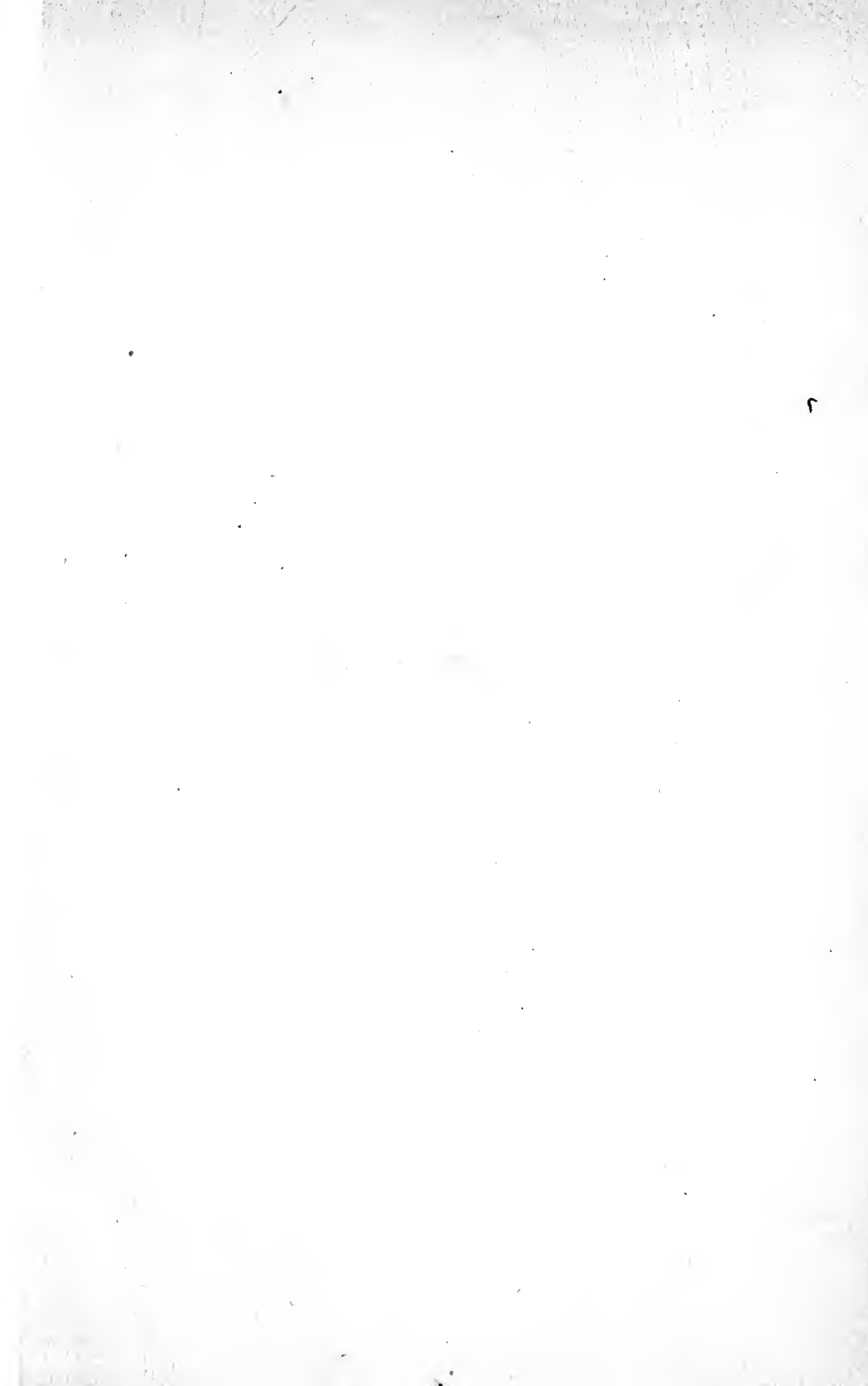


YC 18835

LIBRARY
OF THE
UNIVERSITY OF CALIFORNIA.

Accession 98799 . *Class*



THE
ANTHRACITE COAL INDUSTRY.

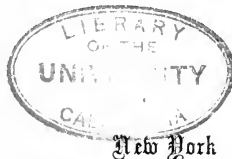
•The M Co. •

THE
ANTHRACITE COAL INDUSTRY

A STUDY OF THE
ECONOMIC CONDITIONS AND RELATIONS OF THE CO-
OPERATIVE FORCES IN THE DEVELOPMENT OF
THE ANTHRACITE COAL INDUSTRY
OF PENNSYLVANIA

BY
PETER ROBERTS, PH.D.

WITH AN INTRODUCTION BY
W. G. SUMNER, LL.D.
PROFESSOR OF POLITICAL AND SOCIAL SCIENCE IN YALE UNIVERSITY.



THE MACMILLAN COMPANY
LONDON: MACMILLAN & CO., LTD.

1901

TN22-0
R6

GENERAL

COPYRIGHT, 1901, BY
THE MACMILLAN COMPANY

PRESS OF
THE NEW ERA PRINTING COMPANY,
LANCASTER, PA.

TO THE
PRODUCERS OF ANTHRACITE COAL,
EMPLOYERS AND EMPLOYES,
THIS WORK IS
DEDICATED.

PREFACE.

In this work we have undertaken to describe and discuss the economic history and condition of the anthracite coal industry of Pennsylvania. We hope to follow it in the near future with a study of the social and moral conditions prevailing in the same region.

Miners are deeply interested in economic questions and the ideals and doctrines of socialism are to a considerable, and perhaps increasing, extent accepted among them, partly as a result of their observation and experience, and partly through the specious, however fallacious and mischievous, arguments brought to bear on them by agitators. There are in anthracite communities a number of very wealthy men who, a few years ago, were earning a scanty subsistence by cutting coal, while others, as skillful and diligent as themselves, are still in the mines. This great disparity of fortune inclines many to question the justice of the industrial system under which it is produced. Socialism proposes to abolish all these ills of life which are incident to freedom of contract, and usher in a paradise of equal and abundant comfort for all. What wonder that its charm is felt by sympathetic souls—the more so because many leaders of thought, in the press and on the platform, having neither time nor facilities nor inclination to make a careful study of industrial evolution and trace the path along which society has painfully advanced to its present condition, are constantly appealing to their sense of justice, their love of fair play, their class interests and prejudices, and their love of ease, on behalf of an impossible but alluring industrial order which is to be achieved by revolution.

We may acknowledge that at one time we were under the spell of Utopian socialism, but remembering the motto of Goethe, “to look upon all sides of things,” we resolved to study

the intricate and perplexing problems daily raised by coal miners under the guidance of masters whose reputation in Political and Social Science is world-wide. The views to which these studies have led us will be found in the following pages. Yale's motto, "Lux et Veritas" has been our guide in the investigation, and the work is offered to the public on the advice of those in whose judgment we confide.

Our deepest gratitude is due to Professors William Graham Sumner, LL.D., and William Fremont Blackman, Ph.D., of Yale University, for their encouragement, suggestions and corrections.

PETER ROBERTS.

SCRANTON, PA., August, 1901.

INTRODUCTION.

The anthracite coal industry ranks as one of the most important in the United States, not so much on account of its magnitude as on account of its peculiar position in our industrial system, and the great number of social and economic questions which cluster around it. It is a limited natural monopoly. It is an extractive industry, the stock of which is exhausted as it is exploited. All the facts which can be learned about it are, therefore, as interesting to the investor as to the economist and geologist. The amount of supply, and the length of time before it will be exhausted, are matters of public welfare. Economizing of the supply and improvement of the methods of working, therefore, interest us all. The policy of management of the industry has turned upon a series of most interesting and important changes in labor supply, modes of transportation, aggregation of capital, and legislation. Therefore we have here a most instructive history for the statesman and man of affairs. The industry has also been the arena of many experiments in labor organization, and of many industrial wars over wages, hours, rules, methods, etc. It brings into coöperation a variety of interests, mining, transportation, banking, and the subdivision of interests is such that the industry, as a whole, is a cluster of interests which it is no easy matter to bring into harmony. The miners form a community which is to a certain extent isolated and peculiar. It is not easily acted upon by currents of thought which are strong in the rest of the State, and it is, at the same time, open to agitation and internal commotion and strife, or to temporary fits of feeling and irregular notions. Hence arise peculiar and important social phenomena in mining towns where laborers of different nationalities are assembled. The position of women and children, the relations of marriage and the family, the con-

dition of churches and schools, all tend to become anomalous, and strange or hostile to our civilization.

The author of this book has had exceptional opportunities of experience and observation which enlist his interest in the subject in the most peculiar manner. He has brought great zeal and industry to the study of it, and he has had a very intelligent understanding of the points most worthy of attention. I have felt that I obtained from the book a great deal of trustworthy information, on various lines such as those above mentioned, which was to me of great importance and value. For this reason I have urged that it should be published.

W. G. SUMNER.

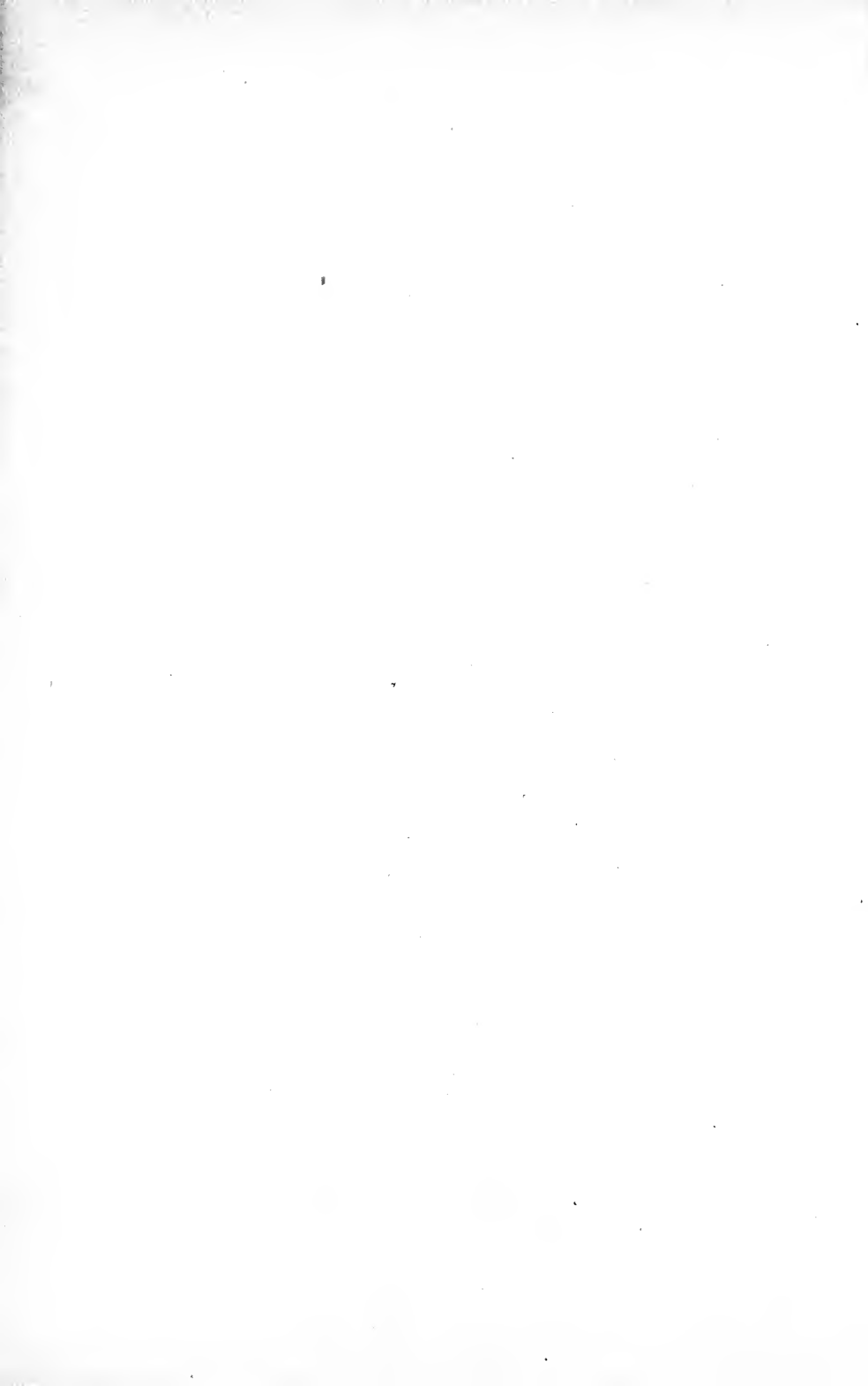
CONTENTS.

CHAPTER I. THE ANTHRACITE COAL DEPOSITS.....	3-16
1. The Nature of Anthracite Coal	3
—2. The Area of the Anthracite Coal Fields.....	5
3. The Veins of Coal and their Depth.....	9
4. The Total Amount Mined and yet to be Mined.....	11
5. The Influence of the Geological Structure of the Coal Fields upon Industrial Conditions.....	12
CHAPTER II. DEVELOPING THE COAL BEDS.....	17-34
1. The Early Days of Mining	18
2. Methods of Mining	20
a. Surface Mining.....	20
b. Slope Mining.....	22
c. Shaft Mining.....	23
3. Cost of Maintaining the Openings Made	28
4. Increase of Money and Muscle; Decrease of Profits and Wages	30
CHAPTER III. CAPITALIZATION.....	35-60
1. Capital's Transforming Power	35
2. Appreciation of Coal Land	36
3. Estimate of Capital Goods.....	42
4. The Cost of Production	45
5. Distribution of the Productive Wealth	56
CHAPTER IV. TRANSPORTATION.....	61-82
1. Early Means of Transportation	62
2. The Development of the Railroads	65
3. Attempts at Regulating Production.....	69
—4. Transportation Rates and Profits	74
5. The Claims of Community of Interests.....	77
CHAPTER V. MINE MANAGEMENT AND INSPECTION.....	83-101
1. The Need of Discipline	84
2. The Duties of Inside Foremen	88
3. The Duties of Miners	91
4. The Duties of Outside Foremen.....	93
5. Legislative Interference	95

CHAPTER VI. EMPLOYES AND WAGES	102-128
1. Personnel of the Employes.....	103
X 2. Historical Sketch of Wages.....	108
X 3. Present Day Wages.....	111
X 4. Variation in Wages.....	114
5. Cutting Down Allowances.....	116
X 6. Factors Affecting the Nominal Wage.....	117
7. Suggestions.....	122
 CHAPTER VII. INCIDENTAL PROFITS OF OPERATORS.....	129-151
1. Houses Rented.....	130
2. The Amount of Powder Sold.....	133
3. The Kind and Number of Company Stores.....	136
4. Volume of Business and Profits.....	139
5. The Good and Bad of Company Stores.....	145
 CHAPTER VIII. ACCIDENTS.....	152-170.
1. Psychological Effects of Accidents.....	153
2. Classification of Accidents.....	157
3. The Number of Widows and Orphans.....	164
4. The Injured Classified in Age Groups.....	166
5. Economic Loss.....	168
 CHAPTER IX. STRIKES	171-191
1. History of Strikes.....	172 ✓
2. The Strike of Last Fall.....	183
3. Estimated Cost of Strikes.....	186
4. The Effects of Strikes.....	188 ✓
 CHAPTER X. UNIONISM.....	192-211
1. The United Mine Workers' Organization.....	193 ✓
2. The Organizer.....	197
3. The Effects of Unionism.....	203 ✓
4. The Limits of Unionism.....	207
 CHAPTER XI. RECLAIMING THE WASTE	212-227
1. Causes of Waste.....	213
2. Improved Methods of Economy.....	216
3. Flushing the Mines.....	219
4. Overhauling the Culm Heaps.....	222
 CHAPTER XII. REFLECTIONS.....	228-257
1. The Capitalistic System.....	229
2. Facts which Labor Ought to Know.....	234
3. Possible Improvements by the Syndicate.....	244
4. The Conditions of Peace and Prosperity to Capital.....	249

MAPS, CHARTS, ETC.

	PAGE.
Map of Northern Coal Field.....	5
Map of Middle and Southern Coal Fields.....	7
Drawing of Sections of Borings.....	9
Chart Showing Amount of Coal Mined, etc.....	11
Drawing Showing Difference in Coal Beds.....	16
“ “ Outcrops.....	20
“ “ Slope in Coal.....	22
“ “ Timbering.....	25
Sketch Showing Development of Seam by Shaft Mining.....	26
Chart Showing Proportion of Distribution.....	56
“ “ Syndicate Control.....	66
“ “ Price of Coal and Production.....	75
Facsimile of Mining Map.....	85
Chart Showing Increase of Employes, etc.....	106
“ “ Wages and Price of Coal.....	110
“ “ Dockage.....	119
“ “ Number of Days Worked.....	121
“ “ Amount of Powder Used.....	136
“ “ Number of Company Stores.....	138
“ “ Number of Killed and Injured.....	159
“ “ Causes of Accidents, etc.....	161
“ “ Age-Group of Killed.....	166





THE ANTHRACITE COAL INDUSTRY.

