THE SLATE INDUSTRY OF NORTH WALES

STATEMENT OF THE CASE FOR A PLAN

BY

D. DYLAN PRITCHARD, M.A.

Assistant Lecturer in Economics,
University College of North Wales.

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FOREWORD

On April 6th, 1946, representatives of the Ministry of Labour and National Service and of the Ministry of Works, headed by the respective Parliamentary Secretaries, visited Caernarvon for discussions concerning ways and means of increasing the output of slate. During the afternoon the matter was discussed with quarry-owners and union officials; in the evening they had a long session with " other interested persons ", including the author.

Mr. Goronwy Roberts, M.P., who was mainly responsible for convening the conference, had invited me to draw up a memorandum for presentation to the Ministers. The memorandum was prepared at break-neck speed during four hectic days, and it is now presented to the public in the exact form that it was submitted to the Ministers. One is not free to state what transpired at the conference. It is sufficient to say that the memorandum formed the basis of discussion for the evening session, and that—as subsequent developments have indicated—it met with a favourable response.

Some six weeks later, on May 21, the Minister of Works announced in the House of Commons that he was appointing a committee on the Welsh slate industry with the following terms of reference:

> " To consider and report upon the organisation of the Welsh slate industry and upon measures for increasing its efficiency and making it attractive to recruits, excluding wages and conditions of employment falling within the negotiating machinery of the industry."

The committee will consist of Principal Sir Frederick Rees as independent chairman, together with representatives of employees and employers, a member of the Government Building Research Station, an engineer and a geologist. This committee is to start forthwith on its work.

The newly-constituted Welsh Slate Industry Committee is empowered to draw up a scheme for improving production and distribution, and for achieving a long-term improvement in the industry's efficiency. It is a cheering thought that one can be reasonably sure that the Government will insist on the implementation of the committee's recommendations. It is all the more necessary, therefore, that all sides of the industry—employers and workers, merchants and roofing contractors—should co-operate willingly with the committee in carrying out its difficult task.

In the present book it is emphasised that, whereas the short-term prospects of the industry are bright, long-term prospects are bad. The view is expressed that slate production, although it will recover during the next five or six years, is never likely to rise again to the pre-war level, and that after 1950 or 1951 there will be a sharp contraction in the volume of production unless the industry has in the meantime put its house in order.

It was outside the scope of this little book to indicate how the industry should proceed to put its house in order. I have certain views on this all-important aspect of the problem, and these will be submitted in due course to the Welsh Slate Industry Committee. The future prospects of the industry could be vastly improved were appropriate measures of re-organisation carried out. The setting up of this tri-partite committee provides substantial grounds for the view that this will be done and a new lease of life given to this most Welsh of Welsh industries.

The preparation of this little book at such short notice would have been impossible were it not for the fact that I was able to make extensive use of articles which I had contributed to *The Quarry Managers' Journal.*

May 31, 1946. DYLAN PRITCHARD.

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Section I

INTRODUCTORY

1—HISTORICAL RETROSPECT

The British slate industry reached its highest point in 1898 when some 634,000 tons of roofing slate were produced. During the last half century—as is indicated in Table I below—the industry has contracted very rapidly, so that in 1937 output was substantially less than half what it was at the turn of the century.

TABLE I

OUTPUT OF DRESSED SLATE DURING CERTAIN YEARS IN GREAT BRITAIN AND NORTH WALES RESPECTIVELY.

Year.	*Great Britain.* ('000 tons)	*North Wales.* ('000 tons)
1898 ...	634 ...	488
1913 ...	353 ...	295
1918 ...	109 ...	101
1927 ...	290 ...	252
1937 ...	268 ...	225
1945* ...	88 ...	—

*Estimated tonnage. Actual number of slates produced was 59 millions.

The very great fall in slate production during the fifteen years prior to the Four Years War was followed by an even more cataclysmic fall during the War. After the Armistice the industry recovered somewhat, and output slowly rose to reach a peak of 290,000 tons in 1927.

From that year until the outbreak of the Six Years War the trend was slowly downwards, the output in 1937 being

268,000 tons, or 22,000 tons lower than in 1927. This downward trend is very significant in view of the fact that the contemporaneous trend in residential construction was markedly upwards and that in the 'thirties this country experienced a house-building boom of wholly unprecedented magnitude. (See Table IV, page 16.)

The outbreak of War meant an immediate slackening in residential building activity, and the building of new houses had virtually ceased by the end of 1940. This brought about a big contraction in the slate industry, and output fell from 268,000 tons in 1937 to an estimated total of 88,000 tons in 1945.

2—DISTRIBUTION OF SLATE IN WALES

The commercially important slate areas of Wales fall into five groups:

(a) The Central Caernarvonshire area, with centres at Bethesda (Penrhyn Quarries), Llanberis (Dinorwic Quarries), and Nantlle (various small concerns).

(b) The North Merionethshire area with its centre at Blaenau Festiniog.

(c) The South Merionethshire area, between Towyn and Corris.

(d) The Corwen - Llangollen - Glynceiriog area of East Merioneth and Denbighshire.

(e) The Prescelly Mountain area of Pembrokeshire and Carmarthenshire.

The above areas are arranged in a roughly descending order of importance, the last three areas being only of minor importance.

3—DISTRIBUTION OF SLATE IN GREAT BRITAIN

The production of slate in England is concentrated in two parts of the country—the Lake District and the Cornwall - Devon - Somerset area. In Scotland the only commercially important slate region is in Argyllshire.

Table II below gives statistics showing the distribution of slate production in 1927 and 1937 respectively. In the latter year 9,731 persons were employed in the industry, and output was valued at £1,842,971. In that year Wales produced 76% of the total output by weight, representing 88% of the total value.

TABLE II

DISTRIBUTION OF SLATE PRODUCTION IN GREAT BRITAIN IN 1927 AND 1937 RESPECTIVELY.

District.	1927 (Tons)	1937 (Tons)
Caernarvonshire	170,744	165,779
Merioneth	76,357	55,932
Denbighshire	4,559	2,975
Montgomeryshire	613	799
Pembrokeshire	617	439
Carmarthenshire	919	846
Cardiganshire	125	—
WALES	253,934	226,770
Lake District	12,546	18,716
Cornwall - Devon - Somerset ...	15,961	19,218
ENGLAND	28,507	37,934
ISLE OF MAN	2,383	8,052
SCOTLAND	13,447	12,695
GREAT BRITAIN	298,271*	285,451*

*Statistics of output include 23,791 tons in 1927 and 17,220 tons in 1937, of crude or roughly dressed slate, used chiefly for building, metalling roads, etc. All the slate produced in the Isle of Man falls within this category, and the rest of the rough slate was produced in the Counties of Aberdeen and Banff, Scotland.

4—INDUSTRIAL STRUCTURE OF THE NORTH WALES SLATE INDUSTRY

The industry is characterised by great diversity in the size of the operating unit as is indicated in Table III below.

TABLE III

DISTRIBUTION OF SLATE PRODUCING CONCERNS IN NORTH WALES IN 1937 ACCORDING TO NUMBER OF WORKMEN EMPLOYED.

Number Employed.	*Number of Concerns.*	*Total Number Employed.*
0—100	19	631
101—250	5	661
251—500	5	1,891
501—1,000	1	765
1,001—2,000	1	1,916
2,001+	1	2,369
Total	32	8,233

There were in 1937 some 19 small concerns employing up to 100 men; and at the other end of the scale were the Penrhyn and Dinorwic Quarries, together employing 4,285 out of the total of 8,233 men employed in North Wales. (See Appendix I for complete list of operating units in 1937 in North Wales.)

