responsibility for National Coal Board tips remaining with the Board, which would at all times have available to it the advice of the National Tip Safety Committee. The

Board could in return render valuable assistance to that Committee in relation to tips outside their ownership or control and (according to Hansard, Vol. 747, 6 June, 1967, col. 173-4) they already "have arranged courses of instruction in soil-heap management which are now being held throughout the country, and have offered specialist advice and assistance to local authorities and private owners in regard to spoil-heaps which are not the Board's responsibility".

291. We are attracted by, and recommend adoption of, the suggestion made by Sir Andrew Bryan that the National Coal Board should prepare for consideration by the National Tip Safety Committee, with a view to its thereafter being issued publicly, a Code of Practice giving guidance on (a) features and factors that may give rise to or reveal instability in a tip, and (b) standards of safety called for in particular locations or circumstances. We attach in Appendix F Sir Andrew Bryan's suggestions as to the topics which should be covered by such a Code. But the vexed question remains: Within the National Coal Board itself, what organisation should in future be responsible for tip safety and stability? We were told that during the Inquiry the lay-out of Board administration had been drastically altered, that Divisions and Groups had already been abolished and the whole country divided into 17 Areas, each headed by its own Area Director, and that the old South Western Division had become two Areas. And it was said in Parliament on June 6th last (Hansard Vol. 747, col. 173-4) that the Minister of Power had ascertained from the National Coal Board that, "A procedure has been established by the Board for technical and operational control over spoil heaps which includes frequent and regular investigations by specialists to ensure safety and stability". Furthermore, Mr. Wien, Q.C., told the Tribunal that in South Wales:

"... we have recently established a Tip Control Unit under the direction of Mr. Gareth Jones, the civil engineer, and he has got a complete team with independent experts to be consulted about old tips. They will give technical guidance to Areas on active tips or on the selection of new tips, and I daresay that when the Tip Safety Committee comes into existence this will be a matter that will be carefully considered by that Committee... The Coal Board has been proceeding assiduously with training courses which have been held quite recently and all kinds of people (from Area Directors downwards, and including Area Civil Engineers from the rest of the country and Her Majesty's Divisional Inspector of Mines) have attended, dealing with tip stability. And in due course instruction will be given down to a very much lower level, to chargehands and foremen".

When these assurances are implemented, the whole attitude in relation to tip stability should soon become dramatically altered. To ensure this, urgent consideration should be given to the appointment of civil engineers to the Inspectorate.

292. Viewing with considerable sympathy, as we do, the difficult position in which the Merthyr Tydfil Borough Council has found itself for many years in its dealings with the National Coal Board, we recommend adoption of the suggestion advanced by Mr. Wardell that, should a local planning authority be dissatisfied about the stability of an existing or proposed tip after consideration of all the available information, the matter should be submitted to the Minister of Power with a request for a special investigation and report. Mr. Wardell continued:

“If the Minister were satisfied that a *prima facie* case had been made out for further enquiry, it is suggested that the Minister should appoint an independent expert to conduct such an enquiry. The independent expert would require full authority to obtain access to all documents, plans, surveys and other information in possession either of the Board or the Local Authority and to any of their officials or employees concerned with tipping. He would also need to have authority to make his own inspection of the tip site or sites concerned and to require the Board or its agents to carry out additional investigations such as boreholes, trial pits, surveys, soil tests, etc., which he may require.

In making his report the appointed expert should include recommendations as to whether:

- (a) refuse disposal on an existing tip should cease permanently or be suspended until satisfactory investigations had been completed;
- (b) in the case of a proposed new tip, whether the site was suitable for a tip or could be made suitable provided that certain specified precautions were taken; and
- (c) in the case of an inactive tip, what action, if any, should be taken to render it safe”.

293. However well qualified and diligent the higher ranks of officials may be, the ultimate control and management of coal tips must rest upon the shoulders of those employed at Unit level. Never again must there be officials and men in a colliery as ignorant of the basic elements of tip stability as Mr. Wynne (manager), Mr. Vivian Thomas (Unit mechanical engineer), and Mr. Leslie Davies (tip chargehand). We therefore recommend adoption of the following suggestions made by Mr. Lynden James on behalf of the National Union of Mineworkers regarding their future education and training:

(1) Present managers and surveyors should as soon as possible receive training in ground-water conditions and the rudiments of soil mechanics so as to be able to appreciate the significance of the reports of, and opinions expressed by, the experts in these subjects.

(2) The statutory qualifications for managers and surveyors should in future include awareness of the elements of soil mechanics and hydrogeology, in addition to the geology which is already comprised in the syllabus.

(3) The Unit Mechanical Engineer and chargehand should be instructed in the significance of tip deformation and of the appearance or disappearance of water-courses. In addition, the chargehand should be trained to record at frequent intervals on a pro-forma a simple questionnaire dealing with such matters as toe-movement, crest-sinking, cracks and breaks. These records should be kept at the Unit Office and inspected regularly by the manager and mechanical engineer. They should also be produced to the civil engineer charged with tip responsibility and to Her Majesty’s Inspectors of Mines on the occasion of each visit to the tip.

294. Finally, we repeat the view expressed earlier (paragraph 284) that the National Coal Board should forthwith examine afresh its lines of communication so as to ensure that essential knowledge passes easily and automatically to those whose business it is to become possessed of it and to eliminate those breakdowns

and omissions which undoubtedly played a big part in bringing about the Aberfan disaster.

295. We turn to consider the amending legislation which is called for. We naturally refrain from doing more than indicate the topics which in our judgment need to be dealt with, for the best method of achieving what we think should be arrived at will need detailed consideration hereafter:

(1) The ambit of the Mines and Quarries Act, 1954, is restricted by its long title to “the management and control of mines and quarries and for securing the safety health and welfare of persons employed thereat; to regulate the employment thereat of women and young persons; to require the fencing of abandoned and disused mines and of quarries; and for purposes connected with the matters aforesaid”. Apart, therefore, from s. 151, which requires a disused mineshaft to be “provided with an efficient enclosure, barrier, plug, or other device so designed and constructed as to prevent any person from accidentally falling down the shaft,” there is no requirement on the owners or manager of a mine to have regard to the safety of the general public. It follows that there is no obligation on the Inspectorate of Mines, in the exercise of its powers of securing the enforcement of the Act, to have regard to the safety of the general public. Indeed, s. 146 (1) which gives power to the Inspector to serve a notice for prohibiting or changing “any matter, thing, or practice at a mine” which “is or is likely shortly to become dangerous” repeats the limitation to the safety of persons employed at the mine. We recommend that this limitation in the Act be removed and that the owners and managers of mines, and also the Inspectorate of Mines, should be required to consider the safety, health, and welfare of all persons going about their lawful business in the vicinity of a mine, including the safety of their property. We have already indicated (*ante* paragraph 74) our view of the civil liability of mine owners to pay damages under the rule in *Rylands v. Fletcher*, but the disaster at Aberfan clearly indicates that substantially more is required to give that protection to the public which it is every citizen’s right to expect.

(2) Section 86 of the Mines and Quarries Act, 1954, (“All buildings and structures on the surface of a mine shall be kept in safe condition”) should be amended so as to eliminate any doubt whether tips are “structures” within the meaning of the Section.

(3) A duty should be imposed upon the manager to take such steps to obtain necessary information in relation to the tipping process as Section 48(2) of the Act requires him to take in relation to matters pertinent to the support of working places.