In the counties of Lackawanna, Luzerne, Schuylkill, Carbon, Northumberland, Dauphin, Columbia and Sullivan coal is king. It is the basis of the economic life of the major part of the inhabitants of these counties. Without it, the 140,000 employes now earning their daily bread in these coal fields would have to eke out their living in some other industry; the large army of employes engaged in transporting the coal to market would be otherwise employed; the flourishing towns and villages now teeming with life, containing many happy homes and thriving commercial enterprises, would be deserted; and the railroads which thread their way over these rich beds of anthracite and depend upon their contents for the major part of their business, would become little better than valueless. It was the discovery of coal which changed the complexion of these regions. When the coal beds shall have been exhausted, the greater part of the 1700 square miles of territory occupied by them, will be a "howling wilderness." The agricultural and fishing industries of the beautiful Wyoming valley, which thrived in the first quarter of the last century, were supplanted by the mining industry. The commercial value of coal was greater than that of wheat or shad, and the hope of large and quick returns by mining coal made of the quiet farmers fervid and keen speculators. As the coal fields were developed, the population increased, and instead of exporting agricultural produce, they imported it. Capital flowed freely into the industry. Men bought farms, not for agricultural purposes, but for the rich coal deposits which they contained.

Railroads were built, coal exported, a large population found subsistence in and around the mines, and what had been for the greater part of the first half of the nineteenth century a quiet agricultural community, became in the latter half, a great industrial center, furnishing employment to more men and producing greater wealth, than any other industry in the state save agriculture. In the progress of the industry, many have made and many have lost, fortunes. Thousands of working men have by mining coal been able to build comfortable homes and raise happy families, while others have wasted their earnings in folly and transmitted to their offspring an inheritance of thriftlessness and wretchedness.

The object of the present work is to trace the history, development and present conditions of these anthracite coal industry.

In this volume we treat the subject from the economic standpoint, relative to the deposits of coal, the method of working them, the cost in money and muscle, the wages and profits of the men engaged in the industry, the friction between capital and labor, etc. The second volume, which we hope to finish in the near future, will have to do mainly with limited areas in these coal fields, and will be a study of the population of these areas in their component parts, the standard of living of the various people inhabiting these localities, the social forces in operation working for disintegration or conservation, etc.

The aim of the work is, to give a true picture of this imported industry which secures a livelihood to about 500,000 persons, to learn what are the conditions under which they live, and if reforms are needed, to intelligently and wisely suggest means to that end. The study is not exhaustive by any means. No one man could exhaust so vast a subject.

CHAPTER I.

THE ANTHRACITE DEPOSITS.

1. THE NATURE OF ANTHRACITE. 2. THE AREA OF THE ANTHRACITE FIELDS. 3. THE VEINS OF COAL AND THEIR DEPTH. 4. THE TOTAL AMOUNT MINED AND YET TO BE MINED. 5. THE INFLUENCE OF THE GEOLOGICAL STRUCTURE OF THE COAL FIELDS UPON INDUSTRIAL CONDITIONS.
-

THE NATURE OF ANTHRACITE.

In the Eastern and Middle States, and as far west as Chicago, few coal agents can be found who do not traffic in anthracite.

The millions who live in these states know the commodity, and owe much of their comfort in life to its inherent power. It is easily distinguished from all other kinds of coal. Take a piece and examine it, and its characteristics are so pronounced that they never need to be mistaken. It has a rich black color of almost metallic lustre, which is the reason it has been called "black coal"; it is hard and, if let fall on the pavement, has a clear ring; this is why it has been called "stone coal." Throw it into the fire, it will not burn readily, but when it ignites, a small blue flame arises giving off very little smoke; in the process of combustion, the small flame disappears, the coal retains its form, and as it burns, produces an intensely hot fire.

These qualities have made anthracite coal the favorite domestic fuel. This has reacted upon the operators of anthracite coal mines, so that in the last decade the tendency is to prepare only those sizes which supply domestic consumption.

Fifteen years ago 20 per cent. of the production of some mines went to the market as lump coal, now hardly 3 per cent.

goes in that form. The demand for domestic purposes has steadily increased, and if the present tendency continues, the production of the anthracite coal mines will be wholly consumed in the homes of the people.

The nature of all anthracite is not uniform. It differs slightly, which is due to the proportion in which its component parts enter into combination. The above description is of hard dry anthracite. There is a kind known as semi-anthracite or soft anthracite. This is found in the Shamokin and Wyoming districts. It is softer, and not as lustrous as the harder coal. When it is thrown on the fire, it burns with a yellow flame resembling that of bituminous coal, but soon this ceases and the anthracite character comes to the ascendency. The difference lies chiefly in the amount of carbon in the coal, which is less in the softer kind and thus reduces its commercial value as a fuel. The following two tables are given by Dr. Chance, State Geologist of Pennsylvania, for the respective coals:

	HARD DRY ANTHRACITE.	SEMI-ANTHRACITE.
Carbon from.....	91 per cent. to 98 per cent.	85 per cent. to 90 per cent.
Hydrogen from..	0 per cent. to 3 per cent.	Principally in combination.
Water from.....	$\frac{1}{2}$ per cent. to $2\frac{1}{2}$ per cent.	$1\frac{1}{2}$ per cent. to 3 per cent.
Ashes from.....	1 per cent. to ?	3 per cent. to ?
Oxygen, Nitro- gen, Hydro- carbons, etc...	0 per cent. to 3 per cent.	5 per cent. to 10 per cent.

Thus we have in all kinds of anthracite from 85 per cent. to 98 per cent. of carbon, from 8 per cent. to 1 per cent. of volatile matter, and from 7 per cent. to 1 per cent. of ashes. Many consumers of anthracite know their favorite kind by the hue of the ashes and so call it "red ash," "white ash," etc. Nevertheless, the quality of the coal does not depend on the hue of the ash residue, but such is the fastidiousness of the consumer, that a higher price is paid for certain kinds of coal which yield a particular kind of ash than for any other.

The specific gravity of anthracite varies from 1.3 to 1.75; its average weight, if hard and dry, is 2,362 pounds per cubic yard.

THE AREA OF THE ANTHRACITE FIELDS.

The area of the anthracite fields is very limited. Geologists tell us that there were once vast areas of anthracite coal, but that the forces of nature swept away all, save a small fraction of the deposits, to the sea. The present fields are thus only a sample of what nature formed and then removed. Nature was very prodigal and men imitated her when first they opened these veins, by inexcusable and reckless waste in mining and preparing coal. To-day, however, their thrifty sons turn the prodigality of their fathers to their profit. What was thrown to the dump in the early days of mining, is now being overhauled and sent to the market.

The whole area comprised by the coal fields is 1,700 square miles. The coal area, itself, occupies 483 square miles. The total area is divided into three great divisions, known as the Northern, the Middle and the Southern coal fields.

The Northern, which is also called the Wyoming, contains 200 square miles, or 34 per cent. of all the coal contents. This rich deposit is in the form of a crescent (see map), whose convex side is toward the northwest. It is 50 miles long and varies in width from $5\frac{1}{2}$ miles down to diminishing points where the coal seams end.

The extreme northern point of the crescent lies in Susquehanna county, and forms the economic basis of the thriving town Forest City, which is the only mining community in that county. The remainder of the basin lies in Lackawanna and Luzerne counties. At its northern point in Lackawanna county, it is two miles wide and contains 307 feet of coal measures. At Carbondale, it is more than two miles wide, and contains 282 feet of coal measures, with 13 feet of coal.

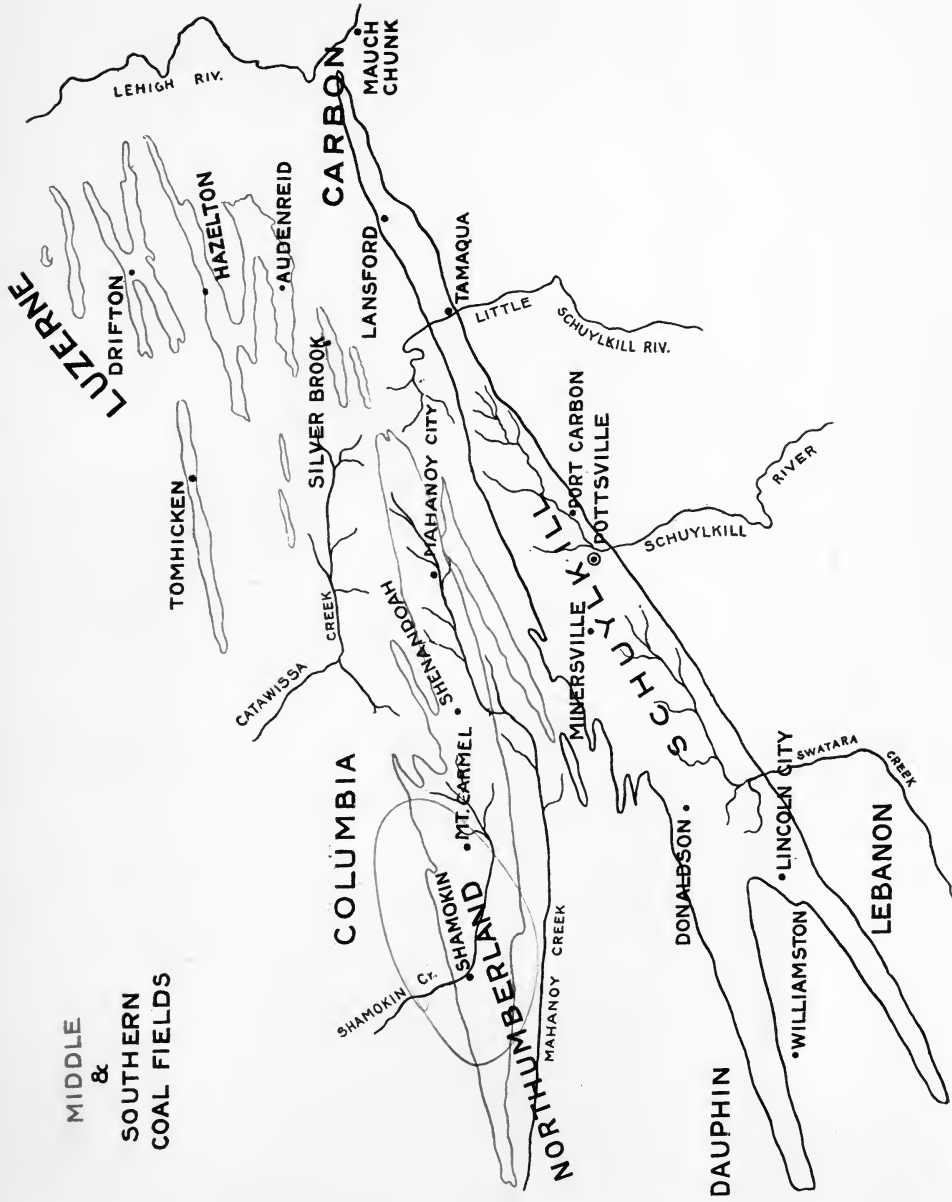
At Scranton, it is four miles wide, and contains 633 feet of coal measures, with 67 feet of coal. From this point south, it narrows down to three miles, and then widens again, so that at Pittston we have four miles breadth, 816 feet of coal measures and 85 feet of coal. At Wilkes-Barre, it reaches its widest area and is five and a half miles wide, containing 900 feet of coal measures and 16 beds of workable coal. From here it

narrows down rapidly so that at Nanticoke, six miles south, it is three miles wide, and within another six miles comes to a point at Hartville.

The Middle field contains 130 square miles. This is divided into the Eastern or Upper Lehigh and the Western or the Schuylkill region. In the Eastern section, we have the Beaver Meadow, the Hazelton and the Black Creek basins; these run parallel to each other in a southwesterly direction, and are narrow and in formation resemble a canoe-shaped trough. The Beaver Meadow basin is 15 miles long and from one and a half to half a mile wide. The Hazelton basin is 13 miles long and the Black Creek about six and a half miles long. The Western section contains six basins, divided into two groups of three each. To the south lies the Mahanoy group, extending from Locust Valley to Ashland. To the north lies the Shamokin group, extending from the head of the Catawissa Valley to Treverton. The total length of the basin is 40 miles, and where the two groups overlap each other, it is about four miles wide. These deposits lie chiefly in Luzerne County, but sections also lie in Northumberland, Carbon, Schuylkill and Columbia Counties.

The Southern field covers 140 square miles, and lies in Carbon, Schuylkill and Dauphin Counties. The Eastern extremity forms the Panther Creek basin, which extends from Mt. Pisgah westward to the Little Schuylkill River. The greatest width of the Southern field is at Pottsville, where it is about four miles wide. The whole of this basin is known as the Pottsville basin, and is from end to end 55 miles long. Its southern extremity forms what is known as the "fish tail." The coal field, having traversed in a southwesterly direction for about 33 miles, divides into two portions which go under the name of the "fish tail." The northern portion forms the Bear Creek basin, which is 13 miles long and one and a half miles wide and ending at Wiconisco. The southern part forms the Dauphin County basin, and is 22 miles long but more contracted than the northern portion. In this coal field lie the districts of Lykens Valley, Pottsville, Tamaqua and Panther Creek.





MIDDLE
&
SOUTHERN
COAL FIELDS

These veins of coal have been laid in a bed of conglomerate rock, which forms the flooring of the coal areas. This conglomerate flooring is surrounded by the underlying Mauch Chunk red shale, and from beneath this latter comes up the outcrop of the Pocono sandstone. The mountains enclosing the coal areas are formed by these underlying beds, to which probably we owe the anthracite fields we now possess, for over them they watched while the disruptive forces of nature were at play, tearing, displacing and transporting to the mighty deep, neighboring coal deposits. The mountains sometimes rise to the height of 2,000 feet, and from their peaks a broad landscape view may be had of the largest streams which pass over the coal fields or wind their way through neighboring valleys. The mountains enclosing the coal areas, bear upon their contour traces of conflicts with mighty forces which they could not restrain. These rock-ribbed sentinels have been pierced through here and there, as if unable to withstand the onslaught of accumulating powers from within the enclosed area.

In Sharp Mountain, which encloses the Pottsville basin on the south, the Little Schuylkill, the Schuylkill and the Swatara rivers have broken through in three different places, forming three gaps.

At the rim of the Mahanoy basin, the point of least resistance, the Shamokin and Mahanoy creeks forced their way. Over the middle and southern portion of the Wyoming basin, the majestic Susquehanna runs, and has made itself a gap of ingress and egress in the surrounding hills. Over the northern section of this coal field, flows the Lackawanna River, entering in at the northern extremity and at Pittston joins the Susquehanna. Both streams at this junction are overlooked by Campbell's Ledge, which in solemn majesty bears witness to the rending, tearing and grinding effected by nature's forces leveling elevations composed of softer stuff.

But in these coal fields, it is not only the rocks above which bear traces of the conflicts waged by giant forces; down deep in the coal basins also, there is clear evidence of the same. The veins are twisted, irregular, broken, faulty and sometimes

are thrown back upon themselves, as if the elements at work failed in their effort to break them asunder and in revenge bent them backward.

What singular suggestions there are in these contortions and interruptions. All seem to testify that nature even begrudged this fractional residue of the vast deposits, which once formed part of the Appalachian range.

The basins, for the greater part, are canoe-shaped troughs. The seams dip on either side of the trough to the floor of the basin, and in the Wyoming Valley more than anywhere else in the coal fields, form a horizontal plain. But in the Northern field, the seams are not permitted to pursue their synclinal path without interruption. Complications set in. Here a series of rolls result in curiously curved surfaces that dip at various angles, and sometimes rise to a vertical position. There, as the seam dips, an unexpected interruption sets in, sometimes going in a northerly or southerly direction, or perchance dies away in a sharp, upward turn. In another place the seam is seen folding back on itself, or it may be wholly lost in a well-marked fault, which leaves no trace where you may look for its continuation.