5—ORGANISATIONAL STRUCTURE OF THE NORTH WALES SLATE INDUSTRY

A. Employers' Association.

Prior to the Four Years War the "Caernarvon" and the Festiniog groups of quarries had their own Associations. The Penrhyn and Dinorwic Quarries were outside these

Associations but co-operated together to some extent in the determination of prices. In 1917 a fully representative Association was set up—the North Wales Slate Quarry Proprietors' Association.

Despite the geographic concentration of the industry and the comparatively small number of business units—factors which should powerfully aid integration—co-operation among employers has been notoriously ineffective. This failure to co-operate is in the main due to two reasons. The first is the fact that the Penrhyn and Dinorwic Quarries jointly produce much more slate than the thirty other concerns put together. The other factor, which is even more important, has been the breakdown of all attempts at price-fixing, particularly when demand was slack. (See pages 17-19.)

The Employers' Association broke up after a few years, and at the commencement of 1943 the only Caernarvonshire corncern in an Association was the Dorothea Slate Quarry Co., Ltd., Nantlle. The other members were the Maen Offeren, Llechwedd, Manod and Oakeley concerns, Festiniog. The output of members of this Association amounted to some 30% of North Wales production so that it could not be regarded in any way as representative of the trade as a whole.

In 1943 the North Wales Slate Quarries Association was revived and is fully representative of the employers' side of the industry.

B. Trade Union.

The North Wales Quarrymen's Union was formed in 1874, but up to the Four Years War it had failed to secure

recognition from the majority of the employers. In the opening years of the century occurred the notorious Penrhyn Lock-out, when about 2,000 quarrymen were locked out for three whole years (November 1900 to November 1903) because they demanded the most elementary rights of combination. This dispute terminated with the complete and unconditional surrender of the men.

Following the Four Years War a new chapter opened in the history of the North Wales Quarrymen's Union with the recognition of the Union by all operating units. (The natural anxiety of the employers to build up their labour force as quickly as possible had an important bearing on this rapproachment between the Employers' Association and the Quarrymen's Union.) Throughout the inter-war period the Union enjoyed a 100% membership, and the right of the Union to represent the men's interests was never questioned. After the break-up of the Employers' Association agreements concerning wages and other matters were negotiated by the Union with individual employers or groups of employers.

The Union has become merged in the Transport and General Workers' Union, although retaining its own title and a large measure of autonomy.

C. Industrial Council.

At the end of the Four Years War a Sectional Industrial Council for the slate producing industry of North Wales was set up, but this organisation soon broke down, and wages and conditions were for some time negotiated between the North Wales Quarry Proprietors' Association and the North Wales Quarrymen's Union, each of which

were represented on the National Joint Industrial Council for the Quarrying Industry. The Employers' Association also broke down, and in 1934 the National Joint Industrial Council agreed that the slate interests should be covered as regards employers by direct representation of the quarries and mines respectively.

In 1943 the Welsh Reconstruction Advisory Committee suggested that there should be set up a body representative of employers and workpeople in the industry. On the initiative of the Ministry of Labour and National Service the Welsh Sectional Industrial Council for the Slate Quarries Industry was revived, and this Council held its inaugural meeting in November 1943. The employers' side consists of representatives of the North Wales Slate Quarries Association and the workers' side of representatives of the North Wales Quarrymen's Union.

The Sectional Industrial Council deals with wages and related matters. When disputes cannot be settled in the Industrial Council, they can, where necessary, be referred voluntarily to a Court of Arbitration comprising an independent chairman and two members from each side of the Council. Failing agreement by the Court, the chairman is required to give a ruling decision. Parties to a dispute which is referred to arbitration must sign an agreement before the hearing that they will abide by the decision of the Court. This arbitration procedure was used to settle a dispute which arose in the case of the Merioneth quarrymen in 1936.

Section II

SHORT-TERM PROSPECTS

I—INTRODUCTION

It is likely that for the next five or six years the demand for roofing slate will be in excess of the supply. The main short-term problem, therefore, is how to increase output as quickly as possible.

Some 9,500,000 houses (about three-quarters of the total number) are roofed with slates. Very large numbers of these houses have been extensively damaged in air raids. Normal repairs have been left to accumulate for six years. The result is that the demand for slate for repair purposes is abnormally high, absorbing all of the current much reduced output of the industry, so that there is no margin of slate which can be spared for the roofing of new houses.

This shortage of slates is serious when considered from the point of view of the community as a whole as it constitutes a bottle-neck, hampering the progress of the country's housing programme. It is infinitely more serious from the point of view of the slate industry itself because it means that, in the national interest, all output is diverted to the industry's sheltered, monopolistic market—the repair of slated roofs; no slates are placed on the open, fiercely-competitive, and (in normal times) quantitatively more important market—the roofing of new buildings, with the result that this market is left wide open for other roofing materials.

In a sense, the national interest and the narrower interest of the industry are opposed because the one market which the industry cannot afford to starve is the open competitive market for materials to roof new buildings. On the other hand, the national interest and the industry's sectional interest are as one in calling for increased production as quickly as possible.

II—ELASTICITY OF SUPPLY OF SLATE

The elasticity of supply of slate—that is, the degree to which supply can be quickly raised to cope with upward swings in demand—is notoriously low. This factor has proved a great handicap to the industry, particularly during the inter-war period.

Table IV below brings out the comparative inertness of output even in the face of great fluctuations in demand—the number of new houses completed within each calendar year being taken as a rough indication of the fluctuations in demand for roofing materials.

In the slate industry, as with most other extractive industries, there is a tendency towards over-production during periods of slack demand and there is inability to expand the scale of production quickly in response to increases in demand. Owing to this factor of inelastic supply, it is not an infrequent occurrence in the slate industry for output to remain stable, or even fall, over a number of years, whilst demand is progressively expanding. This paradoxical situation arose during the minor boom experienced in the industry between 1934 and 1937, as reference to the output statistics in Table IV will confirm.

TABLE IV

ANNUAL OUTPUT OF DRESSED SLATE, ANNUAL CONSUMPTION OF DRESSED SLATE, AND ANNUAL NUMBER OF NEW HOUSES COMPLETED EACH YEAR IN GREAT BRITAIN, 1922 TO 1938.

Year.	*Slate Production.* ('000 tons)	*Slate Consumption.** ('000 tons)	*Houses Built.* ('000 tons)
1922	223	224	104
1923	250	244	82
1924	274	275	123
1925	282	304	165
1926	287	328	208
1927	290	327	256
1928	283	318	168
1929	273	311	203
1930	243	278	173
1931	229	259	198
1932	235	248	201
1933	246	266	242
1934	267	294	320
1935	271	300	321
1936	266	289	343
1937	268	289	337
1938			337

*Annual consumption of slate is equal to the annual output, plus imports, minus exports.

III—DETERMINANTS OF ELASTICITY OF SUPPLY OF SLATE

A. Accumulated Arrears of Development Work.

(i) Feasibility of Postponing Development Work.

It is estimated that on the average for every ton of manufactured slate about twenty tons of rock has to be removed from the quarries and dumped as debris. This high proportion of waste is largely unavoidable and is attributable to the following causes:

(a) Surface rock and overburden of earth covering the slate strata has to be removed and is useless. This is particularly true of open quarries worked on either the "terrace" or "pit" system. Analogous to this work is the driving of shafts and levels for the opening of new "chambers" in a slate mine.