(4) Using the power vested in him by Section 117(1) of the Act, the Minister should make an Order extending the Mines (Notification of Dangerous Occurrences) Order, 1959 (S.I. 1959, No. 2117) to tip slides and fires, “whether death or serious bodily injury is thereby caused or not”, thereby ensuring that they are reported in accordance with Section 116 “forthwith . . . to the Inspector for the District . . .”.

(5) In order to ensure compliance with Section 86 in the amended form which we have suggested in (1) above, statutory provision should be made for regular inspections of all tips by persons competent to judge of their stability and safety and for the due recording of the nature, extent, and result of such inspections.

(6) In addition, all tips (whether active or disused) should be subject to regular inspections by Her Majesty's Inspectorate of Mines and Quarries, whose resultant detailed reports should be published or otherwise made freely available to the local authorities concerned.

(7) A statutory obligation should be imposed upon the owners and managers of mines to maintain and keep at the mine office an up-to-date plan of the surface area of the undertaking, to include the tipping area and contoured once the tip exceeds a height to be prescribed—say, at 20 feet.

(8) The starting of a new tip or extension of an existing tip complex should be prohibited unless preceded by an adequate site investigation (i.e. in accordance with the normal Civil Engineer Code of Practice or the proposed new Code referred to earlier) and the submission to and approval by Her Majesty's Inspectorate of Mines of a tipping plan.

(9) The existing Town and Country Planning Acts require to be amended so as to vest local planning authorities with greater control over the starting of new tips or the extension of existing ones. As to new sites, we favour the suggestion made by Sir Andrew Bryan that these should not be started until a report as to the suitability of the tipping scheme has been submitted to and approved by the planning authority. As to the continued use of an existing tipping site, we recommend that the General Development Order, 1963, be revised by adding to Col. (2) of Class XIX (3) a condition that such continued use after a given date (say, January 1st, 1969) be subject to the production of a similar report prepared by persons professionally qualified and satisfactory to the planning authority. If an *impasse* arises, the dispute should be submitted to the appropriate Minister and he should be vested with power to refer to an independent expert in the manner set out in paragraph 292 above. Provision should be made enabling the Minister to exclude, in a proper case, any claim for compensation if in the ultimate result permission to tip or to continue tipping is withheld or refused on grounds of safety.

PART VII
SUMMARY

Findings:

I. Blame for the disaster rests upon the National Coal Board (Paragraph 74).

This blame is shared (though in varying degrees) among the National Coal Board headquarters, the South Western Divisional Board, and certain individuals (Paragraph 188).

II. There was a total absence of tipping policy and this was the basic cause of the disaster. In this respect, however, the National Coal Board were following in the footsteps of their predecessors. They were not guided either by Her Majesty's Inspectorate of Mines and Quarries or by legislation (Paragraph 66).

III. There is no legislation dealing with the safety of tips in force in this or any country, except in part of West Germany and in South Africa (Paragraph 70).

IV. The legal liability of the National Coal Board to pay compensation for the personal injuries (fatal or otherwise) and damage to property is incontestable and uncontested (Paragraph 74).

Lessons

V. Action needs to be taken to safeguard the future condition of the tips at Aberfan (Paragraph 279).

VI. Underground stowing of mine rubbish is not, generally speaking, a practical proposition (Paragraphs 281–2 and Appendix E).

VII. All tips should be regarded as potentially dangerous (Paragraph 283).

VIII. Tips should be treated as civil engineering structures (Paragraph 283).

IX. The system of intercommunication within the National Coal Board needs examination and overhaul (Paragraph 284).

Recommendations

X. A National Tip Safety Committee should be appointed to advise the Minister and to co-ordinate research into the problem of tip safety and of bulk disposal of industrial waste products (Paragraph 289).

XI. The National Coal Board should continue to have prime responsibility in respect of all tips in its ownership (Paragraph 290).

XII. A standard Code of Practice should be prepared for consideration by the National Tip Safety Committee with a view to its being issued publicly and applied to all tips, whether in the ownership of the National Coal Board or otherwise (Paragraph 291).

XIII. Her Majesty's Inspectorate, strengthened by the addition of qualified civil engineers and armed with additional statutory powers, should be made responsible for ensuring the discharge by National Coal Board officials of their duties in relation to tip stability and control (Paragraph 291).

XIV. A local authority should have access to plans for tipping and reports on existing tips and, if not satisfied with them, should have a right of appeal to the Minister, who might appoint an independent expert to conduct an examination and make recommendations (Paragraph 295).

XV. Men engaged in the daily management and control of tips should be trained for their responsibilities (Paragraph 295).

XVI. Managers and surveyors should as soon as possible be made aware of the rudiments of soil mechanics and ground-water conditions. The statutory qualifications for managers and surveyors should be amended to include awareness of the rudiments of soil mechanics and hydrogeology, in addition to the geology already comprised in the syllabus (Paragraph 295).

Matters requiring new legislation

XVII. The ambit of the Mines and Quarries Act, 1954, should be extended to include provision for the safety of the general public in addition to the existing provisions for the safety of persons employed in the industry (Paragraph 295).

XVIII. Section 86 of the Act should be amended so as to remove any doubt whether tips are "structures" within the meaning of the Section (Paragraph 295).

XIX. The Mines (Notification of Dangerous Occurrences) Order, 1959, should be amended so as to include tip slides and fires among the matters required to be reported forthwith to Her Majesty's Inspectorate of Mines and Quarries (Paragraph 295).

XX. Provision should be made for regular inspection of all tips by qualified persons (Paragraph 295).

XXI. Tips (active or disused) should be regularly inspected by Her Majesty's Inspectorate of Mines and Quarries. Their reports should be available to local authorities (Paragraph 295).

XXII. Mine owners and managers should be obliged to maintain and keep at the local office an up to date plan of the surface area of the undertaking, such plan to be contoured when the height of the tip exceeds, say, 20 feet (Paragraph 295).

XXIII. Local Planning Authorities should be given powers of control over the starting of new tips and the extension of existing tips. The Minister should have power to exclude in a proper case, any claim for compensation if permission to tip or to continue tipping is withheld or refused on grounds of safety (Paragraph 295).

XXIV. The statutory qualifications for managers and surveyors should be amended (Paragraph 295).

.

We wish to record our deep gratitude to Mr. Roger Lloyd Thomas for the highly efficient manner in which he discharged the heavy duties imposed upon him over a long period as Secretary to the Tribunal. We are also grateful to Mr. Brian Hatcher for his invaluable help with the administrative arrangements for our sittings at Merthyr Tydfil and at Cardiff, and to Miss V. M. MacLellan and Mr. G. B. Burleigh for their indefatigable clerical assistance.