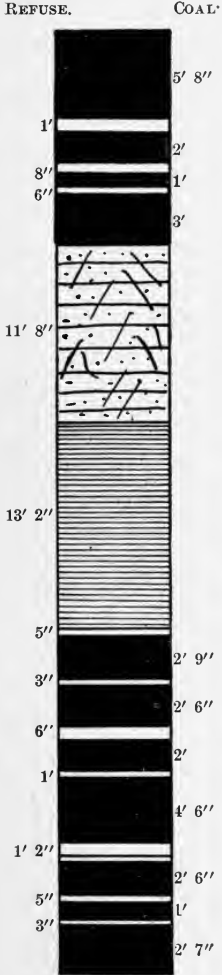
These irregularities are caused by rolls, which are fewer in the smaller basins than in the larger ones. The coal at the rim of these troughs rises to the surface ; from the outcrop to the center it dips at an angle of from 20 to 60 degrees ; as it reaches the center line, it flattens or it may form a series of undulating waves like a petrified sea-surface. When compared with the size of the basin, these waves are mere crumples, but occasionally they reach such magnitude as to divide the main trough into two distinct sub-basins. These irregularities have put to the test the greatest engineering skill of the anthracite coal fields, and the feats performed by some of these engineers are worthy of record.

Another result of these structural peculiarities is, that they have brought into the mining industry a great aleatory element, which has ruined many an operator while carrying others on a wave of success to fortune.

SECTION OF COAL MEASURE
AT OLYPHANT FROM DEL.
& HUD. BORING.

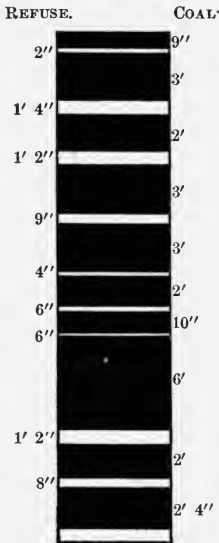
SECTIONS OF MAMMOTH VEIN.

FROM SHENANDOAH
COLLIERY.

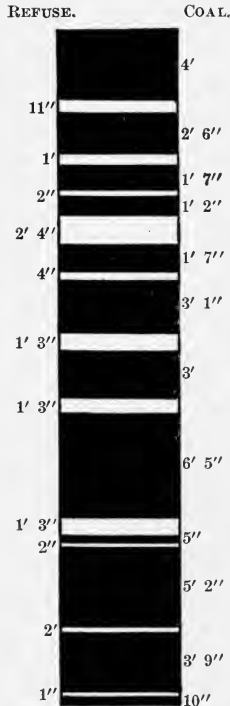


SCALE 1" = 10'

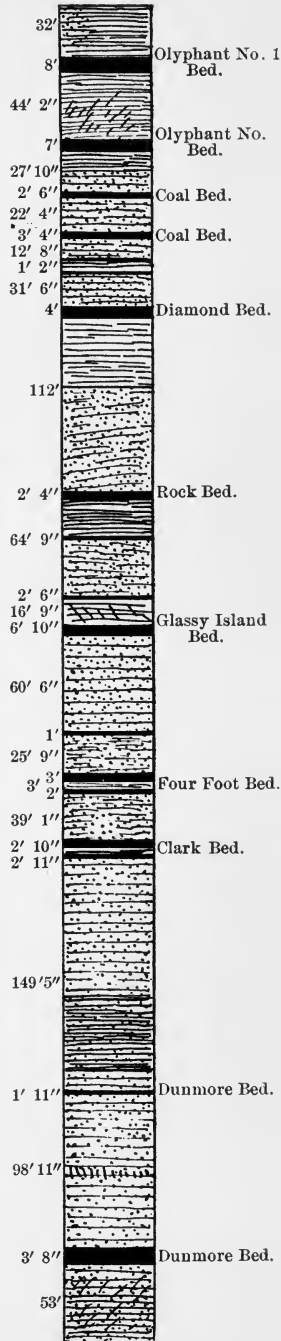
FROM COLORADO
COLLIERY.



FROM PACKER
COLLIERY.



From Dr. Chance: "Coal Mining."



SCALE 100' = 1"



THE VEINS OF COAL AND THEIR DEPTH.

The coal measures, or carboniferous formations, consist of a succession of hard sandstone and black or bluish slate and shales more or less evenly distributed. They are not uniformly laid and are not to be found in the same horizon of the coal measures throughout the anthracite coal fields. As a general rule, however, it may be said, that the upper part of the coal measures consists of softer rocks than the lower sections, although the various rocks may be found at any horizon.

The coal measures vary from 100 feet to 3,300 feet in thickness. With the variety in their thickness, the number and richness of the veins vary. At Tamaqua, the carboniferous formations are 2,300 feet thick and contain 21 coal beds with an aggregate thickness of 126 feet of coal. A short distance from Tamaqua, one bed of the Mammoth vein is 114 feet thick. At Pottsville there are about 3,300 feet of coal measures, with 28 individual beds with an aggregate thickness of 154 feet of coal. In the eastern half of the Western Middle field there are 13 individual beds with 110 feet of coal, and at Shenandoah, the Mammoth vein reaches a thickness of 100 feet. This same vein in Black Creek in the Upper Lehigh region is between 60 and 90 feet thick. In the Northern field in the neighborhood of Scranton, the beds aggregate a thickness of 72 feet, while in the vicinity of Wilkesbarre, there are 13 beds of coal having a total thickness of 94 feet. These estimates of the thickness of the coal are not to be taken as the amount of coal that can be marketed, because they contain impurities such as slate and bony coal.

The veins vary greatly in richness, freedom from faults and lay either favorable or unfavorable to mining operations. Some of them are only a few inches thick, while others are several yards. In some sections, the vein dips at an angle of 80 degrees, while in another part it is horizontal. Irregularities are frequent.

In some places the roof or floor cuts into the bed, forming what the miners call a "horse." In another place, the roof and floor come together forming what is known as a "pinch"

or a "squeeze." Sometimes the vein grows thin and its place is partially or entirely taken up by slate, fire-clay or sandstone. At other places a fault sharply cuts off a coal seam, leaving a clean surface and giving no indication of the probable direction into which the other part has been moved. The miners in some parts find the seam twisted downwards or upwards, or it may end in "crushed coal," which is a soft carbonaceous shale with more or less coal running through the mass, but which is not marketable and goes to the culm dump. When these irregularities are frequent, they entail great loss upon the operators, and great inconvenience upon the miners. The lay of the veins, as well as the richness of the deposits, enters into the calculation when the price of an area of coal land is computed. An acre of coal land in the Wyoming Valley may not contain more marketable coal than an acre in the Southern coal field, but its market value may be double, because of the more favorable lay of the coal beds, which facilitates operations.

The impurities in the strata also make a vast difference in the value of coal land. In some veins bony coal—a commixture of coal and black slate—appears in large proportions and entails much trouble and expense in cleaning. Then bands of slate and sulphur make their appearance, which cause great trouble to the miner, and increase his outlay for supplies, while the operator is affected in finding his production less marketable.

The shafts sunk to work some of these veins vary in depth from 200 to 2,000 feet. The average depth is about 400 feet. Many sections of these veins were above water level, which were operated by individual companies in the early days of anthracite mining. Most of these small concerns exercised little judgment or science. They were eager for coal and produced it at the least possible cost, so that their unscientific and wasteful methods ruined some of the best and thickest layers lying above water level.

The accompanying sketch of borings in Lackawanna and Schuylkill counties shows the various coal strata. The cross

**COAL TO BE MINED
4,832,685,668 TONS**

**COAL MINED
FROM 1820-1899
1,152,706,181 TONS**

PRODUCTION OF 1899



54,034,224 TONS



sections of various parts of the coal fields show the great variety in the geological lay of the strata. A map of the coal fields is also given.

THE TOTAL AMOUNT MINED AND YET TO BE MINED.

The amount of coal in these fields has been computed by various engineers, whose result, taking into consideration the extent of territory and the number and variety of the seams, does not vary greatly. Joseph S. Harris in the *Forum*, Vol. 13, page 193, computed the contents of the fields as 14,453,397,600 cubic yards, and taking a yard as equal to 2,240 lbs., the contents would be that number of tons. The total amount mined up to December, 1891, was 844,019,239 tons, which would mean three times that amount of displacement, or 2,532,000,000 tons. Subtracting this from the above total contents, he estimated that there were 11,921,400,000 tons or 82 per cent. of the original contents to be mined. Since that date 430,832,297 tons have been mined or a displacement of 1,292,497,191 tons, which left at the commencement of this year 10,638,902,809 tons yet to be mined. Mr. Harris expressed the hope that improved methods in mining and more thorough use of the coal, would make available half of the contents of the beds still to be mined or 5,329,451,404 tons. If production rises to 60,000,000 tons annually, he estimated, in 1892, that the supply would last about 100 years.

A. D. W. Smith, in the coal waste commission report, published in May, 1893, estimated the amount of coal yet to be mined and marketed at 6,898,000,000 tons. Since that date 385,832,297 tons have been mined which leaves 6,512,167,703 yet to be mined.

William Griffiths, mining engineer, gave an estimate of the coal yet to be mined in the "Bond Record" for 1896. His calculation gave 5,073,786,000 tons as yet to be mined. Since that date 241,101,082 tons have been mined, leaving 4,832,685,668 yet to be mined. If we estimate the annual production at 60,000,000 tons, the figures given by these gentlemen give us the following forecast of the continuation of these coal fields.

ESTIMATED BY.	TONS YET TO BE MINED.	YEARS DURATION.
Joseph S. Harris.....	5,329,451,404	88.82
A. D. W. Smith.....	6,512,167,703	108.53
Wm. Griffiths.....	4,832,685,668	80.54

The total number of tons mined from 1820–1900, inclusive, is 1,197,706,181. If we take Mr. Griffith's estimate of the tons to be mined, we have about four times as much still in the beds as has been taken out. The accompanying squares show the proportion.

THE INFLUENCE OF THE GEOLOGICAL STRUCTURE OF
THE COAL FIELDS UPON INDUSTRIAL CON-
DITIONS.

The foregoing description of the geological structure of the anthracite coal fields will enable us to answer the question, What effect have these natural facts upon the industrial conditions and relations which arise in the process of developing these coal deposits?

First.—These rich deposits of coal have raised the question as to the moral right of individuals to them. Many men of intelligence believe individual possession is wrong, their convictions and reasoning being as follows :

The coal seams are the free gift of nature to man. It is stored-up wealth, designed by Providence for the good of human society as a whole, and not for the enrichment of the few. Individual ownership is contrary to this design, and must inevitably lead to disorder and injustice. This is clearly seen in the fact that it leads to monopoly. If one man has a right to hold a part of the coal fields as his private possession, he has an equal right to own all of them, and in that case the consumers of anthracite would be wholly dependent on his good will for one of the essentials of our modern civilization.

During the last strike, men lived over rich deposits of coal, and yet they could not touch this free gift of nature which was needed in their homes, except by making themselves amenable to law. The anthracite coal fields are rapidly passing into the hands of a syndicate, and the 140,000 employes of this industry

will be at the mercy of a board of directors sitting in a city far away from the coal fields, who decide the amount of bread they and their families may secure. This condition is, according to the conviction of men favoring collective ownership, wrong, and it logically follows from individual ownership.

The sentiment underlying these ideas is praiseworthy ; it is sympathy with the needs of the many and anxiety to see their condition ameliorated. But generous and sympathetic sentiments are not adequate guides in the adjustment of the relations of life ; we need intellect also, and when the question raised by these men is reduced to a practical test, difficulties arise which gushing sympathetic sentiment never dreamt of.

The Northern coal field was, in the eighteenth century, bought of the Indians for a sum that would not buy a single lot to-day on one of the business sites in the city of Scranton.

Was the transaction right or wrong ? If wrong, then we all must vacate and the redmen be reinstated, a conclusion, we presume, the authors of the above sentiments would repudiate. If right, then the moral and legal validity of business transactions, that is, of contract, is acknowledged, which is the basis of individual ownership.

Take again the present condition of the industry. An estimation of the capital represented in capital goods, railroads, coal lands, etc., would amount to hundreds of millions of dollars ; and all this is property resting exactly on the same basis as the house owned by the miner rests on. The New York Syndicate bought out the anthracite coal interests of the Pennsylvania Coal Company lately, together with some 70 miles of railroad, for the sum of \$30,000,000. The Syndicate has the same right to this property as the miner has to the lot for which he paid \$300.

Suppose we proceed to convert these coal fields from individual ownership to State ownership, how would we proceed ? We would have to re-imburse the men who have put money into this industry, which proposal would be hailed with delight by the major part of them, for they claim the returns they realize on mining operations are very meagre. But the other party to the contract—the State—would be burdened with an indebted-

ness, the interest on which would have to come in part from the taxpayers. That, we would resent, and most assuredly the citizens of Pennsylvania, not engaged in mining, would resent it.

But, further, let us suppose we have got over the two previous difficulties, and the mines are in the hands of the State; we have collective ownership; we must get somebody to control the collieries; to whom shall we delegate that power? We now put our affairs into the hands of town councils, county officers and state officials, and the control of the mines would necessarily fall into the hands of the same. That means, that the politicians would run the mines. The intelligent and thrifty citizens of the anthracite coal fields are far from having enough confidence in the politicians to delegate such power to them. One of the most serious blots on the escutcheon of the Keystone State is the record of some of its brightest sons in political affairs; enlarge the sphere of their operation, and the corruption that has made our State a by-word in the land will increase in greater proportion.

We all agree that individual ownership has its abuses and inflicts wrongs on others, but to commit the basis of livelihood of half a million of people to a class of men who generally seek their own interests, and often betray the interests of the people, is fraught with far greater dangers to the interests of the laboring classes. "So long as the administration is, to any considerable degree, swayed by partisan considerations instead of industrial ones, every extension of government activity to new fields must be regarded with grave apprehension." (Hadley's *Economics*, page 403.)

Second.—Nature, by massing together this treasure house of power into so small a section, and making all possible competition from other regions impossible by denying to them anthracite fuel, can truly be said to have invited monopolistic control of its gift. Men have not been reluctant to act upon the suggestion, and for the last half a century this has been the dream of ambitious coal operators, but up to the present century factional interests, competition and jealousies have defeated every

scheme of that nature. Financiers on the threshold of the new century, still grapple with the problem, and as increased capitalization, and increased cost of production reduce the rate of profits and drive out the individual operators, the dreams of the past seem as if they were about to be realized.

The anthracite coal fields are destined to be controlled by a monopoly. All natural advantages favor centralization of capital, and the fact that anthracite coal land is annually increasing in value, and offers an investment that is yet to last for over a century, is inducement enough to the financial princes of the land to lay hold of this opportunity. Monopolistic control has its good and bad features. Competition has been the ruin of scores of operators in the anthracite coal fields; that source of danger will be eliminated by a syndicate.

Employes, under wise monopolistic control, share in the increased profits of operators, and for this reason, workmen often do not object to a monopoly. If the Miner's Union and the Coal Syndicate can agree in their common interests as against the public, there is no reason why there cannot be a long season of industrial prosperity in the anthracite coal fields. Production will soon reach its maximum. The problem of surplus labor will then be partly solved, for the mines will not be able to produce more than the market demands, a condition which will give all shafts and all employes nearly full time. Self-interest should unite both capital and labor in the anthracite coal fields, and it can be done if practical reason on both sides shall control.

The monopoly, as related to the public, stands in a different light. It must count upon the opposition of public sentiment.

Former attempts at monopolistic control have been met with public indignation and legislative interference. Both the states of New York and Pennsylvania have on several occasions moved against real or imagined monopolistic control. Legal talent may be able to circumvent and defeat attempts to disrupt monopolistic schemes, but if public sentiment does not change from its present temper, an anthracite syndicate may count on antagonistic movements on the part of legislatures.

Third. — The contortions, irregularities, flexures and impurities in the veins of anthracite make it impossible to adjust wages on a uniform basis throughout the anthracite coal fields. Bituminous coal miners meet their employers every year, and a uniform basis is laid down for vast areas of coal fields, and the agreement works satisfactorily to both employer and employe.

This cannot be done in the anthracite coal fields, and the difficulty lies in the geological structure of the coal deposits. Conditions of workings constantly change, and with the changes readjustments of wages must be made. This is left to the judgment of the foreman in charge, whose duty it is to do justice by the workman. Experienced men, who have spent their life-time in the anthracite mines, positively affirm that a standard price for mining in these coal fields will never be practicable. In the case of men working by contract, nothing more than general rules can be laid down. Each shaft has its peculiarities, and never will it be possible to operate these mines without entrusting large powers of discretion, as to the adjustment of prices, to the foreman in charge. The only possible sphere of action for the union is local. Each shaft may have its local assembly, ~~which may~~ by a committee, try to secure its members reasonable remuneration. This is being done, and it is the only extent to which the efforts at adjusting contract prices can go.