(b) Large quatities of unworkable slate rock and of useless igneous or other rock have to be removed in order not to interfere with the proper development and working of the quarries.

(c) The detaching of large masses of rock from the rock-face by blasting, the reduction of these masses to manageable sizes, the sawing of those blocks into small dimension blocks on circular saw tables, the splitting by hand of these blocks into thin layers and the "dressing" of these layers by hand or machine to different sizes—all involve waste.

It is technically possible to postpone expenditure upon the removal of waste rock resulting from causes (a) and (b), whereas removal of waste resulting from cause (c) is unavoidable so long as slates are manufactured at all. The postponement of expenditure under (a) and (b) means that arrears of essential development work are allowed to accumulate, and if this policy is pursued for one or two or more years, it inevitably restricts the productive capacity of each quarry and so of the industry as a whole.

(ii) Economic Incentives to Postpone Development Work.

It is generally acknowledged that it was the normal policy in the industry to economise in expenditure on development work when trade was slack.

This was partly due to the very limited capital resources of most of the concerns in the industry and the

narrow margin of profit earned even during times of brisk trade. It was also due to the failure of all attempts at collective price-fixing with the result that prices tended to fall excessively because of cut-throat competition within the industry.

When building was slack, as during the early 'thirties, progressive price-cutting by the industry was always ineffective in averting the contraction which inevitably occurred in the total demand for slates. Widespread realisation of this fact did not prevent individual slate concerns from trying to maintain their output by seeking to attract to themselves a larger proportionate share of the restricted demand through offering larger discounts than their competitors. During the early 'thirties internecine price-cutting forced prices down in a vicious circle to an uneconomic level with the results that profits were reduced to very small proportions, or disappeared. Consequently there was a strong tendency to reduce capital expenditure of all kinds to the bare minimum. As a result, when demand revived, the quarries were not in a position to increase output because of the heavy arrears of development work.

Furthermore, the cutting down of prices to an excessively low level during depressions, involving many, if not most, of the productive units in financial losses, results in a substantial part of the profit earned in the subsequent booms being used either to liquidate losses or to reduce bank advances, so that it is not available for re-investment in the industry. The fact that demand for slate quickly outstrips demand during building booms does not enable the industry to charge high prices for its product, because to do so would be to further encourage the utilisation of sub-

stitute materials, such as clay or cement tiles, which are in more elastic supply.

(iii) Special War-time Considerations.

During the War the industry was regarded as being a non-essential industry, and, although it was desirable in the national interest that production of slates be continued in order to make possible the repair of war-damaged property, it was also considered necessary to reduce the manpower of the industry to the lowest point compatible with the production of this basic quantity of slates for repair work. Consequently steps were taken to prevent quarrying concerns from doing any avoidable development work and to use their residual nucleus of workers in the actual production of slates. Arrears of development work have, therefore, been accumulating for some six years, and this factor severely limits the capacity of the industry to increase output rapidly at the present time.

B. Technical Factors.

There are many technical factors peculiar to the industry which tend to limit elasticity of supply. Slate production at every stage is a highly-skilled task, and is mainly a manual operation. There are obvious limitations upon any attempt to introduce modern productive techniques—standardisation, mechanisation, mass production, etc.—into the industry. It is equally patent that the industry is very backward in these respects and that a great more remains to be done in these directions, but the limitations inherent in the very nature of this extractive industry are such that the supply of slate can never hope to be as elastic as that of a mass-produced standardised commodity such as tiles.

C. Scarcity of Labour.

(i) Abnormal Age-Composition of the Industry's Labour Force.

It is significant that even in 1931—for which year the Census Returns provide detailed information about the distribution of slate workers among different age-groups—the industry's labour force included an abnormally large proportion of old people and an abnormally low proportion of young workers.

The industry had been contracting very rapidly prior to the Four Years' War. Many left the Welsh slate areas to seek work in other industries, and it has to be borne in mind that occupational as well as locational mobility is higher among the young than among the middle-aged and the elderly, and it was the younger unemployed quarrymen who migrated; furthermore, the recruitment of young workers into the industry was on a very limited scale. Then came the War, which further denuded the industry of its young workers, and the labour force was reduced to about one-third of the pre-war level.

Following the Four Years' War the most important factor limiting the recovery of the industry was the scarcity of skilled labour. This factor remained operative, although not in an acute form, until 1927. Unemployment in the industry fluctuated between 1.5% and 2.9% from 1923 to 1927. During the period of slow contraction after 1927 unemployment was on a much acuter scale, particularly in the depressed early thirties, and it remained extremely bad until the outbreak of War in both the Nantlle and Festiniog districts. In the latter districts there was a chronic surplus of quarry labour throughout the 'thirties. (See Appen-

dix II for unemployment statistics relating to the industry and to the various Welsh slate areas.)

Throughout the inter-war period, recruitment into the industry was on a very restricted scale, with the result that the industry had a progressively ageing labour force. This fact is very clearly brought out in the following Tables.

TABLE V

DISTRIBUTION AMONG DIFFERENT AGE-GROUPS OF THE TOTAL NUMBER OF WORKERS IN THE SLATE INDUSTRY OF ENGLAND AND WALES IN 1901 AND 1931 RESPECTIVELY.

Age-periods.	1901.* *Number.*	1901. *Proportion.* %	1931. *Number.*	1931. *Proportion.* %
14—24 ...	4,352	27.2	2,475	21.6
25—34 ...	3,849	24.1	2,404	21.0
35—44 ...	3,031	18.9	1,884	16.4
45—54 ...	2,550	15.9	2,138	18.7
55—64 ...	1,560	9.8	1,776	15.5
65 and over ...	657	4.1	784	6.8
	15,999	100.0	11,461	100.0

*In 1901 there were 65 boys aged 10-13 in the industry.

TABLE VI

THE PROPORTIONS OF SLATE QUARRYMEN IN THE DIFFERENT AGE-GROUPS IN 1931 EXPRESSED AS PERCENTAGES OF THE PROPORTIONS OF QUARRYMEN IN THE CORRESPONDING AGE-GROUPS IN 1901.

Age-periods.	1901	1931	*Percentage Deviation.*
14—24 ...	100	79	−21
25—34 ...	100	87	−13
35—44 ...	100	87	−13
45—54 ...	100	118	+18
55—64 ...	100	158	+58
65 and over ...	100	166	+66

The above tables show the great change that had taken place between 1901 and 1931 in the age composition of labour employed in the industry; at the later date the proportion of quarrymen aged 14-24 years was 21% less than in 1901, whereas the proportion aged 65 and over was 66% greater. Undoubtedly, this tendency towards a progressively ageing labour force was accentuated during the 'thirties because of the migration of younger workers when thrown out of work, together with the fact that recruitment into the industry was very erratic and on a minute scale.

(ii) Effects of the War.

Following the late War, as after the Four Years War, the main restriction on output is imposed by the acute shortage of man-power, this shortage being wholly attributable to the effects of the War. In the main, the reduction in the industry's man-power is due to the compulsory call-up of men to the Services and the direction of others into various forms of war-work. It is also partly attributable to the voluntary migration of quarrymen into other work. mainly because of the acute depression which prevailed in the industry during 1940. Stocks of slate had accumulated rapidly, and things got so slack that the Penrhyn and Dinorwic Quarries closed down in August 1940 for nine weeks. As soon as the blitz started stocks were soon cleared, and thereafter the numbers of men who voluntarily left the industry dwindled, whereas the compulsory call-up of the younger men proceeded apace. The transfer, compulsory and voluntary, of younger men from the industry, together with the cessation of recruitment into the trade, has left the industry with a depleted and very ill-balanced (from the point of view of age-composition) labour force.