EDMUND DAVIES
HAROLD J. B. HARDING
VERNON LAWRENCE

R. LLOYD THOMAS, *Secretary*
17th July, 1966.

Party	Counsel	Solicitors
The Tribunal	The Rt. Hon. Sir Elwyn Jones, Q.C., M.P. (H.M. Attorney-General) Mr. Tasker Watkins, V.C., Q.C. Mr. Breuan Rees Mr. Ronald Waterhouse	H.M. Treasury Solicitor
County Borough of Merthyr Tydfil	Mr. Alun Talfan Davies, Q.C. Mr. Hywel ap Robert	Mr. Selwyn Jones (Town Clerk)
National Union of Teachers and Mr. Howell Williams, a member of the National Association of Schoolteachers	Mr. W. L. Mars-Jones, Q.C. Mr. David Williams	Mr. Kenneth Wormald Messrs. Taliesin Griffiths and Son
National Coal Board	Mr. Philip Wien, Q.C. Mr. Norman Francis Mr. John Roch	Mr. F. W. Dawson
British Association of Colliery Management National Association of Colliery Managers	Mr. Geoffrey Howe, Q.C. Mr. Bruce Griffiths	Messrs. Gaskell, Rhys and Otto-Jones
Parents' and Residents' Association of Aberfan	Mr. Desmond Ackner, Q.C. Mr. Aubrey Myerson	Messrs. Morgan, Bruce and Nicholas
Cardiff Corporation Taf Fechan Water Board	Mr. Michael Evans	Mr. S. Tapper Jones Mr. D. Price
National Union of Mineworkers Colliery Officials' and Staff's Association	Mr. E. Brian Gibbens, Q.C. Mr. Charles Pitchford	Messrs. T. S. Edwards and Son
Messrs. Powell Duffryn Ltd.	Mr. Philip Owen, Q.C. Mr. Hugh Williams	Messrs. Llewellyn and Hann

APPENDIX B

Witnesses

ANDREW, Stephen David
BADHAM, David Leslie
BAKER, Joseph
BENNETT, Thomas John
BERWICK, Maurice
BEVAN, Clifford Stanley
BISHOP, Professor Alan Wilfrid
BLACKMORE, Gerald
BLEASDALE, Arthur
BOWEN, Joseph James Arthur
BRADLEY, John Firth
BROWN, Gwynfryn Elgar
BROWN, Philip

CARPENTER, Brynley Morley
CARTWRIGHT, Rees Charles
CHURCH, William Henry
COLSTON, Derek

DAVIES, Daniel Penry
DAVIES, Donald David
DAVIES, Evan Edward
DAVIES, George Henry
DAVIES, Howell Llewellyn
DAVIES, Kenneth John
DAVIES, Leslie
DAVIES, Robert John
DAVIES, Stephen Owen
DAVIES, Thomas
DAVIES, Thomas Gordon
DAVIES, Thomas Hobart
DAVIES, Titus John
DAVIES, William Brynmor
DAVIS, Charles Eric Godfroy
DRAGE, William Albert

EDWARDS, Gwilym
EDWARDS, Walter John
EMANUEL, William Trevor
EVANS, Benjamin Talwyn
EVANS, David John
EVANS, Gwynneth Evelyn
EVANS, Haydn Edwin
EVANS, Trefor
EVANS, William Lloyd
EXLEY, Robert Edwin

FARMER, Major Thomas William
George
FLYNN, Michael Dennis

GEORGE, William Trevor
GITTINGS, Tegwyn
GOLDSWORTHY, Alvan
GRIFFITHS, Evan Robert
GRIFFITHS, Thomas James
GRIFFITHS, Thomas Kendrick
GRANT, Peter Malcolm
GROVES, Gareth

HALL, Hugh Marshall
HERSCHEL, Charles Raymond
HILL, Malcolm Henry Roland

JAMES, Ceinfryn
JAMES, Gwynlais
JAMES, Lynden
JONES, Clifford
JONES, Colin
JONES, Colin James
JONES, David Brynmor
JONES, David Cledwyn Williams
JONES, David Terence
JONES, Elvet Charles
JONES, Gareth Ap Abel
JONES, Gerard
JONES, Glyn
JONES, Selwyn
JONES, Victor Charles

KING, William Rees
KIRWAN, John

LAIDLAW, Andrew Duncan
LEIGH, Cyril
LEWIS, Douglas Rowland
LEWIS, Ronald Neil
LLOYD, Cyril John
LLEWELLYN, William David

MAYBANK, David John
MAY BANK, Michael William
MGGINTY, Michael
MCINNIS, Ninian Winder
MINNEY, Robert Michael
MOORE, Professor Leslie Rowsell
MORGAN, Geoffrey Sibbering
MORGAN, Mair
MORSE, John Harold Rees

NASH, Professor John Kevin Tyrie Llewellyn	STILES, Peter Leslie STRONG, Warwick James
PALMER, James Leslie PARFITT, Frederick Charles PHILLIPS, Francis Edward Stuart PIERCE, William PIGGOTT, Roy John POCOCK, John POWELL, Daniel Lewis John PROCTOR, Donald William	TAYLOR, Eric Campbell TAYLOR, Miss Hettie THOMAS, Lorwerth THOMAS, Richard Vivian TUDOR, David Robert
RAYBOULD, William Edward REES, Edward Stanley REES, Frederick John REES, Howard RICHARDS, Glyn Owen RITCHIE, Thomas ROBENS, Lord ROBERTS, David Lewis ROBERTS, William Thomas ROWLANDS, Maurice RYAN, Laurence	WARDELL, Kenneth WATERS, John Samuel WATKINS, Hugh WAY, Arthur WHITEHEAD, William WILLIAMS, Cyril Henry WILLIAMS, Geoffrey Milson John WILLIAMS, George Henry WILLIAMS, Howell WILLIAMS, James WILLIAMS, Mrs. Rennie Louvain WILSON, Reginald WOODLAND, Austin William WOODWARD, Sydney WRIGHT, Thomas WYNNE, Thomas James
SCOTT, Lawrence SEDDON, James Walker SHEPPARD, William Vincent SHORT, Robert Lloyd	YOUNG, Harwood Evans

APPENDIX C

The following individuals submitted written Reports:—

I. At the request of the Tribunal:

Dr. A. W. Woodland, B.Sc., Ph.D., F.G.S.

Assistant Director of the Institute of Geological Sciences (formerly the Geological Survey) who presented a “Geological Report of the Aberfan Tip Disaster”.

Professor A. W. Bishop, M.A., Ph.D., D.Sc., M.I.C.E.

Professor of Soil Mechanics at the Imperial College of Science and Technology.

Dr. H. E. Evans, B.Sc., Ph.D.

Lecturer in Civil Engineering, University College of Swansea, University of Wales.

Dr. J. N. Hutchinson, B.Sc., Ph.D., A.M.I.C.E.

Senior Lecturer in Soil Mechanics, Imperial College of Science and Technology.

A. D. M. Penman, Esq., M.Sc., A.M.I.C.E.

Principal Scientific Officer, Building Research Station.

These four formed the team supervising the post-disaster site investigation and submitted a joint report—“Geological Investigation into the Causes and Circumstances of the Disaster of 21st October 1966”.

Arthur Bleasdale, Esq., B.A., B.Sc.

Principal Scientific Officer, Meteorological Office, who submitted details of rainfall and meteorological conditions from 1938 onwards.

Major T. W. G. Farmer, R.E.

South-West Regional Officer of the Ordnance Survey who presented surveys made under his control and aerial photographs with certain maps made from them.

D. W. Proctor, Esq., B.Sc.

Member of Department of Photogrammetry and Surveying, University College, London, who reported on measurements deduced from various photographs.

Hugh Marshall Hall, Esq.

Supervisor Photogrammetric Department, Hunting Surveys Ltd., who submitted a report on volumetric calculation from aerial photographs to assist the Tribunal experts.

II. On behalf of the National Coal Board:

Professor J. K. T. L. Nash, M.A., M.A.I., M.I.C.E.