CHAPTER II.

DEVELOPING THE COAL BEDS.

1. EARLY DAYS OF MINING.
 2. METHODS OF MINING ; *a.* SURFACE MINING ; *b.* SLOPE MINING ; *c.* SHAFT MINING.
 3. COST OF MAINTAINING THE OPENINGS MADE.
 4. INCREASE OF MONEY AND MUSCLE, DECREASE OF PROFITS AND WAGES.
-

The accompanying section, showing the outcrops of coal beds, makes clear the possibility of taking coal from a seam at a very small cost. In mining, as in all other industries, men first develop that which promises greatest returns for a given amount of exertion. In the earliest days of anthracite mining, operators worked at the outcrops. They were individuals with little capital, and were dependent on quick returns to carry on their operations. Most of them had no machinery ; no hoisting engine ; no pumping apparatus ; all their capital goods consisted in a few cars, some wooden rails, and the few implements needed for mining coal. Besides their own muscle, the mule or horse furnished all the power at their command. Many of these men knew next to nothing of the science of mining. They knew the value of coal ; they possessed some general idea how to open a seam and work it with comparative safety to life and limb ; but in their operations, the effort to get the water out without the necessity of pumping it directed the course of their openings.

These pioneer coal operators worked by tunnel or stripping the richest outcrops, and disregarding both science and the claims of subsequent generations, they ruined many of these valuable beds and left them a source of constant peril to present operators. No maps were kept of their workings, and being abandoned when the cost of production passed the margin of profitable

expenditure by the crude methods of operation then practiced, these old mines filled with water and deadly gases, and are dangerous to the miners of to-day, who, unawares, break into them.

With increased capital, increased skill also was required. As the openings became deeper, machinery was needed to hoist the coal. Scientific methods were adopted, for men would not invest thousands of dollars in opening coal beds, and run the risk of forfeiting all by unscientific methods of operation. A writer in the *North American Review* in the year 1837 (Vol. 42, p. 241) speaks of the methods pursued up to 1836 in anthracite mining. The miners worked the veins by tunneling from water-level upward, but this system was then rapidly being exhausted and resort was being made to sinking shafts. "Experiments are now in train," he says, "for pursuing the veins in the opposite direction, downwards, by sinking shafts below the water-level, and clearing out the water through the agency of steam pumps as in England."

As the mines got deeper, greater capital was needed to develop them. The individual operator was replaced by capital stock companies, and soon the small mining plants were superseded by collieries that would produce five or ten times the quantity of coal. The same writer did not see this tendency, for he speaks of the Schuylkill region as follows: "The Schuylkill region seems to have been marked by nature for individual enterprise, and the State was careful to keep this in view, in the incorporation of the Schuylkill Navigation Company, on whose canal the coal is conveyed to Philadelphia for distribution along the Atlantic." (Vol. 42, p. 248.) This region to-day is in the hands of large corporations, and the Reading Railroad swallowed up the beneficent canal.

The change may be seen by glancing at some of the old statistics. The Schuylkill region is practically in the hands of the Reading Coal & Iron Company at present, but in 1848 there were here 120 operators, working 111 places above and 50 below water-level. In 1847 there were 116 operators. In 1853, we find there 86 operators, who had invested \$2,600,000 in

the Schuylkill region. In 1870, 75 per cent. of all the collieries in this district had passed into the hands of the Reading Railroad. The same process went on elsewhere in these coal fields. The transition was not effected wholly by the increased cost of production—strikes and competition were also at work—but the exhaustion of the seams above water-level, was a prime cause in the superseding of the individual operator by the stock company. The individuals lacked capital to carry on the work, and a once flourishing mining camp fell into decay and desolation, for lack of capital to develop the rich veins of coal buried beneath. Paul de Rosiers has told the story of Silver Creek, and the same may be duplicated in many localities in the Hazelton and Schuylkill regions. A patch of half-ruined houses, a dilapidated school-building, a church structure decaying, yawning chasms whose wide mouths the brush tries to hide; these are the marks of towns that flourished back in the forties and fifties, but were abandoned for the lack of capital to develop the descending seams.

The same process has gone on during the last 30 years. The stock companies followed exactly the same policy as the individual operators did, namely, working the most profitable veins. They did it scientifically, however. But the necessary result is that the richest veins are exhausted, and resort must now be had to poorer ones. The General Mine Inspector of Pennsylvania says in his last (1899) report: "In the last ten years, 1889-1899, a large percentage of the coal has been mined from thin veins varying from two to four feet in thickness" (p. 11, Report Bur. of Mines 1899). In the Middle and Southern fields, the Mammoth vein, that averaged forty feet of coal, is nearly exhausted. In the Northern coal field 80 per cent. of the best veins is worked. This necessitates greater outlay of capital, and, consequently, diminished returns. Coal, in the deeper veins, is not as clean and is harder to dislodge. This means more unfavorable conditions for both operator and miner, and with increased expenditure in money and muscle, distrust and misunderstandings come in, which are occasions of friction between employer and employe.

METHODS OF DEVELOPING COAL BEDS.

There are three methods now in use in mining coal. One is the "stripping" and is seen in its most extensive forms in the Hazelton region. The second is the slope, which may be seen in the Northern field, but is far more frequent in the Middle and Southern, where the coal seams dip more than in the Wyoming coal field. The third is the shaft, which is the prevailing method of mining coal.

STRIPPING MINING. P

This method, as its name implies, consists in stripping off the material overlaying the coal, and then mining it in the full glare of the sun. This method is extensively employed in the Hazelton district, where the visitor can see the hand of man, not leveling the rough places of earth, but rather, scooping out deep trenches, some of them over 100 feet below the surface and from 20 to 50 yards wide. A drive around Yorktown, Audenreid, Honeybrook, and M'Adoo, shows to what extent these excavations have been and are still carried out. Everywhere deep cuttings transforming a naturally rugged and barren mountain to a still more desolate region. The ragged edges of these excavations are sometimes studded with open mouths as dark caverns buried in gloom, over which hang huge rocks: these openings are "breasts" that were worked by miners from the slope or shaft, and abandoned when they came within a few yards of the surface.

The stripping has the right of way: houses, churches, schools, which stand in its path, are removed, so that the complexion of a small town may be wholly changed by these operations in a few years. The coal lies in the form of a canoe, and the stripping follows the same shape. When one considers the extent of these excavating operations, it is surprising that so much débris can be removed and still make the mining of the coal by this method profitable. All operators in the fifth district do more or less of this kind of mining to-day.

The surface is removed by steam shovels, called by the miners, "the American Devil." Some companies operate seven

SECTION SHOWING OVERTURNED OUTCROPS.



SECTION SHOWING UNDERGROUND TUNNELS CONNECTING VEINS.





of these machines. One of them weighs about forty-seven tons : it rests on blocks while in operation, but beneath it are wheels and a track upon which, by the use of jacks, it can be placed, when it is necessary to move it.

Three men operate it : the engineer who swings the crane and hoists the shovel ; the craneman who directs the shovel and empties the contents into the car ; and the fireman. Beside these, there is a force of twenty-five men, who are employed in drilling, driving, dumping, etc. The shovel will make a cut of from eighteen to twenty-five feet wide and about ten feet deep. If the surface contains hard rock, it is blasted by dynamite and powder. This steam shovel will remove from 3,000 to 18,000 cubic yards a month. When this method of mining was introduced by Pardee & Co., in 1874 at Hollywood, it cost from 15 cents to 25 cents a cubic yard to clear the stuff ; to-day it is done for from 13 cents to 25 cents a cubic yard. If rock is removed the cost may rise to 35 cents a cubic yard. This method of mining continued at Hollywood from 1874 to 1899. Operations covered 40 acres, and débris, to the depth of 45 feet, was removed, amounting in all to 2,259,110 cubic yards. In this way 98.32 per cent. of the original contents of coal in the basin was secured.

The advantage of this method of mining is that all the coal can be removed, while in slopes and shafts from 20 to 50 per cent. must be left as pillars. For this reason, land owners lease strippings for lower royalties than they get from slopes and shafts.

The force employed in mining coal in strippings, varies from six to forty-four men. They are all hired by the day. A foreman is in charge, whose duty it is to stand guard on the edge of the cutting, overlooking the force at work, and when blasting takes place, to warn the passers-by. The foreman generally is an Anglo-Saxon, but the force mining is Italian or Hungarian to a man. Common laborers are paid \$1.10 a day, and load six cars for a "shift." The miner gets \$1.50 a day ; he bores the holes and dislodges the coal. All supplies, such as powder, dynamite, squibs, etc., are furnished by the company.

The men in the stripping work nearly full time, so that miners

employed therein, during the year, average more in wages than many English-speaking miners employed in shafts and slopes. In some of these strippings, coal is produced very cheaply. It is estimated that it is mined at 50 per cent. less than by sinking a shaft; but this depends on the amount of débris to be removed.

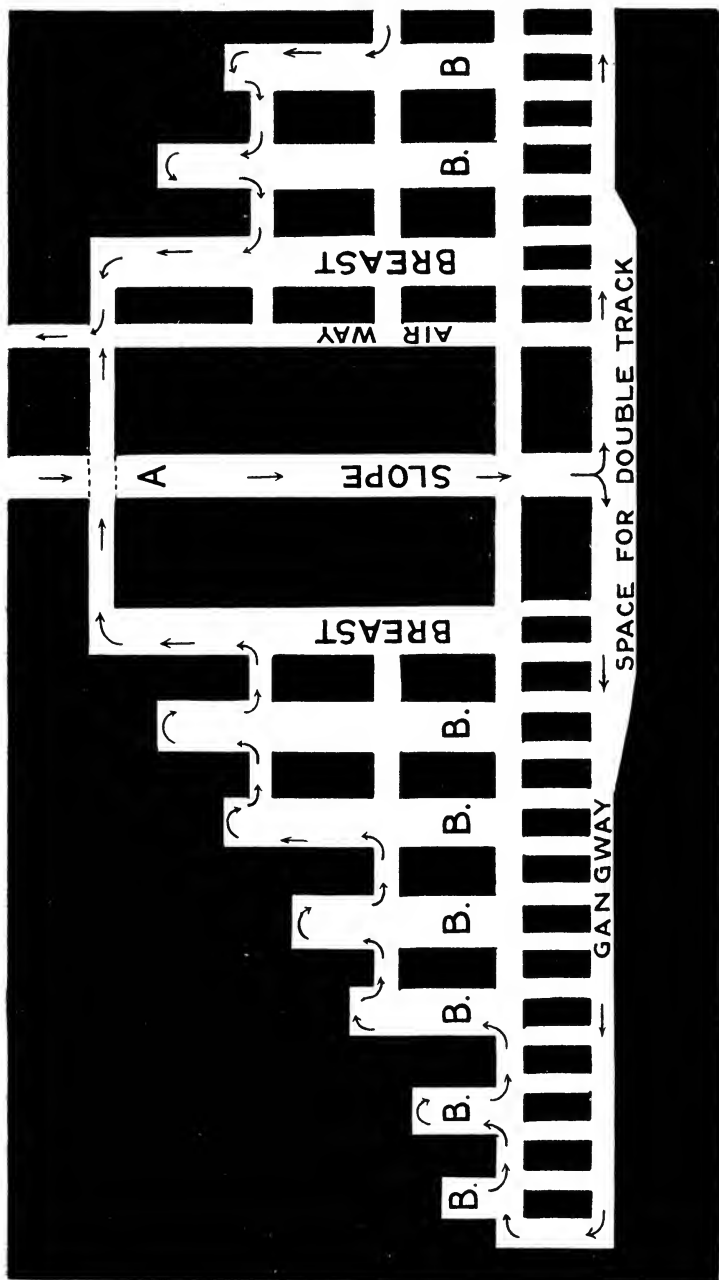
SLOPE MINING.

A slope is an inclined plane driven from the surface down to or through the coal beds. It varies in dimensions. If it is intended for a single track, 12 feet wide by 7 feet high will suffice; if a double track is needed, then it must be about 22 by 7 feet. If sloping carriages must be used, so that the coal will not fall out, then greater height is needed.

As we enter the slope, the timber attracts attention. If the operators are strong capitalists, it is square, of excellent quality and put up by men of high mechanical skill. If they touch or, as the miners say, are put "skin to skin," it proves that the top is liable to run; generally, however, they stand from 6 to 8 feet apart. The size of this timber varies from 15 to 20 inches in diameter, and is calculated to reach a good old age. When the slope passes through hard rock no timber is needed.

The cost of driving a slope depends on its dimensions, the quality of the strata through which it passes, and the amount of timbering needed. These items vary the price from \$25 to \$50 a lineal yard. If the slope follows a coal seam, the coal produced pays for the working; if it passes through soil and strata, operators call it "dead work," which is an item of expenditure without direct returns.

In the Northern coal field the slope generally passes through soil and strata; in the Southern, it often passes through coal. When it passes through strata, as soon as the first workable seam of coal is reached, a gangway or mainroad is driven in it and parallel with that an airway. Both are separated by a pillar of coal from 10 to 12 yards thick, left to support the roof and pierced only at intervals of 12 to 15 yards by "cross-cuts" to secure the circulation of the air. From the gangway chambers or stalls are opened at the most convenient angle, where the miners



SECTION SHOWING A SLOPE, DRIVEN IN COAL, IN SOUTHERN COAL FIELD.

Copied from Dr. Chance.

cut coal. These stalls again are separated by pillars varying in thickness, according to the weight and the character of the overlying strata, and which are also pierced at regular intervals by cross-cuts (see diagram). This development of the seam is called the first lift.

The slope is now carried further down, generally by night shifts, for during the day coal is hoisted over the upper section from the seam that is being developed. Carrying the slope down a second vein is reached. This is developed in the same way as the first and is called the second lift. The slope is again continued in its downward path, until the third seam is reached, which is worked after the same manner as the above. This is the third lift. Ordinarily no more than three lifts are operated in the same slope. No more than 75 men are allowed by law to work in the same lift, nor can the air used in one lift be turned into another; each lift must be supplied with fresh air. The ventilation of these lifts is effected by an inlet and an outlet. If the inlet comes down the slope, a second opening is made at another point, where a fan is attached, which creates a vacuum and so facilitates circulation.

The law requires a fixed quantity of air, not less than 200 cubic feet per minute for each person working in the lift. This is regulated by doors, erected across gangways and other paths of the air current, so that each working is provided with the necessary supply. In order to carry the air to the face of the chambers, new cross-cuts must be driven through the pillar at intervals of about 30 feet; when a new one is driven, the old one is walled up air-tight.

SHAFT MINING.

Seams lying 200 feet or more beneath the surface are generally worked by shafts which vary in depth from 200 to over 2,000 feet. In the Northern coal field they vary from 200 to 1,600 feet. The average depth is about 400 feet.

In deciding the location of a shaft, it is important to know the lay of the coal beds, and for this purpose bore-holes are put down. Cross-sections of the coal measures are thus secured,

the geological structure ascertained, and the shaft located in the most advantageous place. Bore-holes, in the oil regions, have been put down for \$1.00 a foot; the cost is nearly twice as great in the anthracite coal fields. The expense varies, however, with the hardness of the rock and the depth to be reached.

Lewis A. Riley, who has had large experience in this work, estimates the cost per foot as follows :

Labor.....	\$1.15
Diamonds.....	.66
Fuel, Water, Repairs.....	.41
Total.....	<u>\$2.22</u>

The rapidity of the work depends on the nature of the strata.

Sometimes they go down 100 feet in 24 hours, while in very hard rock they will not go over 3 feet in that time. The expense incurred in boring test-holes of this nature may be judged from the fact that between Pittston and Nanticoke over 200 holes were put down up to the year 1888.

The cost of sinking a shaft depends upon its dimensions, the nature of the strata, and the depth to which it must be sunk.

The dimensions depend upon the number of compartments needed.

The older shafts were sunk for two compartments and so were only 10 by 18 feet. In recent years, the shafts sunk are much larger, some amounting to 12 by 53 feet, and divided into six compartments, two for hoisting coal, two kept in reserve, two as an egress for impure air and called the "up-cast," in which are also placed the pump rods, steam pipes, column pipe, etc. If water is hoisted by tanks these run up and down the shaft in a separate compartment.

The compartments are separated by huge beams called buntons.

Over the buntons, separating the section set apart for ventilation, match-boards are nailed all the length of the shaft, and over the boards thick tar-paper is nailed so as to make it airtight. On the sides of the shaft are huge timbers, known as



CHART SHOWING PROPORTION OF MARRIED MEN, SINGLE MEN, AND BOYS KILLED IN 1890-1899.