4—SHORT-TERM EXPEDIENTS FOR EXPANDING PRODUCTION OF SLATE

A. Expansion of Production of Slate following the Four Years War.

The accumulated arrears of development work, the shortage of skilled labour, together with certain technical factors peculiar to the industry, make it difficult to increase output quickly. These difficulties faced the industry, although in a less acute form, after the Four Years War, and it will be instructive at this point to examine how rapidly the output of the Welsh slate trade recovered after 1918. Table VII (page 24) sets out statistics of output, manpower, and number of business units in the North Wales slate industry.

In 1918 the slate industry had contracted to about one-third its pre-war size. Between 1918 and 1920 the labour force of the North Wales industry increased from 3,234 to 7,397, and the output from 101,000 tons to 190,000 tons, the increase in output being less than proportionate to the increase in the labour force. Fourteen slate quarries and eleven mines had closed down during the War, but by 1920 they were once again in operation, the total number of slate concerns in North Wales being 49 in 1920 as in 1913.

The post-war reconstruction boom broke with violence in the summer of 1920, and this, together with the winding up of the Addison scheme of housing subsidies in July 1921 had an adverse effect on the building industry and undoubtedly retarded the further recovery of the slate industry. Recovery was greater in the case of the Merioneth

slate mines than in the case of quarries, and in 1927 the output was only slightly lower than in 1913 (whilst many more men were being employed at the later date), whereas in the case of the open quarries both output and persons employed were substantially below the pre-war level in 1927.

TABLE VII

ANNUAL OUTPUT OF DRESSED SLATE, NUMBER OF OPERATING UNITS, NUMBER OF QUARRYMEN EMPLOYED IN THE SLATE QUARRIES AND MINES RESPECTIVELY OF NORTH WALES IN 1913 AND BETWEEN 1918-1937.

	Slate Quarries.			Slate Mines.			North Wales.		
Year.	*Output.* ('000 tons)	*Men.*	*Units.*	*Output.* ('000 tons)	*Men.*	*Units.*	*Output.* ('000 tons)	*Men.*	*Units.*
1913	206	6,860	26	89	2,675	23	295	9,535	49
1918	69	2,284	12	32	950	12	101	3,234	24
1919	102	...	...	39	1,696	...	141	...	...
1920	134	4,900	24	56	2,497	25	190	7,397	49
1921	137	...	...	63	2,781	25	200	...	...
1922	128	5,332	21	67	2,941	26	195	8,273	47
1923	146	...	...	70	3,071	24	216	...	...
1924	157	...	...	74	3,244	27	231	...	...
1925	161	5,871	20	82	3,462	28	243	9,333	48
1926	?	...	...	?	3,574	27	250	...	...
1927	165	...	...	87	3,654	25	252	...	...
1928	160	6,048	19	86	3,545	26	246	9,593	45
1929	158	...	...	80	3,346	27	238	...	...
1930	131	...	...	76	3,254	26	207	...	...
1931	127	5,212	8	65	2,947	23	192	8,159	31
1932	147	...	...	53	2,756	22	200	...	...
1933	148	...	...	58	2,701	20	206	...	...
1934	159	5,422	14	67	2,901	21	226	8,123	35
1935	162	...	...	65	2,900	18	227	...	...
1936	163	...	...	58	2,875	18	221	...	...
1937	160	5,349	14	65	2,884	18	225	8,233	32

B. Present need for more Rapid Expansion of Slate Production than after the Four Years War.

To sum up: Output can be increased much more rapidly following a war than during normal times, and if the

Welsh industry recovers at the same rate as it did after the Four Years War, output in 1946 will be 40% greater than in 1945, in 1947 90% greater, and in 1948 twice as great.

The rate of expansion needs to be much higher now than after the Four Years War for the following reasons:

(a) In 1918 the output of the North Wales industry was 101,000 tons, whereas in 1945 it was at least 15,000 tons less, so that unless output grows at a quicker rate this time, actual output will be substantially lower during 1946-48 than in 1919-21.

(b) The demand for slate for repair purposes is probably at least *twice* as great as after the Four Years War.

(c) The repair market is absorbing all of the current output of slates and, in view of the rapid decline during the inter-war period in the relative importance of the industry as a roofing-material industry, it is of vital and urgent importance to the slate industry that it should increase ouput rapidly so that there is a substantial amount of slates available to place on new buildings. This latter market is now in effect monopolised by materials other than slate.

(d) The non-availability of slates for roofing new buildings constitutes a serious bottle-neck hindering the building of permanent houses.

The recovery in production achieved up to January 1946 is shown in Table VIII (page 26).

These production statistics cover the earliest stages in the post-war transition period. Recovery in production is disappointingly slow, and the upward trend in production since the cessation of hostilities is much more marked in the case of tiles than is the case with slates.

TABLE VIII

MONTHLY OUTPUT OF SLATES AND TILES IN GREAT BRITAIN, JANUARY 1945 to JANUARY 1946.

		Slates (Millions).	*Tiles (Millions).*
1945.	January	4.19	8.48
	February	3.87	8.08
	March	5.40	11.04
	April	4.76	9.41
	May	4.75	9.84
	June	5.19	10.68
	July	4.56	11.94
	August	4.14	9.08
	September	5.21	12.62
	October	5.84	13.01
	November	6.13	14.38
	December	4.77	13.22
1946	January	5.16	16.00

C. Methods of increasing the Industry's Labour Force.

The crying need of the industry at the present time is for more man-power. "Give us the men and we will provide the slates" sums up the conviction of all employers in the industry. It is an irrefutable fact that to double the present output it will be necessary to more than double the labour force.

(i) Release from the Services.

An immediate offer of release under the Class B scheme should be made to *all* ex-slate quarrymen still serving with the Forces.

A complementary step would be the postponement of further calling-up of young men engaged in the industry until the output is considered adequate.

The reinstatement of former employees in the industry raises rather special problems because the productivity of the slate strata varies in different parts of each quarry, and this has an effect on earnings. If demobilisation is long-drawn-out, those released last will find themselves crowded out of the best working places. This factor tends to make employers very reluctant to take on new workers, as they want to reserve the better work places for their own ex-employees. This factor in some degree explains why unemployed quarrymen in the Nantlle district find it difficult to find employment in the Dinorwic Quarries or in other concerns. The offer of immediate release would solve this practical difficulty as well as directly increasing the industry's labour force.

(ii) Appointment of Labour Supply Officers.

The Ministry of Labour and National Service should appoint labour supply officers with the sole duty of investigating the labour requirements of the industry, and of doing all that can be done to see that these requirements are met. There should be a comb-out of all ex-slate quarrymen from other civilian industries, and positive encouragement given to these workers to re-enter the industry.

(iii) New Deal for the Quarrymen.

It is generally considered that it takes some six years to become a skilled quarryman, and so it is patent that the only way of increasing the labour force appreciably in the near future is by inducing ex-quarrymen to return. Unfortunately, many ex-servicemen and, particularly, war-workers are reluctant to enter the industry if they can possibly avoid doing so. The prospects offered in the in-

dustry seem to many to be singularly unattractive, especially after their war-time experience of wages and conditions of work in other industries.

(a) Wages.