Member of Council, Institution of Civil Engineers; Professor of Civil Engineering, King’s College, University of London, who presented a report on “The Stability of Aberfan Tip No. 7”.

R. J. Piggott, Esq.

Divisional Chief Surveyor and Minerals Manager, South Western Division, National Coal Board, who prepared a statement and maps and diagrams for the Treasury Solicitor at his request prior to the Inquiry. Also compiled joint report with Mr. K. Wardell (*post*) entitled “Report on Mining Subsidence”.

Professor Leslie R. Moore, B.Sc., Ph.D., D.Sc., M.I.Min.E.

Sorby Professor of Geology in the University of Sheffield. Submitted Summary Geological Report on the Tipping Site and its Environs at Merthyr Vale and Aberfan.

John Pocock, Esq., B.Sc.(Mining), A.M.I.Min.E.

Area Planning Engineer No. 3 Area. Submitted "History of the Merthyr Vale Colliery".

Lawrence Scott, Esq., A.R.I.C.S.

Survey Manager, Fairey Surveys Ltd. Submitted a report analysing nine aerial photographs collected by the Treasury Solicitor.

W. E. Raybould, Esq., M.Sc., F.R.I.C., F.I.F., M.I.Min.E.

Scientific Adviser, Headquarters of the Scientific Control of the National Coal Board, submitted a report on "The Disposal of Washery Refuse at Aberfan".

III. On behalf of the Parents' and Residents' Association of Aberfan:

Kenneth Wardell, Esq., M.Sc., M.I.C.E.

Senior Partner, Messrs. Durnford Lee and Wardell, Consulting Mining Engineers and Geologists, presented a report with recommendations. He also collaborated with Mr. R. J. Piggott of the National Coal Board in "Report on Mining Subsidence".

G. M. T. Williams, Esq., M.A., M.I.C.E.

Partner in Messrs. Scott Wilson, Kirkpatrick and Partners, Consulting Engineers, who reported on his examination of the site and the results of the site exploration, and the evidence given to the Tribunal.

IV. On behalf of the British Association of Colliery Management and of the National Association of Colliery Managers:

Sir Andrew Bryan, B.Sc., D.Sc., Ll.D., F.I.C., M.I.C.E., M.I.Min.E., M.I.M. & M.E.

Formerly H.M. Chief Inspector of Mines and former Member of National Coal Board. Submitted suggestions relating to future actions and recommendation.

V. National Union of Mineworkers and the Colliery Officials and Staffs Association:

Lynden James, Esq.

Head of Safety Department, National Union of Mineworkers in the South Wales Coalfield, who submitted a symposium of publications relating to colliery tips and their stability and a memorandum on Underground Stowing.

VI. On behalf of Powell Duffryn Company:

William Brynmor Davies, Esq., M.I.C.E., M.I.Min.E., M.I.M. & M.E.

Consulting Engineer, who produced "Rubbish Tip Slides, Cilfynydd Common 5th December, 1939".

VII. On behalf of the National Union of Teachers:

Professor Edgar Morton, M.Sc., Assoc. I.C.E. (in conjunction with Professor P. W. Rowe), a partner in Messrs. Edgar Morton and Partner, Consulting Engineering Geologists, who reported on technical considerations and calculations relating to tipping.

NATIONAL COAL BOARD
SOUTH WESTERN DIVISION

“The Powell Memorandum, 1965”

The Sliding of Colliery Rubbish Tips

Note:—

The words in bold print in Paragraphs 2, 5 and 6 are those added in 1965 by Mr. D. L. J. Powell to the “Powell Duffryn” Memorandum of 1939.

April, 1965

Divisional Engineering Branch

CONTENTS

1. Introduction
2. Strength of Supporting Ground
3. Inclination of Supporting Ground
4. Action of Water
5. Composition of Tip Material
6. Precautions to Prevent Sliding

- APPENDIX I Safe Pressure on Supporting Ground
- APPENDIX II Tip Slip on Horizontal Surface
- APPENDIX III Tip Slip on Inclined Surface
- APPENDIX IV Tip Interfering with Natural Drainage
- APPENDIX V Formation of Springs No. 1
- APPENDIX VI Formation of Springs No. 2
- APPENDIX VII Herringbone Drainage System

1. Introduction

The stability of a colliery rubbish tip is dependent on:

- 1.1. Nature and strength of the ground which supports it;
- 1.2. Inclination of the surface of the supporting ground and of the underlying rock beds;
- 1.3. Presence of water;
- 1.4. Composition of tip material.

2. Strength of the Supporting Ground

To ensure stability, the ground chosen as the site for a tip must be suitable for bearing the load to which it is to be subjected.

In the South Wales Coalfield, the hills are formed in general of pennant sandstone covered more or less completely with layers of soil and subsoil. The sandstone is much fissured and is readily permeable by water. The valley bottoms are, in many cases, formed in alluvium, and this is in some parts overlaid on boulder clay which may cover the lower slopes of the hills. Thus, the ground in the valleys is often inferior as a foundation, considered solely from the standpoint of strength, to that of the hilltops.

As a foundation, *alluvial deposits* are perhaps the worst type of ground. *Clay* is treacherous. If dry and containing boulders it may be capable of bearing a heavy load; but if wet and plastic, it is quite unsuitable, and it is very quickly affected by water. *Sand* is unsuitable when wet. *Gravel* is almost invariably good. *Rock* is best if it is the bedrock, and not an overlying layer which may disintegrate.

Appendix I, compiled to show the permissible loadings on various types of ground on building sites, gives values of the safe pressure on foundations. A column is added to show the height of colliery tip corresponding to each load for tip refuse weighing 100 lbs. a cubic foot.

3. Inclination of Supporting Ground

Inclination of the supporting ground affects the loading of the supporting ground, the distance to which, in the event of a slide, the material can travel and the action of water.

Horizontal Surface

If the ground surface is horizontal and the ground weak or affected by water, the tip may be raised to a greater height than the foundation can bear. The tip then sinks into the surface and the ground is squeezed out from beneath it in precisely the same way as a weak floor "creeps" in underground workings. This causes a slide of the tip material as shown in Appendix II.

A slide under such conditions is of little consequence where there is no property near the tip which can sustain damage and where water courses are not liable to be choked. Where, on the other hand, the space around the tip is restricted, considerable damage may result.

Inclined Surface

In South Wales, many colliery tips are situated on sloping ground on the crowns or sides of hills. This ground may be bare unweathered rock

or there may be a layer of soil and sub-soil of greater or less thickness. This surface layer may fail under load, and slide down the slope taking with it the tip which it supports. The probability of the occurrence of such a failure is greater if the layer of soil and subsoil is thick, or if it lies upon a smooth surface of bedrock inclined in the direction of the slope of the hill (Appendix III).

4. Action of Water

In South Wales the action of water has been the most important factor in causing both landslides and slides of rubbish tips.

A foundation of soil and subsoil, of clay or of sand is weakened considerably if water has access to it, and a supporting bed initially of sufficient strength may rapidly deteriorate. This is shown by the values given in Appendix I.

The amount of water which falls annually upon the hills in South Wales is enormous. If the rainfall is 60 inches in a year, and this is the average value, the weight of water deposited upon a surface 100 yards square is about 12,500 tons. All of this water must flow from the surface or soak into the ground, and the greatest danger of sliding exists when a tip is so placed and aligned on a sloping surface that its presence interferes with the drainage. This is shown on Appendix IV.