(See Page 166.)

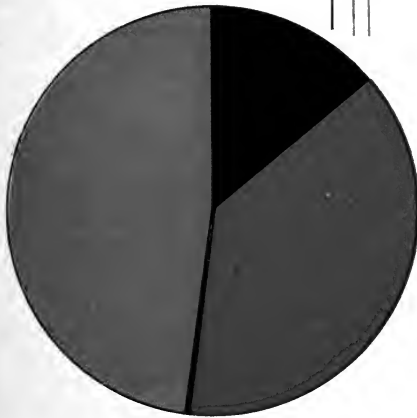


CHART SHOWING PROPORTION OF SCLAVS AND OF ENGLISH-SPEAKING EMPLOYEES KILLED IN 1899.

(See Page 167.)

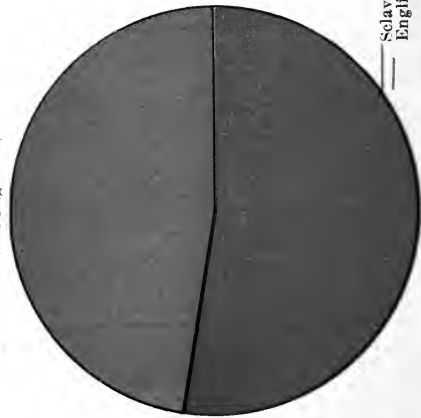
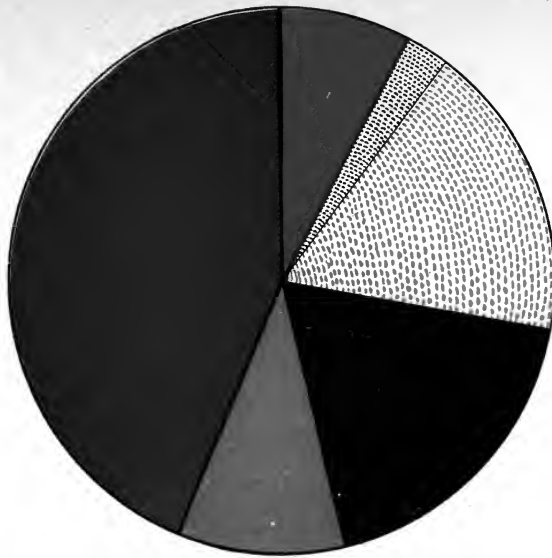
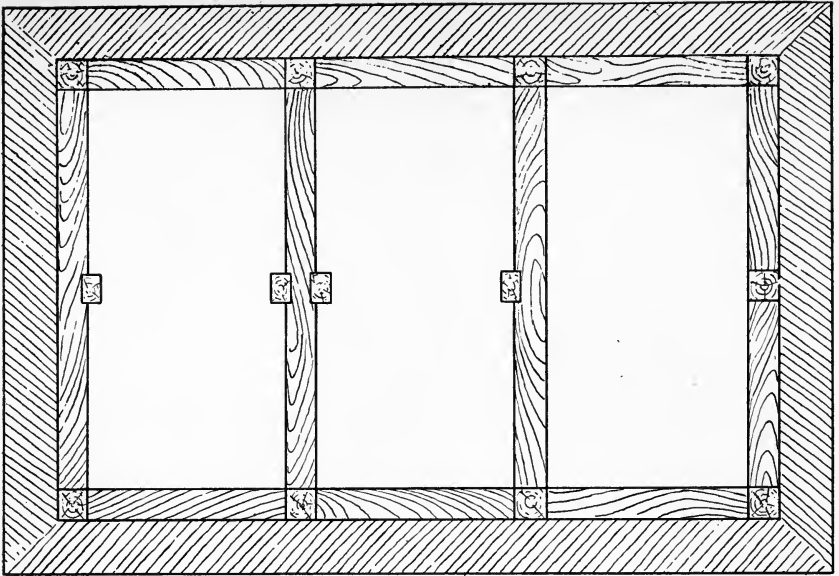


CHART SHOWING PROPORTION OF FATALITIES DUE TO FALLS, CARS AND MACHINERY, GAS, POWDER, FALLING DOWN SHAFT AND MISCELLANEOUS.

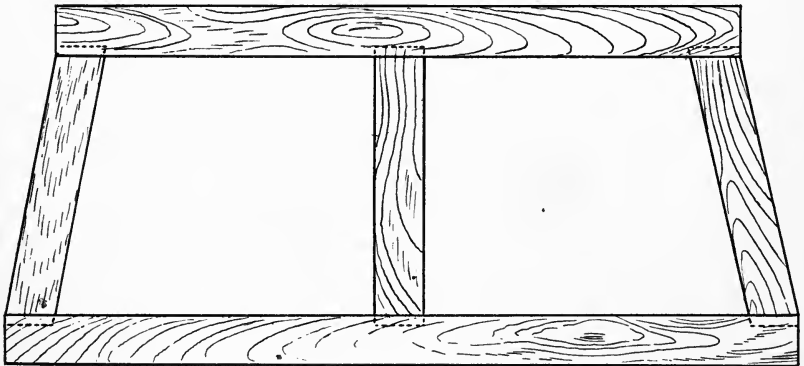


44.39% Falls.
 18.42% Cars and Machinery.
 9.99% Gas.
 8.38% Powder.
 3.52% Falling Down Shaft.
 15.30% Miscellaneous.

100.



GROUND PLAN OF SHAFT TIMBERING.



SLOPE TIMBERING OF SQUARE TIMBER.



“cribbing.” This, in some shafts, descends to a distance of from 20 to 30 feet, to where the rock is hard enough to be self-sustaining. In others, it goes the full depth of the shaft, so as to avoid any accidents from rocks falling from the sides.

This is the case in Lytle's new shaft at Minersville, which is 1,550 feet deep, and divided into five compartments, 7 by 13 feet each. In some of the Wyoming shafts, this cribbing is absolutely necessary to a depth of 150 feet.

Between Nanticoke and Pittston, the old valley of the Susquehanna lies, where clay, gravel and sand in some sections, go down to the depth of 150 feet. This diluvial deposit sometimes takes the form of quicksand, when it requires the greatest engineering skill to go through it. An operator in the Northern coal field struck quicksand in sinking a shaft, and spent \$161,000 before he got the first carload of coal.

In sinking, three shifts, of eight hours each, change each other. The number of men on a shift depends on the dimensions of the shaft and varies from 6 to 18. Holes are generally drilled by an apparatus operated by compressed air, and the progress of the work is from 25 to 35 feet a month. In hard rock, the cost of sinking is from \$5.00 to \$8.00 a cubic yard, for shafts between 600 and 800 feet deep. If the shaft passes beyond that depth, the cost may go up as high as \$10.00 a cubic yard. Shafts 500 feet deep in shale and soft sandstone have been put down for from \$2.00 to \$4.00 a cubic yard. Alternate layers of soft and hard rock are found in the Wyoming Valley, and shafts of ordinary depth can be sunk here for from \$3.50 to \$4.00 a cubic yard.

When the coal is reached, a wide opening is made in the coal seam where four tracks may be laid to give ample room for the handling of the mining cars. This opening is about 300 feet long by 36 feet broad and driven on either side at the foot of the shaft where the cars are put on the hoisting carriage. At the end of this 300 feet the gangway is narrowed to the usual width, and the airway driven parallel with it. The gangway and airway are carried with all possible speed to the second opening, for the law prohibits the working of any

mine until a second way of escape is secured, which will afford the men an egress in case of accident to the main shaft.

When this is done, chambers are opened. The shaft is sunk to various seams, and two or three of these are developed at the same time and coal hoisted from each. Sometimes these seams are developed by slopes or tunnels underground. Around the foot of the shaft, it is necessary to secure perfect safety, and so about 80 square feet of pillar is left untouched on each side of the gangway.

The gangways and airways are driven, in recent years, the same dimensions, which are about 14 feet wide by 7 feet high. In the early years of mining, gangways were generally driven 9 by 7 feet, in order to give the main road the greatest possible safety. But this dimension hardly gave sufficient room to the drivers, and, consequently, a great many of them were injured, while it also interfered with the ventilation when loaded cars were on the road. For these two reasons, the wider dimension has been adopted.

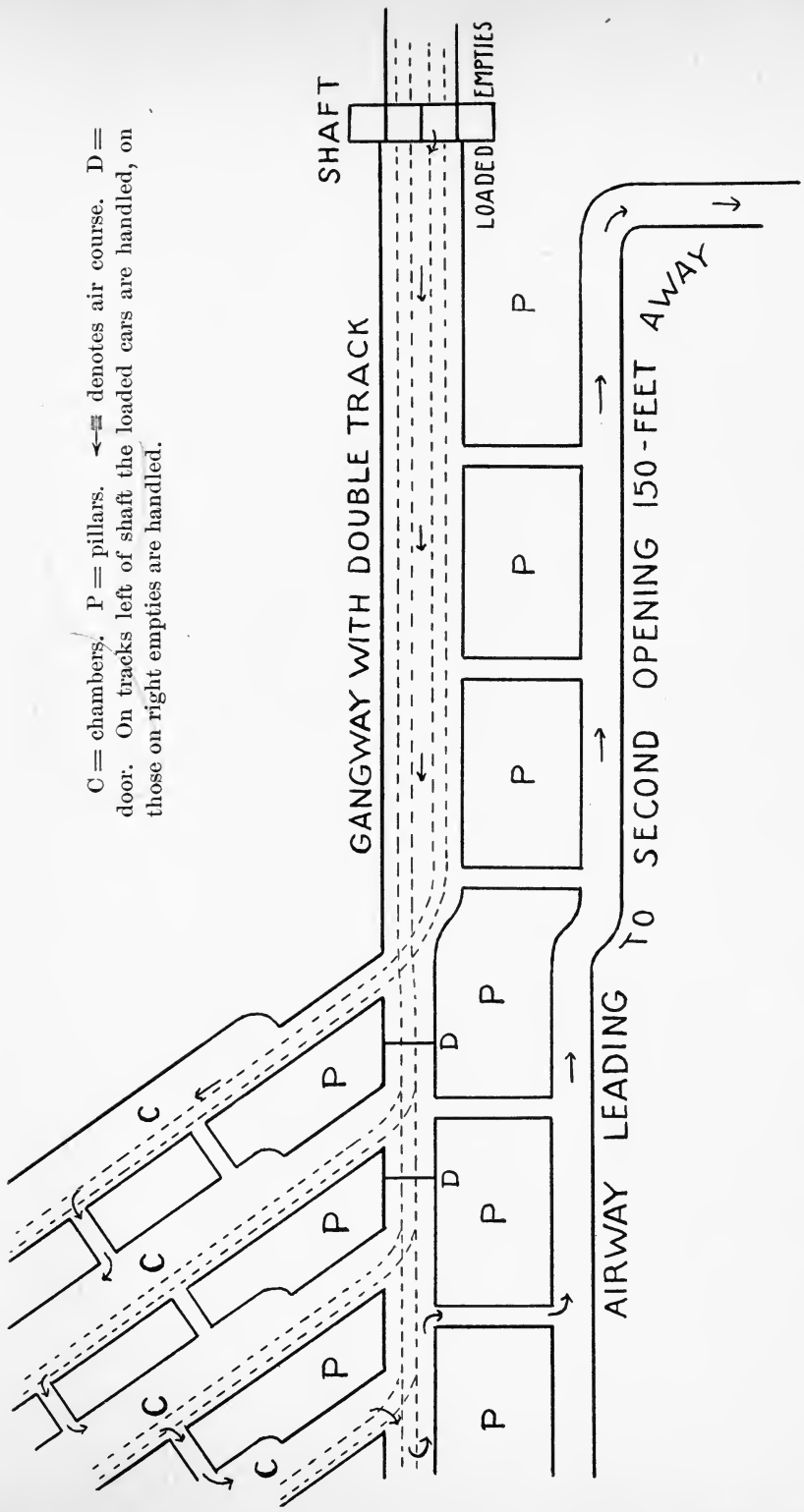
The driving of gangways and airways is called "narrow work," and is done by contract. Various forms of contracts prevail.

Most companies pay so much on the ton of coal, so much per lineal yard of progress in coal, and if rock is blasted, so much per yard on the rock, and when timber must be set up, so much for a set of timber spanning the roadway.

Timbering, when needed, must be well done, and the timber used varies from 14 to 18 inches in diameter when the roof is dangerous. The timbers are placed at about 5 or 6 feet apart. The miner, in gangways, generally has two laborers in the Northern coal field. If the coal is soft and no timbering to be done, he will advance at the rate of four feet in eight hours; if timbering is to be done, it will fall to three. If the coal is hard, without timbering, his progress will not be more than three feet in eight hours, and with timbering, it will hardly reach two and a half feet.

Standard prices have prevailed for narrow work in particular veins, and one of the aims of the Miners' Union is to main-

C = chambers. P = pillars. D = door. ← denotes air course. D = door. On tracks left of shaft the loaded cars are handled, on those on right empties are handled.



SCHEMATIC SKETCH SHOWING DEVELOPMENT OF SEAM BY SHAFT MINING IN WYOMING VALLEY.



tain these prices, which have been lowered in many sections of the anthracite coal fields, by operators asking miners to compete for the work. In fixing prices on narrow work in new seams, the foreman takes a competent miner, puts him to work, computes his expenses in supplies and wages paid the laborers, and then fixes prices so that he will be able to make from \$2.50 to \$3.00 a day.

Let us suppose he advances three feet in eight hours. In hard coal, about seven lbs. of powder are required to the yard; oil, squibs, tools, etc., will cost him another 20 cents a yard, and he pays the laborer \$2.47½ a day; so his expenses would be:

7 lbs. of powder @ \$1.50 for 25 lbs.....	\$.42
Oil, squibs, sharpening, etc.....	.20
Two laborers at \$2.47½ a day	4.95
Total expenses	\$5.57

The foreman adds \$3.00 to this and then fixes the prices to be paid. The working, however, is liable to change, and then a readjustment is necessary. Miners in narrow work make on an average of from \$75.00 to \$100 a month. The operators in the Middle and Southern fields generally pay by the yard. The following prices were the basis prices per yard in coal in the Lehigh district during the years 1875-80.

Year.	District.	Timbered Gangway.	Untimbered Gangway.
1875	Lehigh District	6.12	5.35
1876	“	5.20 to 6.48	4.55 to 5.68
1877	“	4.02 “ 5.20	3.50 “ 4.55
1878	“	4.34 “ 5.50	3.78 “ 4.81
1879	“	4.32 “ 6.12	3.78 “ 5.35
1880	“	5.20 “ 6.12	4.54 “ 5.34

Chambers, called also breasts, rooms, and stalls, are worked by contract. Fixed prices are paid for a car of coal, rock-work and timbering. Out of this the miner purchases the necessary supplies, such as powder, oil, tools, etc., and also pays the wages of his laborer.

In some workings, chambers are opened from the gangway their full width, which is from 20 to 30 feet, according to the

nature of the roof. In other places they are opened 12 feet at the gangway, and carried so for 20 feet, and then widened to their full width. In flat veins and in those pitching up to 30 degrees, the coal is loaded in cars at the face of the chamber. In veins which pitch over 30 degrees, the major part of the coal is left in the chamber, the quantity taken out being such as to give the miner room to carry on his work and build his manway. In chambers where the coal is left, two miners generally work as chums; they are paid from \$3.50 to \$4.50 a yard for working the stall and divide their earnings equally. After the stall is carried to its full length, company hands are put to work to load the coal. When the coal is loaded into wagons at the face of the stall, a miner and a laborer work together. The miner pays the laborer \$2.20 for loading 6 or 7 cars of coal.

The laborer also helps the miner at timbering and rock-work, and gets one-third of what the company pays for this extra labor. The chambers are driven in most flat veins and in those pitching up to 30 degrees, to a distance of 300 feet.

Two men, working on an average of 20 days a month, will drive a chamber that distance in a year in seams about four feet thick. In pitching veins, where the coal is left till the chamber is carried to its full length, the distance to which a stall is driven is about 100 feet. The length to which chambers are carried, as well as their width, depends largely upon the pitch of the vein, the character of the roof, and the nature of the coal. In some of the large veins, the coal "runs," that is, fissures and cleavages are in the seams, so that when a chamber is opened, the coal runs out without being blasted.

In all this, we see the great variety of operations in the anthracite coal fields, which necessitates different methods for different districts.

COST OF MAINTAINING OPENINGS.