Wages in the industry have risen appreciably during the War, and the percentage rise in weekly earnings since 1938 is not far short of the 76% rise in earnings in industry as a whole. The minimum guaranteed weekly wage for skilled quarrymen contractors has risen from 44/- (8/- per working day) pre-war to 83/5 (15/2 per working day) at the present time. The "letting standard" at present is 17/6 per day, but the average wage earned by quarrymen contractors is considerably higher. Labourers get 82/6 per week (15/- per day), and skilled quarrymen when not working on contract get 87/1 per week (15/10 per day).

Wages in the industry are by no means low, but if one takes into consideration the highly skilled nature of the work, the occupational risks, the arduous nature of the work and the unsatisfactory labour conditions—the rates of wages do not appear in such a favourable light. If rates of wages are further increased in other building material industries—most of whom employ predominantly unskilled or semi-skilled labour—there will be an unanswerable case for substantial wage increases for slate quarrymen. (See Appendix III for particulars of effect of occupation and its accompanying environment on mortality among slate quarrymen in North Wales.)

(b) Conditions of Work.

There is room for very considerable improvement in conditions of work, such as improved sheds and mills, appliances for the elimination of slate dust, provision of work

canteens, adequate drying facilities for wet clothes, more mechanical devices to reduce lifting of heavy weights and the pushing of heavy loads by manual labour—to mention only a few. These improvements can only be introduced over a long period and cannot enhance the attractiveness of the industry in the immediate future.

(c) Apprenticeship.

In view of the abnormal age-composition of the personnel of the industry, it is essential that there should be substantial recruitment of juvenile trainees into the industry. There is a serious shortage of apprentices, however, and there is little likelihood of adequate numbers being attracted into the industry unless much more generous financial provisions are made covering the period of training. One may illustrate this point by reference to the scheme now operative at the Dinorwic Quarries. Apprenticeship is for six years and commences at either 14 or 15 years.

The standard daily wage is as follows:

1st year	...	...	...	4s. 3d.
2nd year	...	...	...	5s. 3d.
3rd year	...	...	...	6s. 5d.
4th year	...	...	...	8s. 9d.
5th year	...	...	...	10s. 2d.
6th year	...	...	...	12s. 3d.

This wage may or may not be supplemented by the group of quarrymen contractors for whom the "journeyman learner" (that being the name by which the apprentice is called after completion of his first year's training) is working.

An initial wage of 23/4 per week is too low to attract suitable juveniles into the industry, and the standard payment during the first year should be not less than 35/- per

week, with appropriate upward adjustments for subsequent years. The quarrymen contractors might well object to more generous financial provision for the Dinorwic apprentices because it is they who pay the wages of the trainees after the end of the first year, and it is likely that during the second and third years it would be necessary for the management to pay some proportion of the journeyman's remuneration. Apprenticeship schemes differ in various quarries, but they are all subject to the criticism that the financial provisions are not generous enough.

D. Appointment of Production Consultant.

A large proportion of the managerial ranks in the industry have little experience of modern productive techniques, their working life having been spent in close association with the slate industry. Moreover, progress in civil engineering has been so rapid of recent years that the slate industry—isolated as it is from the major industrial areas—has failed to investigate the potentialities of modernised methods of production.

However, the task of developing the quarries is so great and so expensive that it has become increasingly urgent to explore the possibility of doing this work quicker and cheaper by adopting non-traditional methods. The quarries and mines are growing deeper and larger; the distances between rock-face and slate mill and between rock-face and tip are becoming greater; the result is that the task of planning and co-ordinating transport arrangements within the quarries has in many cases become very complex, and there is greater need than ever to install the most efficient and economic transport facilities. The advice and assistance of a civil engineer of the first rank would be invaluable to the

industry, and the suggestion is made that the Government should appoint a Production Consultant for the industry. (Provision for the salary of the Production Consultant could probably be made under the terms of the Building Materials and Housing Act, 1946).

E. Priority in the Supply of Mechanical Equipment.

Many concerns in the industry have placed orders for mechanical equipment of various kinds, but they are unable to get delivery and have, in some cases, been informed that they must not expect delivery within less than eighteen months or even more. Among other mechanical aids to production, a large number of small Diesel engines for haulage purposes have been ordered by the management of the Dinorwic Quarries, but it is not known when these engines can be supplied.

It is suggested that the Government should consider whether it is practicable to expedite delivery of certain kinds of mechanical equipment to the industry and to carefully consider the needs of the industry in disposing of surplus equipment.

F. Production of Slates of Random Widths.

If valuable slate rock is not to be wasted, the production of numerous sizes is inevitable. Some thirty different sizes of slates are manufactured. The width as well as the lengths of slates are standardised, whereas if slates were produced with the same standard lengths as at present but with random widths, there would be a big reduction in waste of good slate rock and a substantial increase in output. For instance, at present the following sizes of slates 18 inches long are produced, viz.: 18 × 12, 18 × 10, and

18 × 9. If it were decided to produce slates of random widths the slate dresser could make the slate as wide as the thin layer of slate would allow, instead of having to cut it down to one of the above standard widths.

The production of randoms would have many ad-advantages:

(i) The output of the industry would be increased by from 10 to 15 per cent.

(ii) *Per capita* output would be increased.

(iii) More economical use would be made of good slate rock.

(iv) The amount of debris to be cleared would be slightly reduced.

(v) The appearance of slated roofs would be greatly improved. Roofs covered with slates of one standard length and random widths are more attractive than when covered with the present "sized" slates. Roofing with a slate of uniform length but random width involves little, if any, more skill or expense than with the present "tally" slates of standard width.

The manufacture of random slates would involve selling by weight or by covering capacity instead of by the thousand of 1,260 slates as at present. This would present no practical difficulty because it is already the custom in Welsh quarries to sell "Ton" slates and "Queens" by weight, whereas many of the English slate concerns dispose of their output by weight.

In the United States all slates are sold by covering capacity.

One important practical consideration militates against the production of randoms. Practically all of the 9,500,000

slate-roofed houses in Great Britain are covered with slates of standard length and width, and so the repair market, which at present absorbs all of current production, has to be supplied with the ordinary "tally" slates. This may mean that it is impracticable at present to switch over to the production of randoms, but this difficulty would disappear as soon as the industry has a surplus available for roofing new buildings.

G. Scheduling of the Festiniog District and the Nantlle Valley and its Contiguous Areas as Development Areas.

Many of the smaller productive units—most of them being located in the Festiniog and Nantlle districts—have inadequate capital resources, and many of them may be termed marginal concerns. It is precisely in these two areas that costs of development are greatest because of the methods of production peculiar to these two localities—slate mining in the Festiniog areas and the open pit system in the Nantlle area.

The long-term prospects of the industry—particularly in these two areas—are too black to attract the private investor, and so the smaller concerns are thrown back on their own slender resources. The Penrhyn and Dinorwic Quarries are much more fortunate in this respect; their owners have derived handsome profits for generations from the quarries, and the owner of each quarry derives an income of not less than £25,000 per annum from his landed estates.

The necessary financial assistance for the smaller slate concerns could be provided under the terms of the Distri-

bution of Industry Act, 1946, were the Festiniog district and the Nantlle Valley and its contiguous areas scheduled as development areas. The strong arguments in favour of scheduling these areas have been set forth at length in memoranda prepared by and for the Industrial Development Committees of the Caernarvonshire and Merionethshire County Councils and presented for the consideration of the Board of Trade by the North Wales Development Committee. The argument advanced above reinforces the case for the scheduling of these areas and offers the only hope for the resuscitation of the basic industry of the areas.