Rain water which penetrates a permeable rock such as Pennant sandstone, sinks until it is stopped by a bed of impermeable rock, usually a fireclay or a shale. When such a bed crops out on the slope of a hill, the water issues from the ground and a line of springs is formed as shown in Appendix V. These springs may flow continuously, or intermittently following a period of wet weather. If a rubbish tip is extended so as to cover such an outcrop, the issuing water may be checked or dammed, and a slide may result.

Springs of water may also occur where the lower slopes of a hill are formed of impermeable beds overlying the permeable rock, as shown in Appendix VI.

The tendency of a rubbish tip to prevent the drainage of water through it increases as the material composing it is weathered. In addition to water drained from the hillside, an immense amount of rain falls directly upon the surface of a large tip, and washes down to its base the fine clay products of weathering. It is then more liable to dam back water.

A slide is usually the result of a combination of these circumstances:

- 4.1. Silting of the lower portion of the tip.
- 4.2. Water-logging and softening of the supporting ground.
- 4.3. Accumulation of water drained from the tip and the hillside above it after a period of heavy rain.

5. Composition of Tip Material

The material to be tipped differs greatly in both size and composition. This results in variation in the angle of repose that it takes up, and this must be taken into account when deciding on the location and subsequent management of the tip.

The inclusion of such materials as "tailings" in the general run of rubbish for disposal can result in a marked lowering in the angle of repose from as high as 27° to as low as 4-5°. The tip then becomes completely unmanageable.