When a seam has been opened and the coal is being removed, the expense of keeping the main avenues of transportation in good condition is considerable. Old workings cannot always

be abandoned. They must be kept open to secure proper ventilation and prevent the accumulation of explosive gases. In one of the gaseous mines of Wilkes-Barre, a force of 8 men was employed solely to keep open such an old working. In a slope in Williamston, Dauphin County, a force of 32 men is kept to attend to the timbering needed. Timbers, in some collieries, rot very quickly. They will not last a year. In other collieries, they last 30 years and more. In most places, however, water and gas make their life short, and then they must be replaced.

If we now consider the quantity of timber in a colliery, from the mouth of the shaft on to the end of the main gangways, sometimes aggregating from 7 to 10 miles in length, we can well imagine the heavy outlay in timber and wages necessary to keep all the openings in a safe condition. The dead-work—the name generally given to this class of work—varies considerably in mines, but it generally adds from 3 cents to 20 cents to the cost of producing a ton of coal.

The cost of maintenance of road-ways, also, is considerable.

There are some collieries which have over 8 miles of track underground, which must be kept in good order. The rail in common use is a T rail about 35 pounds to the foot, which costs \$13.00 a ton. In order to keep the road in good condition, a force of trackmen and helpers are needed. This would amount to about two men to four miles of track. To this item of wages must be added that of supplies, in replacing rails and sleepers.

The item of ventilation is a constant source of expense. The fan must be run night and day, regardless of the hoisting of coal. The airways must be carefully inspected every morning and evening. Air will find a crevice if it affords a short-cut to the up-cast, and such crevices must be blocked up air-tight. Hence there is a force of bradish-men employed whose duty it is to adjust doors, build partitions, wall up cross-cuts, etc., so that the invisible air may be made tractable to the needs of the colliery, and led by diverse ways to the face of the workings. In gaseous mines such as are found in the Northern coal field,

the care bestowed on ventilation is ceaseless, for it means life or death to the employes.

These are some of the items of expense in labor and material needed to keep the workings open. A mine is not like a factory, where a man can set all things in order, lock the door and put the key in his pocket and when he comes again at the end of a week, he finds all things undisturbed. No colliery can be so treated. It demands constant attention whether coal is hoisted or not, unless the operator is ready to abandon it. And the larger the extent of the workings, the greater the cost of maintenance.

INCREASE OF MONEY AND MUSCLE, AND DECREASE OF PROFITS AND WAGES.

By the above sketch of the development of the coal fields, it is readily seen that an increasing outlay is absolutely necessary to carry on the work. It is just as clear also that more muscular strength and skill are needed to cut coal in the lower veins than in the upper ones. This means that more capital and more labor are needed to operate the lower coal beds.

It is evident also, assuming for the nonce that the art of mining is constant, that the same amount of capital and labor, applied to extract coal from the deeper veins, will yield less returns than they did in the upper seams. This is true as a general rule. There may be exceptions. But taking the industry as a whole, the art of mining being constant, the returns to the same amount of capital and labor in operating the lower veins is less than it was in the upper ones. The law of diminishing returns was felt by the individual operator in the early days of mining. Six men, with a thousand dollars, could do a great deal, when the coal could be worked in the light of day, and all they needed were a few implements, a team of horses and a small rolling stock. But as they followed the veins downward, they worked harder, they required more horses, and the day came when the returns were not adequate for the extra outlay and exertion, and so they quit. What they needed was more capital. The lack of capital drove out the individual operator. The law in operation was that of diminishing returns.

Capital flowed into the coal fields, and the law of diminish-

ing returns seemed for a time suspended. It was still there, however, and its pressure has been more felt in the last decade than ever before in the history of anthracite mining. Capital deferred its effect, but it cannot evade the law. It will continue to operate until the point is reached where any additional increments of capital and labor will not pay, and then the stock company will get out of the mining business as the individual operator did, and for the same reason. Indeed, it is the case to-day, that some mines excellently equipped in every respect, have been abandoned, not for the want of beds of coal, but because they demanded more capital and labor than could be profitably expended to develop them. They reached the marginal return and passed beyond it, and were abandoned. At Yorkville, in Schuylkill County, the Lehigh Valley Company has \$300,000 in a plant which they have abandoned. In Lackawanna County, operators work veins less than 3 feet thick, but they are not remunerative. They are operated because the companies have the equipment and the facilities to handle coal, and in order to make up the tonnage, they extract coal from these small veins. The point will be reached when they cannot go further. Some of the veins are less than two feet thick, and the question many anthracite coal operators will have to answer within the next half century is, what is the thinnest vein that can be profitably operated?

England is answering the question, and they have come down to veins less than 20 inches thick. Some of their engineers say that the margin is reached. American anthracite operators have not been able to operate veins much less than three feet in thickness. The line of marginal return, as far as it has been discovered at present, is close to three feet. The economic prevision of anthracite coal operators sees the end of this store house of natural force. Those who hold the largest areas will reach the end in about 100 years; during 1950-2000 A. D. company after company will fall out, for each one of them in turn will find the point when no additional capital and labor can be profitably expended on the smaller veins. As they approach this point their returns will diminish. This is true to-day if we take the anthracite coal fields as a whole.

Not only is this law affecting the operators, it acts also with irresistible pressure on the miners, and here we find one of the prime causes of the present friction between capital and labor in the anthracite coal fields. As the veins get deeper and thinner, the coal becomes harder, there is more rock to handle and more powder and muscular exertion needed. Back in the sixties and seventies, miners could do work in two hours, which now, in the smaller veins, takes six. Their labor, estimated in time and exertion, is increased 200 per cent. This condition has come on gradually during the last decade, and as it became more general, the miners felt that their labor computed in time and exertion increased; while their returns in wages decreased. This was the loadstone which drew the men together and still holds them together. They express it by saying "it is more work and less pay." Their statement is just and deserves consideration. The palmy days of mining are past. Employes engaged in cutting coal must face hard work. The men will undoubtedly demand concessions from their employers such as will intensify the struggle between these coöperating parties in the mining industry. It may be safe to predict, also, that the intensified struggle for existence against nature and capital will afford a firm basis for unionism among the men.

In future, the law of diminishing returns will be more seriously felt, for thus far, three counteracting forces have held it in check. These are: improvement in the art of mining, increased prices, and cheaper transportation. But to these checks there is a limit which cannot be passed.

Miners could never do the work demanded of them to-day, if it were not for improved appliances in machinery to bore holes. They work harder, but they have better tools to work with. The drilling machine enables them with less exertion to bore three holes to-day, in the time it took to bore one with the old hand-drill. This invention is the chief improvement which has come to the employes. Experiments are now making to still further relieve muscular strength. Drilling machines are being introduced which are operated by compressed air. Some predict a complete revolution in the methods of anthracite mining

by this innovation, while it is calculated also to defer the point of marginal return. The miners, however, do not look with favor on the machine, and some collieries have struck, and demanded its removal from the mines. Others are of the opinion that it will not succeed in superseding the miner, because of the expense attached to it.

The greatest improvements, however, have been in appliances to handle coal. In the fifties, 200 cars hoisted from the shaft, was considered a good day's work; to-day from 600 to 800 cars are hoisted. In shafts 1,500 feet deep, it is possible to hoist a car a minute, and the machinery for handling this coal is so accurately adjusted that cars from the foot of the shaft to the breaker seem gifted with intelligence as they almost automatically pursue their destined route. The aim of coal operators has been to so reduce the cost of handling coal by improved machinery, that this gain may counteract the increase in the cost of mining, and thus make the cost of production as near stable as possible. The large companies have succeeded in doing this up to the present, or nearly so, but the race between the law of diminishing returns and the ingenuity of man in these coal fields, has been a close one in recent years, and engineers have only been able to keep up the pace by a plentiful supply of capital to draw upon to put their inventions into operation. The law of diminishing returns will win, however, and it is now gaining ground rapidly. A superintendent of wide experience in the Northern and Southern coal fields said that he thought the engineers had reached a point where the demand made on capital by them had passed the limit of profitable expenditure. It is in the nature of the case to be so. Man can defer but cannot escape the effects of the laws of nature. These will sooner or later issue the dictum, thus far and no further.

Operators have yet a considerable margin to work upon. The methods pursued by many of them are extremely expensive. There is to every shaft a certain amount of fixed charges. These are the same whether they produce 50,000 or 100,000 tons, but in the one case, it is only half as much on the ton of coal as in the other. A plant worth \$300,000, capable of pro-

ducing 30,000 tons a month, and only producing 20,000 tons, is far from reaching the margin where the investment does not pay. Companies state that they lose money in mining coal, and still the vast majority of plants in the anthracite coal fields do not produce over two-thirds of their capacity.

Reduced railroad rates enhance the returns of operators. Last December, individual operators secured 5 cents a ton more than they formerly did on tidewater prices. To an operator who sent to market 1000 tons a day, it meant a daily increase of \$50.00 profit. This offsets the effect of diminishing returns. The same is effected by an increase in the market prices. When the miners in October last got 10 per cent. advance on their wages, it meant increased cost of production to the operator and so diminishing returns, but by adding 50 cents a ton to the wholesale prices at tidewater, the operator recouped himself and thus counteracted the effect of the increased cost of production.

CHAPTER III.

CAPITALIZATION.

1. CAPITAL'S TRANSFORMING POWER. 2. APPRECIATION OF COAL LAND.
 3. ESTIMATE OF CAPITAL GOODS. 4. THE COST OF PRODUCTION.
 5. DISTRIBUTION OF THE PRODUCTIVE WEALTH.
-

About two centuries ago the major part of that portion of northeastern Pennsylvania occupied by the anthracite coal fields, was marked on the map as the "Wilderness of St. Anthony." The name was very appropriate for the bleak and barren hills of Carbon and Schuylkill counties. The Wyoming valley, on the other hand, has been called the "Garden of the State"; it deserved that name when its natural beauty was not marred by the hand of man. To-day the unsightly culm dumps, rock heaps, coal dust, and foul black streams have spoiled much of what was once fair to look upon.

But the industry that has contaminated the streams and disfigured the natural features of this "Garden of the State" has turned the "wilderness" into a great industrial center, where flourishing villages, thriving towns and populous cities are seen.

On this area of 470 square miles, not less than three-quarters of a million people get their living directly or indirectly from mining. Besides this, there are in this territory machine shops and factories, car shops and foundries, iron and steel works, etc., some of which are directly related to the coal industry, while others were attracted here by an abundant supply of cheap fuel.

The transportation of coal to market also furnishes employment to thousands; while commerce, whose fleet messengers bring from afar the necessities of life and comfort to the inhabitants of this area, engages thousands more. Thus, if we

take all classes attracted to the anthracite coal fields, depending wholly or partially on them for subsistence, the number will be about three-quarters of a million souls.

One of the prime factors in transforming the "Wilderness of St. Anthony" into an industrial center, threaded by railroads and resounding with the buzz of revolving wheels, was capital. The artificially stored-up energy of man joined hands with the stored-up energy of nature, and the wilderness became the scene of an important industry.

Great wealth has been turned into these regions, which crystallized into the form of tracks and rolling stock, machinery and buildings; much of it is invisibly buried in deep shafts and rock tunnels; but most of it was seed which brought forth a hundred fold. The circulation is kept up. Capital is constantly sunk, that it may reappear in an increased form, only again to begin the cycle anew. The profits realized on the sunken capital were due to three factors: (a) to natural force stored up in these coal fields; (b) to labor which also flowed in as the collieries were developed; (c) to the courage and capacity of entrepreneurs who opened up these coal measures and established the industry on its present basis. The object of this chapter is to trace the part played by capital in the development of the anthracite coal fields, by giving instances of what has been sunk in certain localities.

APPRECIATION OF COAL LAND.

Charles Gide says "the value of the coal mine concessions in the Department of the Pas-de-Calais has risen from £1,080,000 in 1853-63, when they were first granted, to £11,840,000 at the present day. Thus in thirty years the value has been multiplied by more than ten." (Pol. Econ., p. 463.) This rise in the value of coal land is nowhere better illustrated than in the anthracite coal fields of Pennsylvania.

All this territory, two centuries ago, belonged to the Indians. In 1749, a section 125 miles long and 30 miles wide, extending from the Blue Mountains on the south to the Susquehanna River on the west, and from the mouth of Mahanoy Creek on

the north to the mouth of the Lackawaxen Creek on the east, comprising all of Dauphin and Schuylkill counties together with parts of Northumberland, Columbia, Luzerne, Northampton, Monroe and Pike counties—all this territory the Government bought of the Indians for the sum of £500. To-day, an acre of coal land containing three feet of workable coal will command from \$500 to \$600; while a building lot in the city of Wilkes-Barre, on one of its busy thoroughfares, will command more than \$20,000. In 1768, a similar purchase of the Wyoming Valley was effected and the price paid the Indians was about the same. Dr. Throop says in his "Fifty Years in Scranton," that in 1774, land was sold in the neighborhood of Scranton for 4 cents an acre; in 1884, the same land could not be bought for \$3,000 an acre.

In 1762, 200 colonists from Connecticut settled at Mill Creek, near Wilkes-Barre, and the land there appreciated so that it commanded from \$2.00 to \$3.00 an acre.

These hardy, industrious and patriotic pioneers, who sent, in 1778, 3,000 bushels of wheat to the Continental Army, and whom the combined forces of both Indians and Tories did not dislodge, never dreamt that beneath their lands rich beds of anthracite lay. The land was valued by them for its wheat, tobacco and corn crops, which they took to Easton market, 60 miles away, driving thither over Mt. Pocono. They caught bass and shad in the Susquehanna River, which they sold for from 2 cents to 8 cents each. It was not until the first decade of the eighteenth century that the rumor of coal beds in the Wyoming Valley got abroad, and then it was a voice as from afar, the meaning of which was never fully understood by the men of that generation. Back as far as 1768, a blacksmith by the name of Gore had used anthracite in the neighborhood of Wilkes-Barre, but it was in 1807 that an attempt was first made to ship coal to market, and from that time coal land has appreciated, and those of the early settlers, who tenaciously held to their farms, have found them an El Dorado, of which their ancestors, living by agriculture, fishing and hunting, never dreamt. The news of the discovery of coal in

the Wyoming Valley brought to the scene ardent fortune seekers. Some of these never left—they lie beneath costly monuments in graves overlooking the scene of their activities, and their descendants enjoy the heritage left by their hardihood, courage and perseverance.

There is a romantic element associated with the estates that form the basis of some mining companies. The story of the purchase of coal land which furnished the basis of the organization of the Delaware and Hudson Canal Company is representative. In 1812 a young Philadelphia merchant, named William Wurts, left his store to explore the fields whence the stone coal which was winning its way into public favor in that city, came. While exploring, he met one David Nobles, who, to escape imprisonment for debt, had taken to the woods. Mr. Wurts engaged the wanderer, and having found traces of coal in Carbondale, Archbald and north of Scranton, he sent him in his ragged apparel and unkempt appearance to buy, in these neighborhoods, all the land he could secure.

By this scheme the young merchant secured hundreds of acres for prices ranging from 50 cents to \$3.00 an acre. In 1814, Wurts began operations on the Anderson farm, north of Scranton, and exhibited the production in Philadelphia and New York City. Two obstacles stood in the way of success. On the one hand was a prejudiced public, which looked with disfavor on hard coal that was so difficult to ignite; hence a market had to be created by teaching the public how to use the fuel. On the other hand, there was no means of transportation from the mines to the cities on the seacoast. By 1820, the first obstacle was removed, and a rapidly growing demand came from a public which had learned the excellency of anthracite as a domestic fuel. So in 1822, the Wurts Bros. hauled in wagons 100 tons from Carbondale to Lackawaxen, where they built rafters of pine, put the coal on them and floated the cargo down the Delaware River to Philadelphia, and sold it for \$10.00 and \$12.00 a ton. That act facilitated the removal of the second obstacle—transportation. In the following year, a charter was secured to construct a canal along the valleys of Neversink and

Roundout as far as Honesdale. To secure capital for the undertaking, it was advertised that coal could be mined and brought to New York City for \$3.00 a ton, and sold for \$10.00.

In 1824 the Delaware & Hudson Canal Co. was organized, with a capital of \$1,500,000. When the books were opened, the entire stock was taken in a single day. Work was begun. At the end of eight years, the gravity railroad and the canal were not completed, but all the capital was spent. In 1832, the state of New York advanced a loan of \$300,000. In April following, the canal was opened, and by the close of that year, 90,000 tons of coal had been shipped to market. The sanguine predictions of the organizers of the company were soon verified. Substantial returns were realized by the stockholders. In 1834 they shipped 150,000 tons, and dividends began to be paid. Twenty-one per cent. was paid in 1841 on the capital stock, and ten years after the canal was opened (1843) all the indebtedness of the company was paid, save the \$300,000 it owed the state of New York. This last indebtedness was paid January 1, 1849, and the company freed of all debt. To-day, the company operates about 30 collieries, and in 1899 produced 4,429,575 tons of coal, or about 9 per cent. of the total tonnage of anthracite.