Section III

LONG-TERM PROSPECTS

1—NEED FOR DEVELOPMENT COMMITTEE OR WORKING PARTY FOR THE WELSH SLATE INDUSTRY

The immediate short-term prospects of the industry are good, and it is likely that slates will be in short supply for five or six years. The long-term prospects—that is, prospects after the next five or six years—are, however, extremely bad, and it is unlikely that the production of slate will ever again come up to the 1937 level. The extent to which the industry is able to rehabilitate itself will depend largely on the ways it tackles long-term, as well as short-term, problems. The industry is desperately in need of a plan, and it is suggested that the only way of formulating such a plan is to set up appropriate machinery. This machinery could take the form of a Slate Industry Development Committee to be set up by the North Wales Slate Quarries Association, or, much more effectively, through the device of having a Government sponsored Working Party for the industry.

The recently revived Employers' Association as such cannot possibly constitute the machinery necessary for the formulation of a plan such as is called for. The Association could, however, appoint a Development Committee to do this work. Such a Development Committee would be

mainly composed of representatives of employers together with not more than eight co-opted members, of whom not less than three should represent the North Wales Quarrymen's Union. The task of the Committee would be to carry out a thorough investigation into the present condition of the industry and to make recommendations calculated to improve the efficiency and prospects of the industry. It should aim at producing its final report within six months of starting on its task. It should invite and consider oral and written evidence from individuals and organisations, such as Associations of roofing contractors, slate merchants, builders, etc. It would be necessary for the Development Committee to split up into sub-committees, or to set up special sub-committees, to consider specialised aspects af the problem. Travelling expenses, subsistence allowances, etc., of members of the Committee and witnesses would have to be met generously if the work is to be done effectively, and the cost would run to several hundred pounds, this expense to be borne by the North Wales Slate Quarries Association.

There is very little likelihood of the Employers' Association voluntarily adopting a scheme of this kind. The Association is showing a livelier appreciation of the seriousness of the industry's problems than was shown by its earlier prototypes. A very limited scheme of collective advertising has been adopted, and plans have been considered, but rejected, for collective research. There is very little indication that the Association will not content itself with its traditional policy of merely tinkering with the problem of improving the industry's future prospects. It has also to be remembered that the Penrhyn and Dinorwic

Quarries together produce more than half the output of the Welsh slate industry. These two Quarries are better placed in all respects than the smaller concerns, and their future is assured—it is the smaller concerns that have always suffered from the contraction of the industry. This lack of community of interest arising out of the extreme diversity in the size of the operating units militates powerfully against effective collective action.

The best solution—and, indeed, the only hope for the industry—rests in a Government-sponsored Working Party such as has been set up in many industries. The Quarrymen's Union would welcome a Working Party for the industry, and it would be acceptable to most of the employers, many of whom are progressively minded. A Working Party would provide the ideal machinery for the formulation of a plan for the industry.

It is proposed in the remaining part of this section to consider, firstly, the factors affecting the future prospects of the industry and to establish the seriousness of the position with which the industry is faced and, finally, to briefly outline the measures that would necessarily fall within the terms of reference of either a Development Committee or a Working Party when considering how to improve the prospects of the industry.

2—DECLINE IN RELATIVE IMPORTANCE OF THE SLATE INDUSTRY AS A ROOFING-MATERIAL INDUSTRY

Table IX (page 38) brings clearly into relief the unhealthy economic condition of this most Welsh of Welsh

industries; the Table brings together for comparative purposes the output of slates, clay roofing tiles, and the number of houses built in Great Britain during certain years since 1912.

TABLE IX

OUTPUT OF CLAY ROOFING TILES, OUTPUT OF DRESSED SLATES, AND NUMBER OF HOUSES COMPLETED IN GREAT BRITAIN IN 1912, 1924, 1930, AND 1935.

Year.	*Clay Tiles* ('000 tons).	*Slate* ('000 tons).	*New Houses* ('000)
1912 ...	200	... 364	... 70
1924 ...	376	... 274	... 123
1930 ...	608	... 243	... 173
1935 ...	823	... 271	... 321

In interpreting the significance of the above Table, it is necessary to remember that in 1924 hardly any roofing tiles were made of concrete or cement, whereas in 1935 229,000 tons of such tiles, valued at £497,000, were produced; similar roofing tiles (quantity not known) to the value of an additional £292,000 were also manufactured. Consequently, the output of all kinds of roofing tiles in 1935 may be reliably estimated to be in the region of 1,200,000 tons, which is *six* times greater than the volume of production in 1912. Between 1912 and 1935 the expansion in the roofing tile industries kept pace with the expansion in residential construction, whereas the output of slate contracted over the same period. It is therefore abundantly clear that in the inter-war period, more especially in the 'thirties, roofing tiles were becoming vastly more popular than slates, and this development has placed the slate industry in a very precarious economic position.

3—FACTORS TENDING TO REDUCE THE RELATIVE IMPORTANCE OF THE SLATE INDUSTRY AS A ROOFING-MATERIAL INDUSTRY

A. Aesthetic Considerations.

Throughout the nineteenth century, urban areas were developed haphazardly and intensively. Houses were huddled together in narrow streets; pavements were narrow and houses rarely had gardens attached to them; roofs tended to have rather a flat pitch. Under such conditions it is seldom that the roofs of urban houses can be seen from street level. It is little wonder that, prior to the Four Years War, the outward appearance of a roof was of purely secondary importance, and all the emphasis was laid on cheapness and durability, so that flat-pitched roofs of purple and blue-grey slates were the order of the day.

On the other hand we have become increasingly "roof-conscious" during the inter-war period. The accelerated centripetal growth of our large cities; the rapid development of suburban areas on less intensive lines; the popularity of detached and semi-detached houses; the greater demand for gardens; the popularity of steep-pitched roofs —all these factors have co-operated to make us more roof-conscious because the roof is now the most conspicuous part of a house and so much greater attention is paid to its appearance. Another factor which has tended to increase the attention paid to the appearance of houses was the large growth in house ownership between the Wars.

Increasing attention is paid to the appearance of roofing materials; comparative prices and durability remain as

secondary—but important—considerations. The result has been a widespread objection on æsthetic grounds to Welsh slates, together with an increased demand for the more colourful and decorative roofing materials.

This æsthetic objection applies only to the common-or-garden varieties of slate, forming the large bulk of Welsh slate production, and does not apply to "rustic", "architectural" or green slates which form a high proportion of English slate production. English slates are much more expensive than Welsh slates, but the demand for them was increasing in the inter-war period. English slate output increased from 28,507 tons in 1927 to 37,934 tons in 1937, whereas the output of Merioneth fell contemporaneously from 76,357 tons to 55,932 tons. (See Table II, page 9.)

B. Comparative Costs.

Prior to the Four Years War it was cheaper to use slates than tiles for roofing, but the reverse was the case during the inter-war period. In 1913 in London it cost 42/- to roof a hundred square feet with tiles, and 38/- with slates. In 1939 it cost 56/- with tiles and 80/- with slates; in 1942 it cost 111/- with slates and 85/9 with tiles. Cement tiles are cheaper again by a considerable margin.

The industry has to face up to the fact that slate can never again compete on a price basis with substitutes such as clay, cement or asbestos tiles.