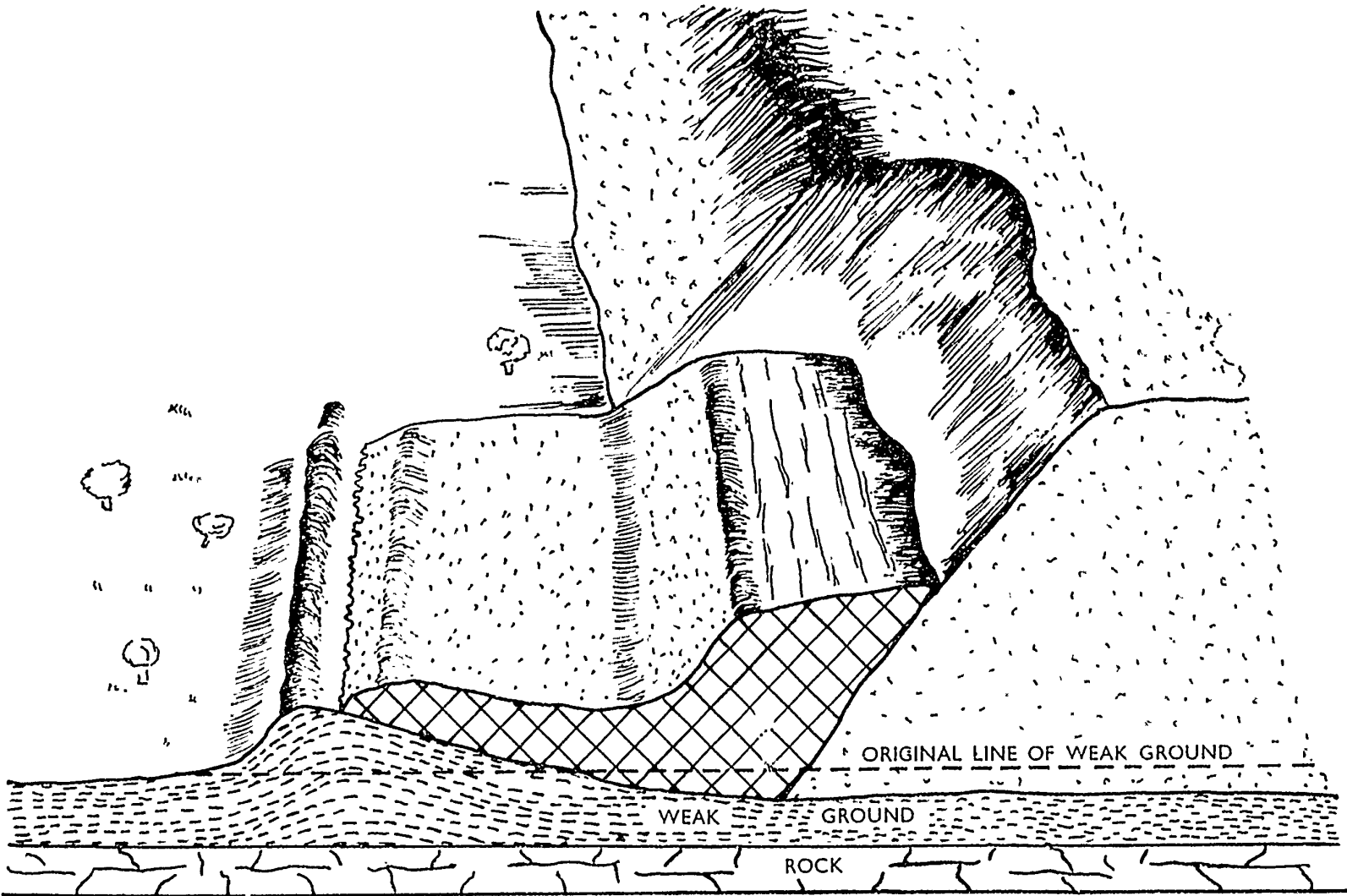
6. Precautions to Prevent Sliding

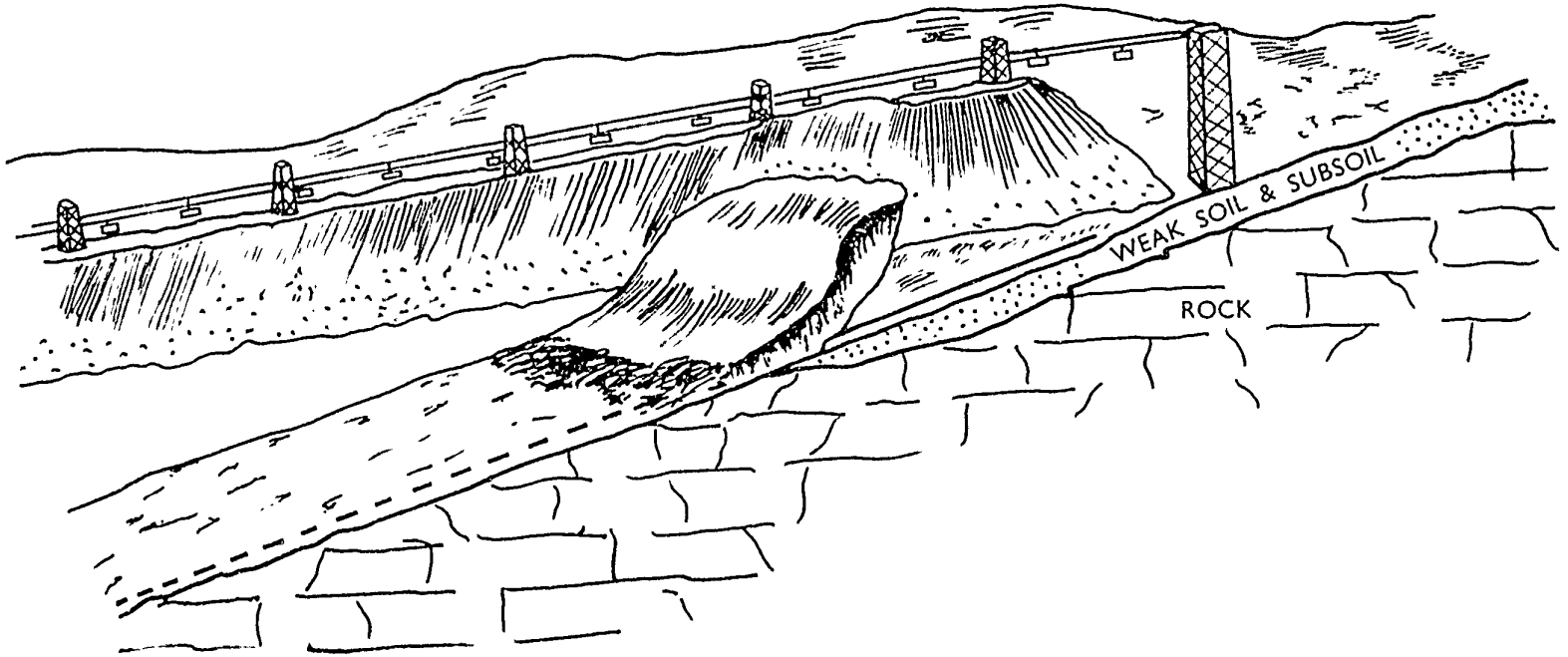
- 6.1. The height of a tip should be limited to avoid overloading the supporting ground.
- 6.2. Where a slide would cause damage to property, no tip over 20 feet high should be placed on a hillside unless the ground is a compact gravel or of better quality than this.
- 6.3. The advancing tip should be so aligned, along a sloping surface, that water draining off the ground above it can be collected, if necessary, by a system of drains cut in the ground, and led past and clear of the tip. Along the uphill edge of the advancing tip, no bays or recesses should be formed in which water can collect.
- 6.4. On the dip side of the tip, deep drains (not less than 18 inches) should be cut leading downhill to prevent water accumulating and to keep the ground dry. A herringbone system is illustrated in Appendix VII as well as the method of packing the drains with flat stones placed on edge.
- 6.5. Tipping should never be extended over springs of water, whether continuous or intermittent, or over bogged and water-logged ground.
- 6.6. The composition of the tip material must be carefully watched for variation and the disposal of materials, such as "tailings" must be carried out separately, preferably into redundant shafts or similar enclosures where the failure to maintain a good angle of repose is of no consequence.**

SAFE PRESSURE ON SUPPORTING GROUND

Type of Supporting Ground	Safe Pressure in tons/sq. ft.	Height of Tip Producing this Pressure ft.	Remarks
Alluvial Deposits, Soft Clay, Moist Clay and Sand. Made Ground, depending upon age and material	$\frac{1}{2}$ to 1	11 to 22	On inclined surfaces, no tip should be placed on foundations of these types
Alluvial Earth-Loams	$\frac{3}{4}$ to $1\frac{1}{2}$	17 to 34	On inclined surfaces, no tip should be placed on foundations of these types
Ordinary Clay	2 to 3	45 to 67	—
Clay with Coarse Sand	2 to 4	45 to 90	—
Dry Sand	3	67	—
Coarse Sand and Gravel	4 to 6	90 to 134	—
Compact Gravel	4 to 8	90 to 180	Where a slide can cause damage, no tip over 20 feet should be placed on a hillside unless ground is a compact gravel or better
Rock	5 to 30	112 and upward	—