The history of other pioneer companies in anthracite mining is similar. They were organized by men of vigorous minds and brave hearts, who courageously grasped the opportunity, fought innumerable difficulties, and carried to success the business they laid their hands to. It required courage; for in the thirties and forties, the knowledge as to the contents of the coal measures was meagre among men who made it their business to attain that information. In the forties, the Pennsylvania Coal Co. sent its geologist and chief engineer as far as Scranton and Dunmore, to prospect for coal. They found an outcrop on the west of Scranton, but thought it a mere misplacement. They came to the conclusion, after careful investigation, that there was no coal there, while beneath the soil they trod were 70 feet of workable coal. In this way the Pennsylvania Coal Co. let slip some of the richest coal lands which they could then have

secured at low rates. The advisers of the company thought that there was little coal worth working north of Pittston. The men who invested money in coal land in those days walked by faith and not by sight. They had the commercial instinct which impelled them to risk, and many of them reaped fortunes.

The appreciation of coal land was gradual. As population increased and the market for coal was well established, as railroads were opened and collieries developed, as science unveiled the contents of this treasure store of nature and increased mechanical skill came to the fore, coal land advanced in value. It was an evolution. The rise has not reached its apex even to-day. We have some landmarks of the rise in the Northern coal field. In 1839, William Henry came to Slocum Hollow, now Scranton, and paid \$8,000 for 503 acres near Roaring Brook, or on an average of \$18 an acre. It was a big price, and was the talk of the day, and many prudent men said it was a mistake. Abijah Smith came to Plymouth in 1807 and bought 75 acres for \$500, or \$6.66 an acre. John, his brother, followed him about the same time, and paid \$600 for 120 acres, or \$5 an acre. A writer in the *North American Review* in the year 1837, estimates the price of coal land in the Schuylkill region at \$40 an acre. The *American Encyclopædia* of 1873 estimated coal land at \$250 an acre. In the census of 1890 the estimate given is \$488 an acre.

During the last decade, as the best veins are being exhausted and financiers see in the distance the end of this coal supply, the price of coal land has risen higher than ever before. Prices are also more accurately adjusted to the contents of the seams, for the geological surveys have been minute and a comparatively thorough knowledge of the coal measures is accessible to all to-day. The value of coal land is not proportionate to the quantity of workable coal in the veins, for the conditions of working them may be very different. Indeed, the value of an acre of coal in the same vein may differ within a few miles. The Red Ash vein from Plymouth down to Nanticoke is good working, but the same vein from Plymouth Junction up to Pittston is very different. Here there are from eight inches to

two feet of stuff between the rock and the vein, which runs when the atmosphere comes in contact with it, so that a smaller percentage of the original contents of the bed is produced, and the pillars are unsafe. Hence the owner of 10 acres of Red Ash coal at Nanticoke is better off than a man who owns 20 acres of the same vein above Plymouth Junction.

An exact estimate of the total capital in coal land in the anthracite fields is difficult to make. The price varies from \$500 to \$5,000 an acre. The total capital invested in coal land in 1836 as estimated by a writer in the *North American Review* (Vol. 42, p. 241) was \$4,900,000. The *American Encyclopædia* in the edition of 1873 estimated it at \$75,000,000. In the year 1889 an estimate was given by John Birkenbine, who placed it at \$162,000,000, which did not include undeveloped lands. The census of 1890 gives 213,938 acres valued at \$104,415,802. The total acreage as estimated by William Griffiths in the "Bond Record," 1896, is as follows :

DISTRICTS.	ACRES.	BEDS.
In Wyoming.....	100,744.....	4 feet
In Lehigh.....	27,637.....	3 feet
In Western Middle.....	54,455.....	3 feet
In Southern	84,669.....	3 feet
Total	<u>267,505</u>	

If we estimate this at \$500 per acre, we have \$133,752,500 as an approximate estimate of the value of the coal land. Of course, every year, the acres that are exhausted become valueless, but those which are untouched appreciate, which is the reason that in recent years stocks in coal land have more and more found their way into closed boxes of the investors. Profitable transactions, however, are continually being made in the coal industry. The recent transaction conducted by J. P. Morgan is a good illustration. In a suit brought to restrain the voting trustees and directors of the Erie Railroad from buying the Pennsylvania Coal Co.'s mines and plants, with certain miles of railroad, the plaintiff said that Mr. Morgan paid \$27,400,000 for the property, and then sold it to the Erie for

\$37,000,000, clearing \$9,600,000 by the transaction. The reply made by the defendant was, that Mr. Morgan only cleared \$2,300,000 on the deal, which it claims was only fair and just, being less than 9 per cent. on the transaction. It is the opinion of men familiar with coal land stocks that more money has been made by speculating in coal land than by mining coal.

ESTIMATE OF CAPITAL GOODS.

In order to get some idea of the amount of capital invested in machinery, buildings, and general equipment, we will give an estimate of the value of a plant in Lackawanna County, capable of producing 1,500 tons a day.

Sinking shaft 200 feet.....	\$ 15,000
Tower over shaft.....	3,000
2 engines of 150 horse power, each \$5,000.....	10,000
Boiler plant.....	10,800
Wire ropes.....	8,000
Barn, blacksmith shop, engine house, etc.....	5,000
Two sets of scales.....	4,000
Breaker, machinery, belts, etc.....	45,000
Water, per year.....	800
Tracks outside.....	275
Three mules outside.....	375
Pumping apparatus.....	5,000
Gangways and airways.....	830
Tracks inside (5 miles long).....	5,000
Cars, 175 @ \$40 each.....	7,000
Fan, fan-house and fan-engine.....	4,000
Mules, underground, 50 @ \$125 each.....	6,250
Rope haulage inside (engine, etc.).....	4,000
Dumping equipment.....	3,000
Total.....	\$137,330

Mr. Veith, superintendent of the Reading Coal and Iron Company, said that the company generally invested from \$200,000 to \$250,000 in a plant calculated to produce 1,200 tons a day. A superintendent at Wilkes-Barre estimated the outlay in that region about the same as that of the Reading. At Silver Creek, Mr. Veith said the plant represented \$500,000

capital with a capacity of 1,500 tons a day. In one of the plants of the Delaware, Lackawanna & Western Coal Co., where the operators have had bad luck, over a million dollars has been expended. The outlay varies greatly, and depends on the difficulties met with in sinking and developing the coal seams. An individual company began operations in Schuylkill county, not far from Pottsville, with a capital of \$400,000. In less than four years, all was spent, little coal produced, the company failed and the property reverted to the land owners. It is estimated that not far from a million dollars has been expended in the Lytle colliery plant at Minersville. From these figures, which are given by men versed in the coal industry, we may get some idea of the capital invested in necessary equipments to develop the lower seams.

The aleatory element plays a very important part in the development of mines, and no gold mining camp has more stirring records of good and bad luck than are found in these coal fields. Many individuals have sunk all the money they had in a colliery; the enterprise failed, all their capital was consumed and in poverty they died of a broken heart. Others started operations on borrowed capital, and in a few years became millionaires. In the Hunt shaft which belonged to the Delaware, Lackawanna & Western Coal Co., the river broke into the workings and drowned the colliery. For six months, night and day, the company by heavy pumps and water tanks, tried to get the water out, but failed to lower it an inch. The millions of the operators were helpless in combat with the flood, and the colliery was abandoned. In another colliery, in the same coal fields, each one of the five stockholders cleared in one year \$55,000. When the company was formed and operations were commenced at this colliery, each of the parties put in \$20,000; they operated the mines for 15 years; during that time, it yielded each of them a handsome fortune, and when they finally sold it they realized \$400,000. Another colliery, in Lackawanna County, changed hands a few years ago. The former operators had lost money. The parties who purchased it paid \$500,000 for the property. The new

proprietors, within a year, struck a rich vein of coal which will supply the plant with sufficient production for the next 20 years, and they are clearing away their bonded indebtedness at the rate of \$30,000 a month.

Another company, in Luzerne county, opened up a rich vein of coal, and in their anxiety to increase production, did not leave sufficient pillars. As they advanced the inevitable result came—the mine closed in upon them. It took the operators six months to open it again, at an expenditure of over \$50,000.

To attract capital to an industry which is fraught with so great an aleatory element, the profits must be great. It was the promise of large profits which made it possible for the Delaware and Hudson Canal Co. to secure \$1,500,000; the Lehigh Coal and Navigation Co., \$2,200,000; and the Pennsylvania Coal Co., \$2,000,000 capital, before they could bring the product of their mines to the market.

What estimate can be made of the amount of capital represented in mining plants for the production of anthracite coal? In the year 1837, the following estimate is given by a writer in the *North American Review* (Vol. 42, page 241).

Railroads and Canals : 489 miles.....	\$9,750,837
Collieries, Boats, Cars, etc.....	1,270,280
Mining Capital.....	480,000
Total	\$11,501,117

In 1834, a report of the capital invested in the production, transportation and purchase of coal land, was made to the Legislature of Pennsylvania, and the aggregate sum was placed at \$19,176,217.

In the census of 1840, the estimated capital invested in producing anthracite coal is \$4,334,102. An estimate is given in the *American Encyclopædia*, edition of 1873, as follows :

Collieries, 437, each at \$100,000.....	\$ 43,700,000
Canals, 673 m. @ average cost of \$7,000 p. m.....	47,000,000
R. R. 2290 m. single track at \$56,000 p. m.	128,000,000
Total	\$218,700,000

Joseph F. Harris says in the *Forum* (Vol. 13, p. 193) that \$2.00 is needed for every ton of annual production to keep a

colliery in good working order. G. P. Bidder, in the *Nineteenth Century* (Vol. 35, p. 807), says that it requires ten shillings for every ton of annual production to open and develop a mine. These two estimates are pretty near each other, and mean that a colliery that produces 500,000 tons a year needs a capital of \$1,000,000. Estimated on this basis, the capital represented in mining plants which produced 54,034,224 tons of anthracite coal in 1899 would be \$108,068,448.

According to the census of 1890, the aggregate sum under the head of capital goods is \$57,368,671, or an average of \$1.41 for every ton produced in 1889. On this basis, we have \$76,188,255 as the total capital invested in equipments, etc., for the tonnage produced in 1899. If we take the latter estimate and add it to the estimate of the capital invested in coal land, we have :

Capital invested in coal land.....	\$133,802,500
Capital invested in implements, buildings, etc.....	76,188,255
Total.....	\$209,990,755

The number of employes in 1899 was 140,583 ; the above total represents a capital of \$1,493 for every employe in the anthracite mines. The lure to the investment of this vast sum is the hope of profits. English mine operators expect 10 per cent. returns in order to realize profits on and the redemption of the capital invested. The anthracite coal operators are actuated by the same motives ; they are in the business for profit and whatever they realize must come from the coal produced. Let us then consider the cost of production.

THE COST OF PRODUCING A TON OF COAL.

Competition is a law of nature dominating every sphere of organic life. It has ever been dominant in human affairs and will remain to the end of time in every department of human activity. Its abuse has stirred the ire of many philanthropists and economists, who vividly depict the ruin and distress due to the struggle for preëminence between rival individuals or groups. The fruits of limitless competition in the essentials of life are death to the weak but life to the strong. Civilization echoes with the cry of distress due to ruthless competition. Granting

that to be true, it does not follow that competition is wholly bad, and resembles an accursed bough which is to be lopped off the tree of life. To imagine such a thing is vain; it is a dream never to be realized. A state of non-competition would be dull, insipid and barren. Life would lose its zest and the race would not be worth running. What we need is to draw the line between competition which enhances life and that which brings death, and then cleave to the one and forsake the other. To find that line is difficult. It may be beyond our ken, but it is what men need and leaders everywhere should strive to discover it.

There has always been competition in the Wyoming Valley during historic times. The first settlers fought each other with musket and sword for possession of the soil. Occasionally white men fought their brethren of kindred blood, but at the approach of a foreign foe, both joined hands to preserve life against the stealthy onslaught of the Indians.

When peace was secured and the quiet life of agriculture was steadily pursued, competition was still present; it related to the excellency of the crops, the fineness of maple sugar, the skill in hunting or fishing, and even the fair maidens entered into spirited rivalry as to their skill at the spinning wheel.

That era is passed, the conditions of life have changed, but competition still holds sway. Now the question is, who is the best miner, the best engineer, the best mechanic, etc., and in no sphere is competition more keen, and human capacity more exerted, than in the attempt to produce cheap coal. The foreman or superintendent who can keep down the cost of producing a ton of coal is the man of the hour, and is in constant demand. The man who can successfully combat the tendency to increased cost of production, due to greater depths of workings, greater expense to keep them open, and more refuse and water to handle, is the one the operators are after. Success in this regard is widely known in coal circles. Honor, confidence and remuneration are bestowed upon the successful man, and his counsel is eagerly sought by his peers. To stimulate their foremen some companies have offered prizes to those who pro-

duce the cheapest coal. The object of the operators was legitimate, but it often worked injury to the employes in charge of unscrupulous men. Many foremen, eager to clutch the prize offered, made their names a curse upon the lips of men, and were finally banished by burning wrath from the scenes of their activity. The cry of the operators is "cheap coal," and foremen and superintendents, anxious to respond, have sometimes resorted to cunning devices which oppress the employes.

The cost of production varies in every colliery, in different veins in the same colliery, and in different sections of the same vein. It depends upon many conditions. The thickness of the vein has much to do with it. From six to seven feet of height in the clear is needed for the cars; if the seam is eight feet thick, no rock need be handled to secure that height; if it is only three feet thick, four feet of rock must be blasted, which adds considerably to the cost of mining a ton of coal. In a shaft in Lackawanna county the coal is only twenty-six inches thick and every carload costs the company in mining \$1.86.

If the roof is bad, it means a considerable outlay in timber, which in some Schuylkill collieries goes up to 12 cents per ton produced. Water may enter the mines freely and necessitate a considerable loss of time in its removal. The distance of the coal from the foot of the shaft enters into the computation of the cost of production, for if the workings are at a considerable distance the cost of transportation increases and more rolling stock is needed. It depends also on the amount of coal mined, for the fixed charges are nearly uniform whether the plant produces 1,000 or 1,500 tons a day, but in the latter case, the fixed charges would only be two-thirds per ton of what they would be in the former. The market demand for coal has its influence: if it is brisk, the coal inspector will pass cars which have 10 per cent. of bony coal in them; if the demand is slow, he will condemn cars which have 5 per cent. of impurities in them, so that the breaker hands will have to exercise greater care in cleaning the coal, and the production of the plant may be reduced by one-third. The weather has its influence also.

A great quantity of water is used now-a-days to wash the coal, so that hard frost will sometimes block a plant and cause delay.

In strippings, where coal is mined by the day and not by contract, the personal character of the workmen is an important factor in the cost of production. In one of these strippings, the foreman in charge pointed to two gangs of six men each working in two pits about ten yards apart and under the very same conditions, and said "I get nearly twice as much coal from this pit as from yonder one. These work, those don't half work." Yet he could not remedy the evil. If he remonstrated with them, the reply was "Me nòt got four hands." If he discharged one of them all would quit work.

The personal element in foremen also counts considerably in the quality and amount of work done by the employes. Some bosses have the tact to get along excellently well with their men, so that they work with a will, whether the foreman is present or not. Others bully and irritate those under their command, so that it is considered a virtue to shirk and skimp work.

In a large colliery, during the year, needless waste will amount to a considerable sum, unless strict account of supplies is kept. Prior to the eighties and nineties, the returns from the mines had been such that the large companies paid little or no regard to the item of supplies. The foreman in charge sent in his monthly order, and the supplies were, without question, forwarded. In the last decade, however, there has been a change in this respect. Now a strict account is kept of the smallest item, and the foreman is held responsible for the proper use of all supplies, and must at all times render an account to the management. Under the old régime, shovels, hammers, steel, oil, etc., disappeared in mysterious ways; but when returns diminished, and the management investigated where they could curtail expenses, the item of supplies was more closely watched, and in some collieries, a saving of 50 per cent. was effected under this head.

Skill in management while developing a colliery has much to do with the returns derived from it. Wise management will guard against the error of disproportionate expenditure between

outside and inside. A company in Schuylkill county, under the superintendency of a man who lacked judgment in this regard, placed \$120,000—the major part of the capital—in a first-class plant on the surface, but before the coal beds were developed, so as to furnish a reasonable quantity of coal to the breaker, all the capital was spent. This lack of judgment brought the company to the verge of bankruptcy.