Costs of production are tending to increase in the industry. Practically all the mines and quarries in operation have been worked for more than a century. The Penrhyn Quarries have been worked on a large scale since 1782, the Dinorwic Quarries since 1788. The quarries have already

yielded up their more productive and accessible slate. The proportion of rubble is tending to increase. *Per capita* output in the slate mines is falling because of a variety of reasons, but has been well maintained in the open quarries. The nature of the industry's product does not admit of mass-production by machinery. Wages costs amount to some 75% of total costs of production, so that no substantial reduction in costs is possible without lowering wages, and that is out of the question because wages should be raised and not lowered.

Fabricated roofing materials of clay, cement, asbestos, etc., can be produced by mechanised processes, and costs of production tend to fall. The increased cost of coal is a much greater handicap to these industries than to the slate industry, but, despite this fact, the margin between the comparative costs of slate and other roofing materials is more likely to widen rather than grow smaller.

C. Elasticity of Supply.

The elasticity of supply of slate, as has been indicated in Section II, is small, and is lower than that of fabricated roofing materials. The slate industry is not able to benefit fully from upward swings in demand, particularly since it dare not raise prices very appreciably. Other materials which are in more elastic supply are much better situated to benefit from the big upward swings in demand which occur periodically.

D. Marketing.

We have already noted that it is inevitable that each operating unit should produce two or three qualities of slate, each divided into some thirty different sizes. The

Penrhyn Quarries produce 230 different slates, and its output is composed of quantities of all these different slates. This sub-division of the output of each concern creates very serious marketing problems, especially for the smaller operating units. The industry, as at present organised, has always found it difficult to handle large orders expeditiously, and this difficulty is accentuated during periods of brisk demand because of the inelasticity of supply. Customers of the industry have frequently very great difficulty in placing an extra large order when trade is brisk, and are often forced to accept delivery in a range of sizes and even to split the order up among different concerns.

This inability to cope with large orders constitutes a serious problem as the difficulty of placing such orders acts as a powerful deterrent driving customers from the industry. This difficulty does not normally arise with fabricated products because production is restricted to a narrow range of standardised sizes, and the supply of the product has a greater measure of elasticity.

E. Building Technique.

Whereas before the Four Years War practically all factories, shops, business premises, and public buildings had sloping roofs of slate, it has become increasingly the practice for non-residential buildings to have flat roofs or else sloping roofs of some lighter material than slate.

During the inter-war years there was a big increase in the construction of blocks of flats, and this tendency will continue in the future. Following the late War we are witnessing the introduction of house-building by non-traditional methods, and it is quite certain that the number of perma-

nent houses built in this way will increase fairly rapidly and will affect the demand for roofing slate.

F. Imports and Export Trade in Slate.

The largest quantity of slate imported after the end of the Four Years War was 51,390 tons in 1926. There was a marked decline in imports during the 'thirties, and they fell to 25,660 tons in 1937. The source of slate imports in 1937 is shown in Table X.

TABLE X

SLATE IMPORTS IN 1937.

Country of Origin.	*Tons.*	*Value.*
		£
Norway	10,149 ...	39,055
France	6,757 ...	43,407
Portugal	5,357 ...	23,073
Belgium	1,952 ...	10,641
Eire	1,190 ...	4,889
Germany	119 ...	503
Finland	99 ...	490
United States ...	41 ...	172
Italy	6 ...	22
Total ...	25,670 ...	£122,252

Comparative prices are the decisive factor in the competition between home and foreign slates, and it is noteworthy that since 1923 the average price per ton (including cost of transport to this country) of imported slate has been substantially lower than the average price per ton of home-produced slates on the quarry bank. The competition of foreign slate was especially keen in districts far away from the producing areas, as railway rates are very high as compared with water transport. That this factor is important is indicated by the fact that of the total of 25,670 tons im-

ported in 1937, only 210 slates were imported into Wales; furthermore, pratically all the Norwegian slates imported went to Newcastle, Leith and Grangemouth, whereas Grimsby, Harwich, Plymouth, Portsmouth and Southampton were the main ports for French and Belgian slates.

The most important development in the import trade during the decade preceding the outbroak of War was the almost uninterrupted growth in the import trade from Norway, rising from 83 tons in 1923 to 10,149 tons in 1937.

Most varieties of foreign slates are inferior in quality to the home product, and there are many instances of foreign slates decomposing in the acid-laden atmosphere of our industrial cities, the roofs having to be stripped and replaced by Welsh slates.

Prior to the Four Years War there was a big export trade, the Festiniog slate mines playing a leading role in this trade. Germany was the most important market, but this market was never recaptured after the termination of hostilities. The export trade has sunk to a very low ebb since 1925, when 13,864 tons were exported, of which 9.490 tons went to Eire (which was part of the domestic market up to 1921). Exports in 1937 amounted to 4,566 tons, of which 2,202 tons went to Eire. The fall in exports after 1925 was therefore attributable to a contraction in the Irish market, due to subsidisation of the Irish industry and the imposition in 1934 of a heavy tariff against imported slates. Practically all the slate exported from this country comes from North Wales.

G. Slate Goods.

According to the Census of Production Reports, the total value of slate goods (mantels, chimney-pieces, writing

slates, etc.) was £219,000 in 1924 and £172,000 in 1935. In the latter year the total value of slate production (excluding rough undressed slate) was £1,730,975, so that the production of slate goods is very insignificant.

To sum up: The prospects of the slate industry after the next five or six years are extremely bad, particularly so if the traditional policy of drift is allowed to continue.

4—TERMS OF REFERENCE FOR A DEVELOPMENT COMMITTEE OR A WORKING PARTY.

The following scheme does not claim to cover exhaustively all the matters that would properly fall within the terms of reference of the proposed Development Committee or Working Party, and is meant only as an outline of the main topics that need investigation. The author of the present Memorandum has decided views on many of these points, but believes that no useful purpose would be served at this stage by entering into detailed proposals for the reorganisation of the industry.

(i) Marketing.

(a) Merits and de-merits of pre-war marketing arrangements. Advantages, if any, of alternative marketing schemes, e.g. Welsh Slate Marketing Board, District Marketing Boards, Central Order Department, mutual assistance schemes for meeting large orders, etc. Advisability of forming joint depots in different parts of the country to facilitate distribution, etc.

(b) Machinery for unified price policy and effective control of prices to eliminate cut-throat competition.

(c) Standardisation of the product and adoption of uniform nomenclature.

(d) To consider desirability and practicability of producing "randoms" (as well as "sized" slates for the repair market).

(ii) Advertising.

(a) Merits and demerits of individual and collective advertising. Estimate of budgetary requirements for centralised advertising and consideration of most effective advertising channels.

(b) Provision of exhibits, etc., for Schools of Architecture, Housing Exhibitions, Town Planning Exhibitions, etc.

Production of literature, technical and popular, indicating range of natural colours available and the beauty of the product.

(iii) Research.

Consideration of need for collective research and the most effective way of prosecuting the research. To consider cost of this work.

(a) Consumer research in relation to marketing and advertising.

(b) Engineering research—mainly the adaptation of mechanical contrivances to the special requirements of the industry.

(c) Utilisation of slate waste. Possibility of starting small industries in the slate areas using slate dust or slate waste as raw material.

(d) Research on the tinting of natural slate.

(iv) Labour Problems.

(a) Consideration of labour shortage.

(b) Improvement of conditions of work.

(c) Apprenticeship schemes. Technical Education. Methods of Promotion.

(d) Wages and the Wage-system.

(v) Methods of Production.

(a) Appointment of Production Consultant.

(b) Increased mechanisation of the industry.