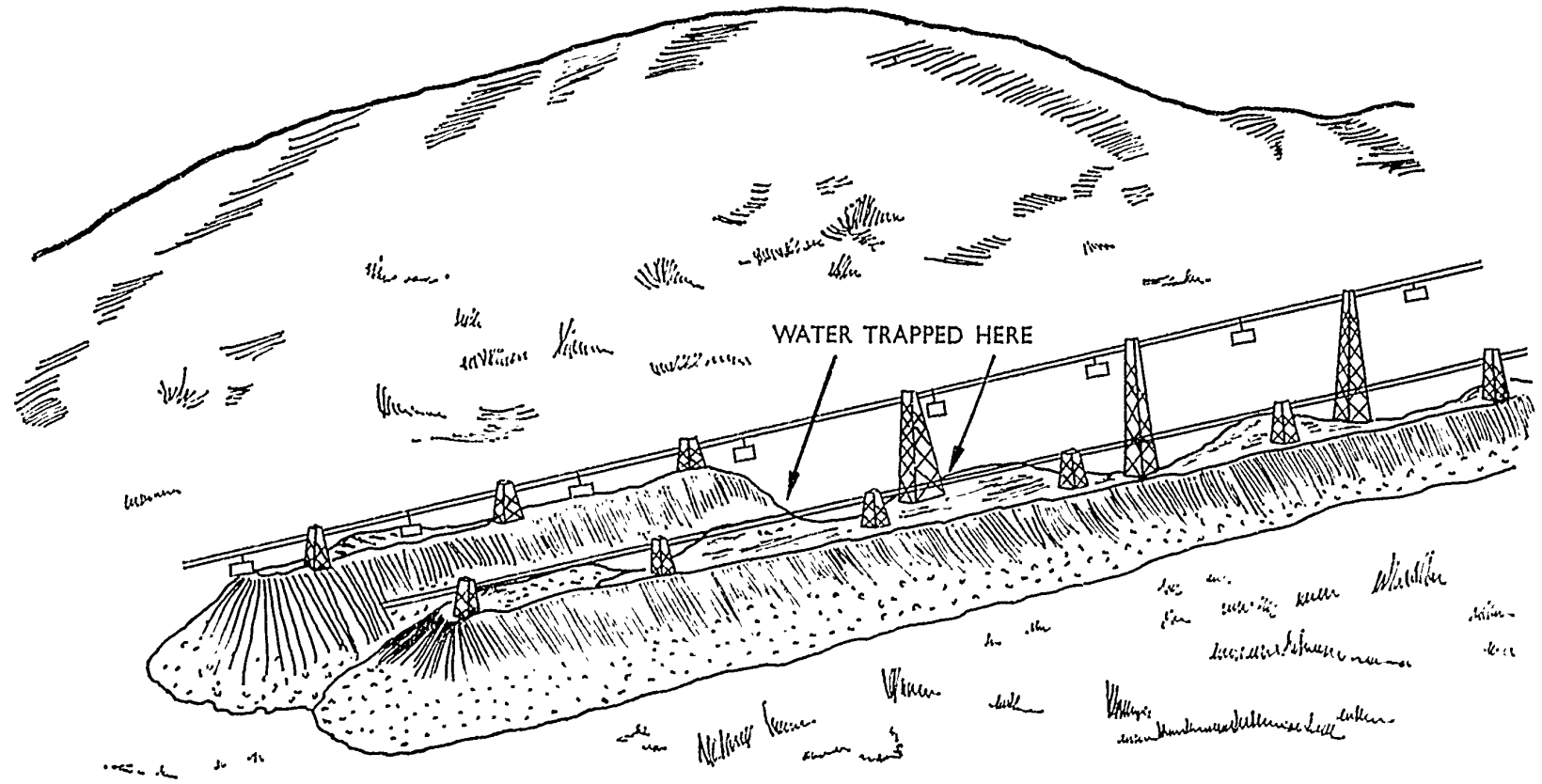
TIP SLIP ON HORIZONTAL SURFACE

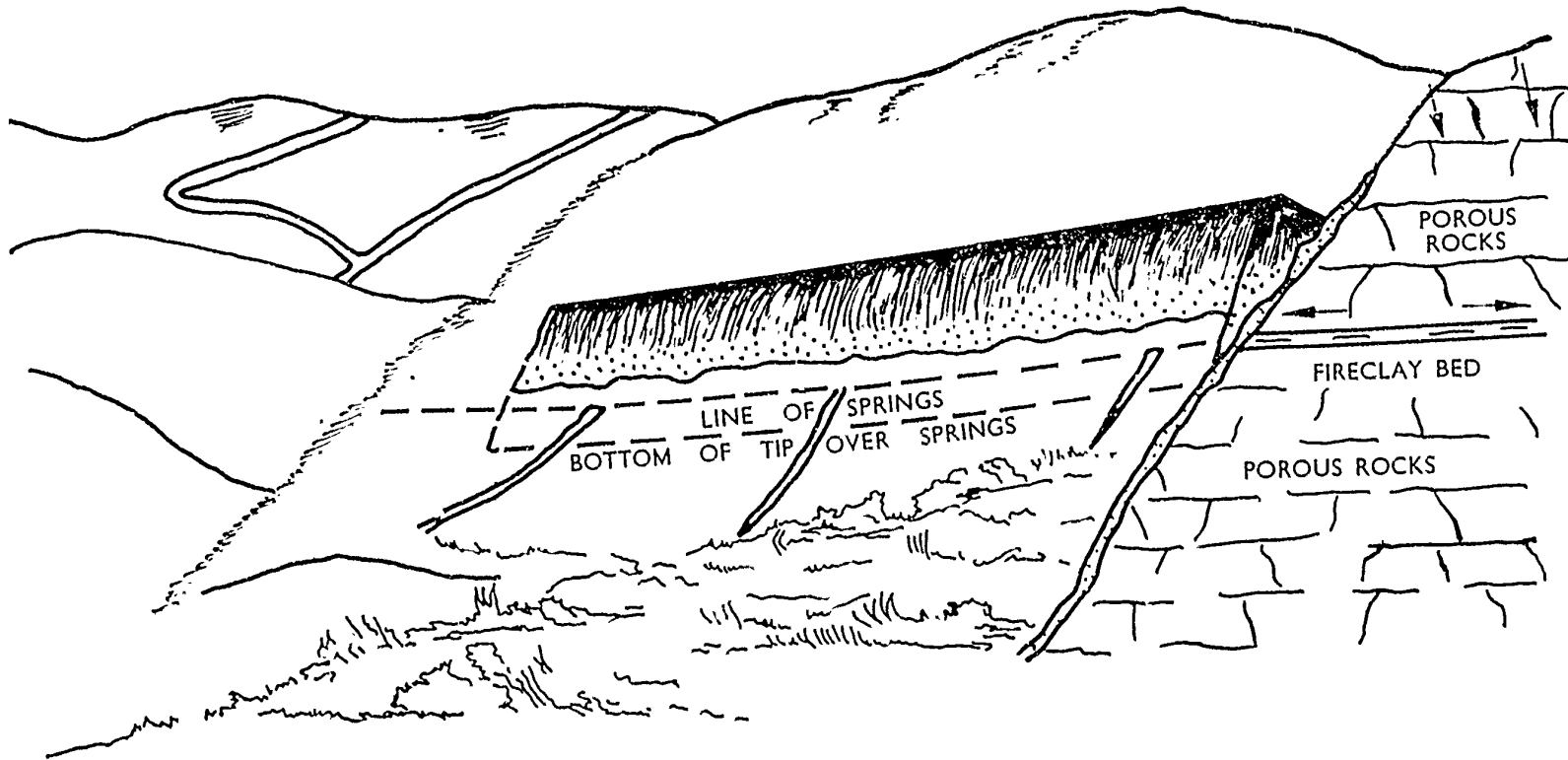




TIP SLIP ON INCLINED SURFACE

146

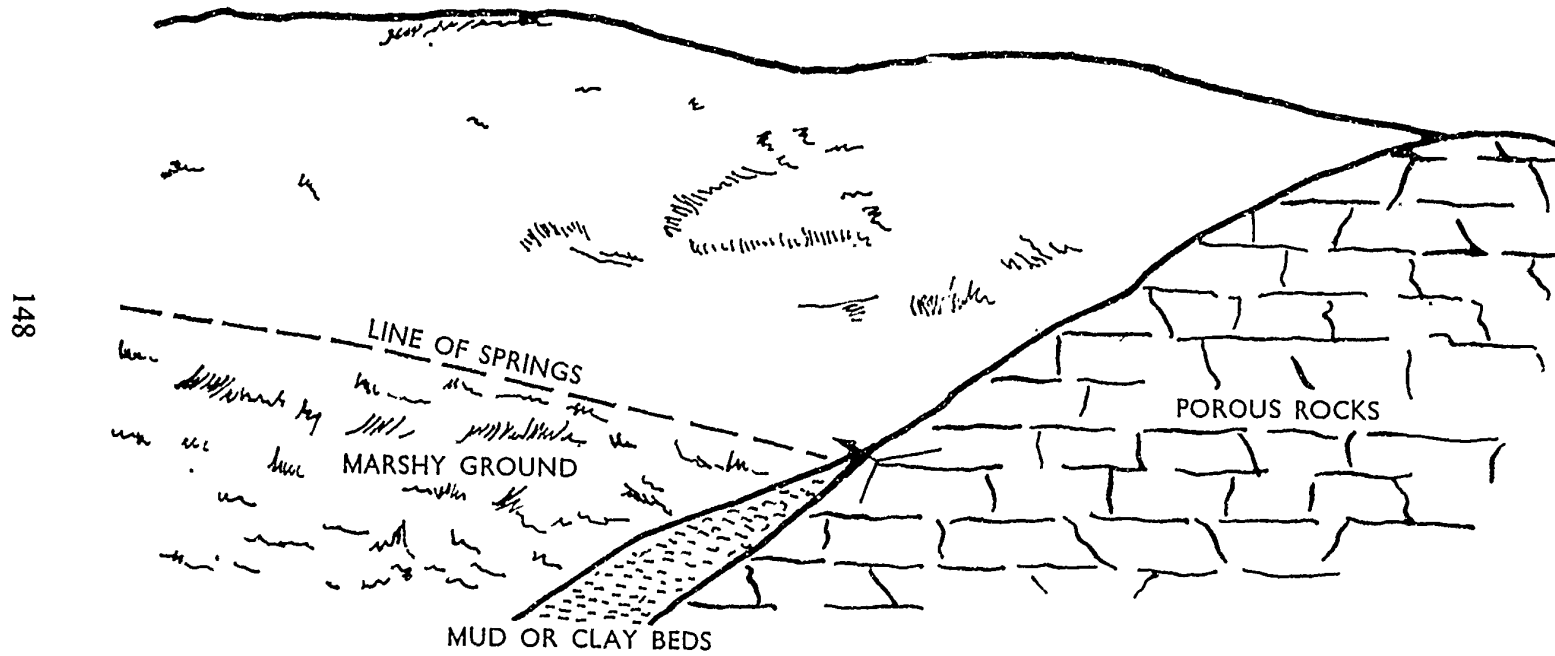




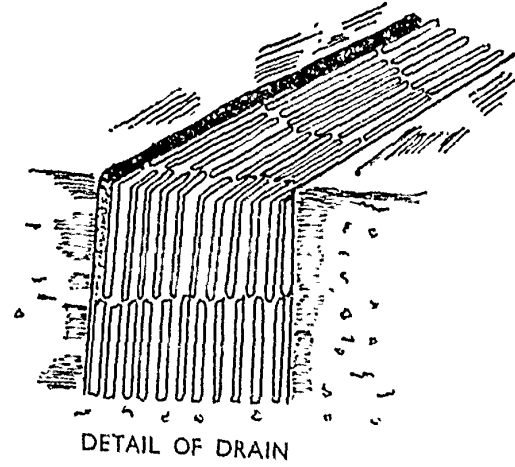
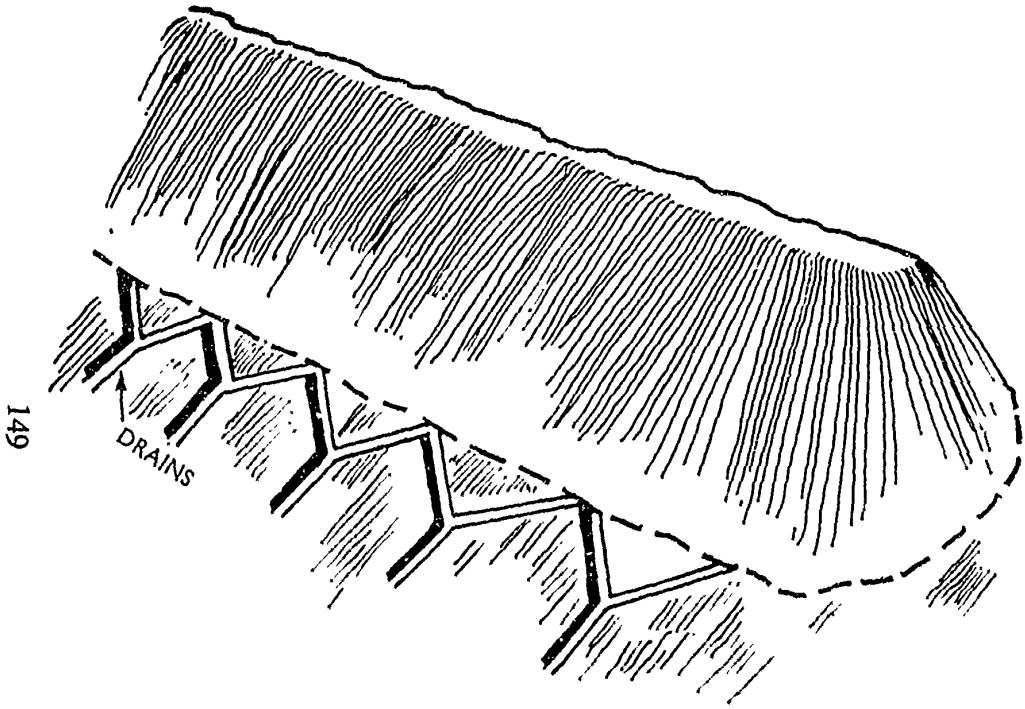
FORMATION OF SPRINGS No. 1

FORMATION OF SPRINGS No. 2

APPENDIX 6



148



HERRING BONE DRAINAGE SYSTEM

165

APPENDIX 7

APPENDIX E

NATIONAL COAL BOARD MEMORANDUM ON UNDERGROUND STOWING

1. Before and since nationalisation the *desirability* of stowing mine waste underground in the Colliery being operated has been clearly recognised by the coal mining industry. There has been and still is much consideration given to the multiplicity of problems involved and many experiments have been carried out in relation to run of mine rubbish and washery discard (including tailings).

2. In *general* terms underground stowing is *technically* feasible, though the problems vary from colliery to colliery and even from seam to seam *but the cost is too great to be justified*. The increased rate at which the coal face must advance if advantage is to be taken of modern mining methods makes it more difficult than ever to apply, economically, a system of stowing large quantities of the waste underground. There has to be considered *not only the actual cost of stowing* but the decrease in rate of output of coal which must necessarily follow. *If underground stowing were generally employed the result would be a financial burden that the coal industry could not bear.*

3. Stowing, albeit technically feasible, *creates hazards which cannot be ignored*. Airborne dust is increased and in South Wales in particular this can bring an added risk of *pneumoconiosis*.

4. The German coal industry has experienced problems that are similar to those experienced in the United Kingdom. In the *Ruhr* there has been a marked decline in underground stowing in recent years. Whereas in 1958 about 50 per cent. of all coal was obtained in conjunction with solid stowing today the figure has been reduced to 16 per cent.

5. *Ten years ago* the Parliamentary Secretary to the Ministry of Housing and Local Government stated in the House of Commons that "there has been the idea of underground stowage of the spoil material, but very often that is not practically possible." (see Hansard for 23rd May, 1957). With greater mechanisation since 1957 and more intensive mining methods *underground stowing is today even less of a practical proposition.*

6. At the present time stowing is employed in some exceptional cases mainly to improve the conditions of faces and underground roadways and to minimise surface subsidence where normal methods of strata control are inadequate. In South Wales stowing is being practised in approximately 2½ per cent. of the working faces.