(c) Consideration of ways and means to improve efficiency and reduce costs.

(vi) Transport.

Consideration of the problem of transport to market in light of proposed nationalisation of railways and long-distance road haulage.

Most of the above matters cannot be dealt with satisfactorily by the individual productive units. Neither are they likely to receive more than the most cursory attention from the Employers' Association. Hence the need for either a Development Committee or a Working Party for the industry.

APPENDIX I

TABLE I

LIST OF CONCERNS WORKING OPEN QUARRIES IN NORTH WALES, TOGETHER WITH NUMBER EMPLOYED BY EACH CONCERN.

Name of Concern.	*Quarry or Quarries.*	*Number Employed.*
Caernarvonshire Crown Slate Quarries Co., [Ltd.	Alexandra	
" " "	Cilgwyn	
" " "	Crown New	
" " "	Moeltryfan ...	185
Dorothea Slate Quarry Co., Ltd. ...	Dorothea	
" " "	Gallt-y-Fedw	
" " "	Penybryn	
" " "	South Dorothea ...	359
Gloddfa-Coed Slate Quarry Co.	Gloddfa-Coed ...	10
W. R. Morris & Co.	Tan'Rallt ...	11
Pen-yr-Orsedd Slate Quarry Co., Ltd. ...	Pen-yr-Orsedd ...	351
Tynyweirglodd Quarry Co.	Tynyweirglodd ...	39
Vronlog Green Slate Quarries, Ltd. ...	Vronlog ...	36
O. J. Hughes & Sons	Vron	7
Garmon Vale Slate Quarries, Ltd. ...	Garmon Vale ...	9
T. Owen	Upper Glynrhonwy...	2
Gallt-y-Llan Slate Quarry Co., Ltd. ...	Gallt-y-Llan ...	3
Sir M. Duff Assheton-Smith, Bart. ...	Dinorwic ...	2,369
Lord Penrhyn	Penrhyn ...	1,916
Rhos Slate Quarry Co. (Capel Curig) Ltd. ...	Rhos	52
	NORTH WALES OPEN QUARRIES ...	5,349

TABLE II

LIST OF CONCERNS WORKING SLATE MINES IN NORTH WALES IN 1937, TOGETHER WITH NUMBER EMPLOYED BY EACH CONCERN.

Name of Concern.	*Mine or Mines.*	*Number Employed.*
Abergynolwyn Slate & Slab Co., Ltd. ...	Bryneglwys	
" " "	Cantrybedd ...	58
Aberllefenni Slate & Slab Co.	Talyllyn ...	131
Bowley's Quarries, Ltd.	Gartheiniog ...	26
Braichgoch Slate & Slab Quarries, Ltd. ...	Abercorris	
" " "	Braichgoch ...	101
Craig-ddu Slate Quarries Co., Ltd. ...	Craigddu ...	95
J. W. Greaves & Sons, Ltd.	Llechwedd ...	438
Maen Offeren Slate Quarries Co. Ltd. ...	Maen Offeren	
" " "	Rhiwbach ...	429
Manod Slate Quarries, Ltd.	Manod	65
Moelferna & Deeside Slate & Slab Co., Ltd.	Moelferna ...	98
Oakeley Slate Quarries Co., Ltd. ...	Diphwys	
" " "	Oakeley	765
Ratgoed Quarries, Ltd.	Ratgoed ...	15
Votty & Bowydd Quarries Co., Ltd. ...	Votty & Bowydd ...	314
Wrysgan Co., Ltd.	Wrysgan ...	27
T. Glyn Williams & Co.	Hendreddu ...	15
B. B. Bevan	West Llangynog ...	22
Cwm Machno Slate Quarries, Ltd. ...	Cwm Machno ...	123
Cwt-y-Bugail Slate Quarries, Ltd. ...	Bugail	41
Glyn Quarries, Ltd.	Cambrian ...	121
	NORTH WALES SLATE MINES ...	2,884

APPENDIX II

TABLE I

AVERAGE ANNUAL PERCENTAGE UNEMPLOYMENT IN THE SLATE INDUSTRY 1924 TO 1938.

Year.	*Percentage Unemployment.*	*Year.*	*Percentage Unemployment.*
1924	1.5	1932	20.8
1925	2.4	1933	13.8
1926	2.9	1934	8.5
1927	1.9	1935	8.1
1928	4.5	1936	7.1
1929	10.4	1937	6.3
1930	22.1	1938	6.0
1931	27.5		

TABLE II

AVERAGE ANNUAL PERCENTAGE UNEMPLOYMENT AMONG INSURED PERSONS IN THE SLATE PRODUCING AREAS OF NORTH WALES, 1930-1937.

Year.	*Bethesda.*	*Llanberis.*	*Nantlle.*	*Caernarvon.**	*Festiniog.*
1930	35.3	22.1	17.5	28.5	14.3
1931	7.6	20.5	36.6	34.0	23.7
1932	6.4	15.5	31.3	32.3	28.1
1933	7.7	9.4	27.6	32.1	17.3
1934	7.0	5.6	21.8	30.8	13.2
1935	7.2	5.2	26.1	33.3	12.9
1936	6.4	5.4	23.6	27.0	11.4
1937	5.6	5.7	23.1	35.0	9.1

*The "Caernarvon" district includes certain areas contiguous to the Nantlle Valley—areas which were very hard hit by the contraction in the slate industry.

APPENDIX III

Statistics showing some of the Effects of Occupation and its accompanying environment on mortality among slate quarrymen in North Wales.

TABLE I

ANALYSIS OF MORTALITY AMONG CAENARVONSHIRE SLATE QUARRYMEN AGED 20 TO 65 YEARS DURING CERTAIN YEARS.

	Registered deaths in 1930-32.	*Standard deaths.**
Respiratory Tuberculosis	35	13
Bronchitis	3	3
Pneumonia	9	7
Asthma	2	1
Chronic interstitial Pneumonia	1	0
Other respiratory disease	2	0
Influenza	2	3
Cancer	24	15
Heart diseases	31	17
Diseases of digestive system	5	7
Nephritis	8	4
Cerebral vascular lesions	5	6
Suicide	8	3
Accident	13	5
Other causes	17	14
	165	98

*Standard deaths is the number which would have resulted if the 1930-32 death rates for all males in England and Wales had been operative at each age group of the census population.

Slate quarrymen suffer excessively from tuberculosis, respiratory diseases and from diseases of the heart and the circulatory system.

TABLE II

THE DISTRIBUTION BY AGE GROUPS OF THE 135 SLATE QUARRYMEN WHO DIED OF TUBERCULOSIS DURING THE SIX YEARS 1931-32, 1934-37.

Age Groups.	*Number of Deaths.*	*Percentage of Total.*
15—19	6	4.4
20—24	11	8.1
25—29	5	3.7
30—34	6	4.4
35—39	3	2.2
40—44	3	2.2
45—49	6	4.4
50—54	23	17.1
55—59	21	15.7
60—64	28	20.8
65—69	14	10.4
70—74	5	3.7
75—79	1	.7
80—84	3	2.2
TOTAL	135	100.0

The above data illustrates the harmful results of exposure to silica dust if the exposure is long enough.

TABLE III

DIRECT OCCUPATIONAL RISKS IN THE SLATE INDUSTRY IN 1937.

	Mines.	*Quarries.*	*Total.*
Number killed	4	1	5
Number disabled*	365	989	1,354
Number employed	3,142	6,589	9,751

*For more than three days.