7. *The conclusion is that underground stowing is not economically practicable though technically feasible.* Modern mining methods entail multi-shift working of rapidly advancing, highly mechanised faces. Under these conditions stowing is *a practical impediment* to the type of mining necessary to make the industry economically viable.

8. The underground stowing of tailings has been the subject of special study and experiment, but (a) it has not yet proved possible successfully to avoid the clogging of the stowing pipes and (b) even if this problem could be overcome in the future it would *not* be economically practicable to stow tailings for the reasons set out above.

7th March, 1967

Sir Andrew Bryan's Memorandum

The following are some of the matters upon which it is suggested guidance should be given in the *Code of Practice*:

(a) *Choice and exploration of a site for new tips* with special reference to the effect of:

- (i) nature of sub-soil and surface drift deposits;
- (ii) slope of ground;
- (iii) presence of water, e.g. streams, springs or issues, groundwater, rainfall, and the need for efficient drainage of the tip site and effective control of groundwater, if any;
- (iv) proximity to places of work; dwellings and other property; roads, railways, rivers and canals; cuttings or other excavations; power transmission lines and water and gas mains.

(b) *Characteristics of the various methods of tipping*, (e.g. aerial ropeways, conveyors, crane and trams, lorry and bulldozer, etc.) and their possible effect on *stability of tips* and on matters of safety generally.

(c) *Matters to be considered* and, where necessary, the appropriate precautions to be taken, *when the nature of the material to be tipped varies in quality and quantity*, having special regard to size grading, moisture and carbon content, weathering characteristics and liability to spontaneous combustion.

(d) *Factors affecting the determination of the safe height of a tip* and the precautions that may be necessary to ensure safety as its height increases.

(e) *Possible degree of instability arising from tipping fresh debris* over the weathered surface of old tip material.

(f) *Signs and symptoms of instability in a tip* and ways and means of their detection;

(g) Methods of improving the factor of safety in tips;

(h) The possible effects of *underground workings*—past, present and future—under the tip site on the stability of the tip.

(i) *The system of inspection, that is required in different circumstances*, with special reference to the types of inspection, their frequency, the qualifications of persons making the different inspections, the kind of report that should be made and the records that should be kept.