Some collieries have far more favorable natural conditions than others. The power of the engines and the capacity of the pumps and the magnitude of the boiler plant, depend very largely on the depth of the coal beds. There are collieries in the Southern coal field which consume from 8 to 10 per cent. of the tonnage sent to market, to generate steam, because they hoist from a depth of 1,500 feet, two tons of rock and ten tons of water for every ton of coal produced. In mines where there is much rock to be blasted, if it is hard sandstone, it will cost the company from \$2.00 to \$2.75 a yard in allowances. In a shaft in Lackawanna county the employers paid a miner as high as \$6.00 a yard for blasting rock. The item of water varies greatly. In some instances it amounts to 10 cents per car of coal mined. In the Schuylkill region, pumps are abandoned as a means of removing water from deep shafts. When the shaft goes down to 1,500 feet, large tanks are used and the water is removed at one-third the expense of pumping it out. In the Wyoming Valley tanks are also being introduced in preference to pumps. In the Lytle's new shaft, two tanks are thus used, each with a capacity of 2,500 gallons, which can be raised from a depth of 1,550 feet in one minute. They are self-acting. A pair of powerful engines are set apart solely for the purpose of hoisting these huge tanks which fill automatically, and as they come to the surface, they topple over and discharge their contents into chutes specially constructed to carry away the water.

In some veins, the rock so clings to the coal that it is very difficult to dislodge it. Instead of being dislodged as a body, it comes in layers, so that the miner must blast it the second and third time. A Hungarian expressed himself in this

difficulty by saying "you must shoot him three times." When this is the case, the miner may not be able to cut more than six cars of coal with a keg of powder, so that the foreman must give him allowance in order that he may earn the average wage. The Delaware, Lackawanna and Western Company placed the minimum number of cars to be cut with a keg of powder in the early eighties at 18, and when the average during the month fell below that, allowance was granted. When this is done, it adds to the cost of production.

The lay of the veins has its influence also. In Panther Creek, the veins pitch so that they are best worked by driving tunnels from the one to the other, which means an outlay of from \$35 to \$50 a yard in tunnelling. Again in veins which pitch over 40 or 45 degrees, the coal is left in the chamber, held in place by a strongly built framework called a battery; when the coal is cut, it falls lump on lump, and as the bulk, measuring 100 by 25 by 20 feet, moves on an incline plane of 60 or 70 degrees, the weight crushes and grinds a large quantity of the coal to powder, so that the waste often amounts to 40 and 45 per cent. This item adds considerably to the cost of mining.

In the Southern coal field, the veins on the average pitch 60 degrees. One man in Tuscarora said he worked the hardest place in Schuylkill, and the reason he gave was, that the coal in his chamber pitched at an angle of 110 degrees.

Two difficulties meet us in the effort to get data as to the cost of producing a ton of coal: First, the refusal of operators to give the figures; and second, the great variety of these figures providing we could get them. No two collieries are alike, and the same colliery has not the same figure for two successive months.

Dr. Chance gave an estimate of a dozen collieries, and closes with the following remark: "These are only approximate, and in many cases, are evidently untrustworthy. It is exceedingly difficult if not impossible to obtain reliable data from many of the individuals and corporations mining coal. Their reasons for withholding exact statements are often of a private nature,

and it seems beyond the province of this report to examine into and disclose to the public the private business of individuals or details of the business of corporate bodies." (Coal Mining, p. 361.)

Some of the companies state, in these estimates, that it cost them \$3.16, \$2.53, and \$3.13 to produce a ton of coal, which is absurd on the face of it, when it is remembered that coal at tide-water sells on an average for less than \$4.00 a ton.

G. P. Bidder says in the *Nineteenth Century* (Vol. 35, p. 807, May, 1894) that it cost six shillings to produce a ton of coal in England: the cost is distributed as follows:

Wages	69.26 per cent.
Materials	15.26 per cent.
Royalties on coal raised	7.70 per cent.
Surface rents	1.52 per cent.
Rents and taxes.....	3.15 per cent.
Salaries, general expenses	3.11 per cent.
	100.00 per cent.

This estimate would be about \$1.44 a ton, and there is no reason to believe that the cost of production in the anthracite coal fields, on an average, exceeds that.

In 1850, Mr. Neal in his report of the Philadelphia and Reading Railroad Co., said, that "the mines in the Schuylkill Valley can deliver coal at Mt. Carbon at \$1.25 and \$1.50 per ton."

In the sixties, a foreman, still living, placed coal on the cars ready for the market for 50 cents a ton. The Delaware & Hudson Canal Co. said in its report for 1849, that coal could be put on the cars at Carbondale for 60 $\frac{3}{4}$ cents a ton. In 1860, the Barclay Coal Co., operating in the Wyoming Valley, appeared before the New York Senate Investigating Committee, and said, if it could get \$1.75 a ton for the coal it shipped to Towanda on the North Branch Canal, it was satisfied. This would bring the cost of production at the mines near the dollar mark. The Delaware & Hudson Canal Co. paid an individual operator at the breaker, \$1.36 a ton for all coal of the size of chestnut and above; from this sum the operator had to pay 20 cents

a ton as royalty, so that his profits must come out of the \$1.16 per ton left him. In the years 1881-2, the Reading Coal and Iron Co. stated that the average cost of production was \$1.46 and \$1.47, which included royalties, insurance, and general expenses. One of the collieries of this company produced coal at 83 cents per ton. C. A. Ashburner, in Vol. 18 of the *Trans. of Am. Inst. of Mining Engineers*, says it costs \$1.95 to produce a ton of coal when the wages paid the miners was 85 cents a car of two gross tons. J. M., an individual operator, mined coal and placed it on the car ready for the market for 86 cents and 89 cents a ton. J. H., in the Hazelton region, placed coal on the cars for 70 cents a ton. T. C., in Lackawanna county, placed coal on the cars for 94 cents, and a rival colliery, under the same company, had a lower figure. In the Mahanoy Valley, miners work in veins from 12 to 15 feet thick for \$4.50 a yard. The chambers are driven 30 feet wide. A cubic yard equals a ton, so that \$4.50 per yard for coal 12 feet thick driven 30 feet wide would be about 15 cents a ton for mining. Allowing 25 per cent. for refuse, it would be about 19 cents a ton as the cost of mining. If we add 23 cents a ton for loading and haulage, and 20 cents a ton for cleaning, and 15 cents a ton for ventilation and timber, the coal would then be put on the cars at 76 cents a ton.

J. B., in Lackawanna county, placed coal on the cars for one year at an average cost of 69 cents a ton. The same gentleman produces coal to-day at less than a dollar a ton. The Susquehanna Coal Co. produced coal from 1877 to 1882 inclusive, for an average cost per ton of \$1.13, \$1.04, \$0.96, \$1.20, \$1.22, \$1.43. W. S., in Luzerne county, placed coal on the cars at an average cost, for one year, of 87 cents a ton. An operator in Schuylkill county said that he mined coal for an average of 45 cents per diamond car.

These figures have been gleaned from reliable parties who have no reason to conceal the truth. They are possibly some of the lowest averages which prevail, but they show that, under favorable conditions, it is possible to produce coal at an average cost of a dollar a ton.

The following figures are taken from the books of an operator in Schuylkill county.

Average cost per ton.

Year.	Inside.	Outside.	Total.
1892	65.07	28.05	111.42
1893	61.38	32.28	110.77
1894	63.58	33.88	117.86
1895	62.35	31.26	113.95

The following are the figures for 1896 month by month.

Month.	Inside.	Outside.	Total.
Jan.	67.49	32.17	118.55
Feb.	88.11	33.01	150.28
Mar.	67.90	28.35	115.71
Apr.	70.44	28.84	123.14
May	66.13	29.94	119.58
June	71.15	29.30	118.20
July	76.33	29.22	125.94
Aug.	69.99	29.07	114.37
Sept.	61.39	29.53	107.21
Oct.	62.82	26.42	102.35
Nov.	65.49	31.24	111.71
Dec.	61.19	29.60	127.01

Average for year 1896	69.03	29.72	117.83
--------------------------	-------	-------	--------

Taking the five years, we find that coal was produced at this colliery for an average cost of $\$1.14\frac{36}{100}$ per ton.

The following itemized account of a colliery for one month, shows how minute the subdivision is, so that the management can instantly trace any extra cost in mining.

Inside.	Cost per ton.
Mining Coal.....	60.44
Deadwork.....	07.20
Transportation and Hauling.....	07.74
Maintaining Roads.....	01.03
Maintaining Cars.....	00.72
Ventilation.....	01.44
Hoisting.....	00.88
Maintenance of Machinery.....
Pumping.....	00.49
Other expenses not above specified.....	01.78
Total inside.....	81.72
Total inside previous month.....	92.53

Outside.	Cost per ton.
Transportation.....	01.98
Handling.....	02.05
Cleaning.....	03.10
Weighing and Inspection.....	01.45
Culm.....	01.12
Maintenance of Machinery.....
Other expenses not above specified.....	01.31
Total outside.....	11.01
Total outside previous month.....	12.56
Fixed expenses.....	04.99
Total cost.....	97.72
Total cost previous month.....	110.08
Tonnage previous month.....	
New construction.....	
Horses and mules killed.....	

The following figures, relative to the inside expenses of producing a ton of coal, are taken from the books of one of the companies in the Northern coal field for three successive months in 1900.

INSIDE EXPENSES.

Mining.	Yardage.	Ventilation.	Trans- portation.	Timbering.	General.	Total.
50.35	5.94	2.30	10.04	1.07	2.24	71.94
57.63	2.63	1.81	10.80	1.33	2.81	77.01
44.70	5.74	2.48	9.45	1.74	3.41	67.52
Average 50.89 $\frac{2}{3}$	4.77	2.19 $\frac{2}{3}$	10.09 $\frac{2}{3}$	1.38	2.82	72.15 $\frac{2}{3}$

The following estimates of the cost of producing a ton of coal, are given by two men well versed in mining, both of whom are successful managers of collieries in the Northern coal field :

	First.	Second.
Transportation.....	.05	from .08 to .14
Ventilation.....	.02	from .02 to .03
Roads, rails, repairs.....	.05	from .10 to .15
Dead work.....	.12	from .05 to .10
Fixed charges.....	.03	from .02 to .03
Mining.....	.52	from .55 to .60
Supplies.....	.15	from .12 to .15
Outside expenses, breaker, clerk, etc..	.05	from .10 to .15
Total per ton.....	.99	from \$1.04 to \$1.35

One of these gentlemen produced 32,551 tons of coal last December at an average cost of \$1.04. Successful mining consists in keeping down these several items in the cost of production. This is the aim of the foreman in charge, and he is a happy and highly favored man if he can, during the year, produce coal at an average cost per ton of less than a dollar.

From the above data, it is safe to say that coal is produced from \$1.00 to \$1.30 a ton ; if we put the figure at \$1.25 a ton as the average cost throughout the anthracite coal fields of placing coal on the cars ready for the market, we should not be far from the actual cost of production.

To this we must add royalties, insurance, office expenses and taxes. Those who hold old leases have royalties as low as 12 cents a ton ; those of modern times reach 45 and 50 cents a ton in the Northern field, and about 40 cents in the Southern, on all sizes sent to market above pea-nut coal. A fair average for royalties would be 30 cents a ton. The above mentioned items would be approximately as follows :

	Per ton.
Royalties.....	.30
Insurance004
Office expenses.....	.004
Taxes.....	.005
	<u>.313</u>

This would make the cost per ton \$1.56. Transportation to tide-water costs about \$1.50 a ton ; the average price realized at tide is \$3.75 net for stove coal ; hence we have :

Cost of production per ton including royalties, etc...	\$1.56
Transportation to tide-water.....	<u>1.50</u>
Total.....	<u>\$3.06</u>
Price realized per ton at tide-water.....	\$3.75
Profit of operator per ton.....	69 cents.

These would be average profits ; some individual operators realize less than 25 cents a ton profit, while others are known to have passed the dollar mark. The following statement of T. P. Fowler, President of the New York, Ontario and Western Railroad corroborates our computation. "I do not know to what extent the anthracite business has been effected by railroad

rates, but I think it could be shown in an investigation of the subject, that all the operators have made money out of mining and shipping coal or in selling their ventures at an advance. Some of them, now said to be millionaires, began ten years ago with a hole in the ground as an asset. One of them, who has recently offered to sell at \$1,200,000, a property which cost him not over \$200,000, bases his valuation on the fact that he had averaged 70 cents a ton profit during the last few, comparatively dull, years on all coal mined. They have nearly all made money." (*Com. & Fin. Chronicle*, 1898, p. 744.)

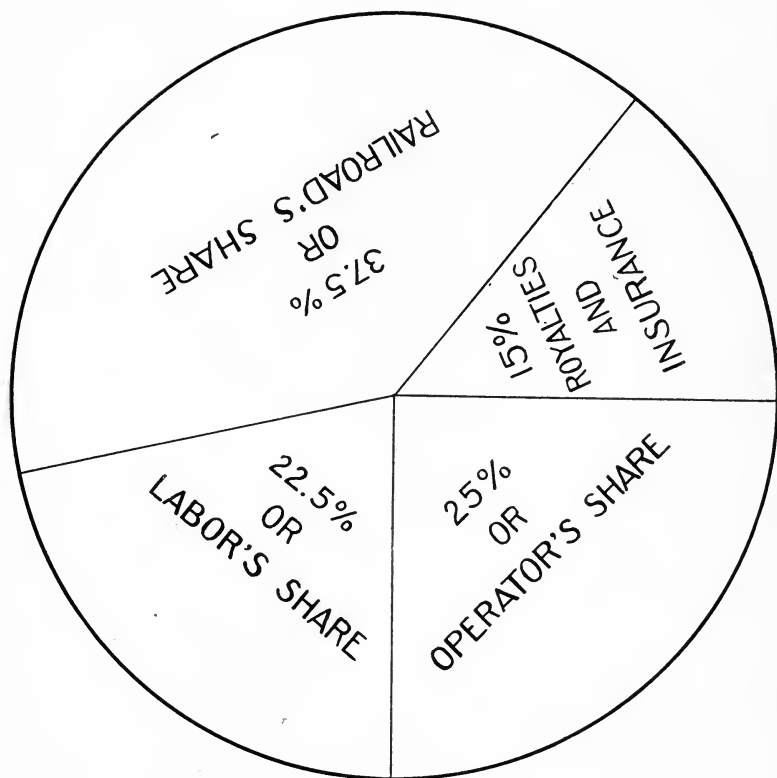
DISTRIBUTION OF THE PRODUCTIVE WEALTH.

The miner works for wages, the capitalist furnishes the instruments of production for profits, the land-owner permits the extraction of coal from his estate for royalties; but each one of them must look for his returns from the coal produced, which meets a public demand, and for which the consumer pays a certain price. The sum realized from the sale of anthracite produced at the 366 mines is the source that furnishes the motive power which keeps the industry in motion. Miners work, looking for their share of the distribution in the form of wages; the land-owner takes his share in the form of royalties; and the remainder is left in the hand of the capitalist, and represents his share.

In the production of coal three elements are essential. We must have nature, labor and capital. Nature has furnished the raw material, labor modifies it as to place and form, while capital furnishes the means whereby the modification is accomplished. Not one of these elements can be dispensed with.

Nature's forces, packed in these coal measures, is the basis of all the industry; this serviceable treasure of power has attracted to it both labor and capital. But before the coal is ready for consumption it must be cut, transported to the surface, broken, cleaned and washed in the breaker, and again transported to where men may advantageously use it. In this work the strong arms of scores of thousands of workingmen are engaged, and without this modification of the original contents of

CHART SHOWING PROPORTION OF DISTRIBUTION OF THE PRODUCTION
 OF THE MINES FOR YEARS 1820-1899, WHICH IS ESTIMATED
 AT 1,152,706,181 TONS.



If the coal mined during the above period sold for an average of \$4.00 a ton and distribution were made in the above proportion, the share of each of the interested parties would be :

Laborer's and Miner's Wages, 90c. per ton = \$1,037,435,562.90 or 22.5 per cent.
 To Carriers, \$1.50 per ton = \$1,729,059,271.50 or 37.5 per cent.
 To Operators, \$1.00 per ton = \$1,152,706,181 or 25 per cent.
 Royalties and Insurance, 60c. per ton = \$ 691,623,708.60 or 15 per cent.



the coal beds there would be no wealth produced and nothing to distribute.

Under our present form of industrial organization it is a natural law that capital is absolutely necessary. Put man, without capital, in possession of the richest coal deposits the world contains, and he is helpless to produce a ton of it. Give him a pick and shovel and he will be able to do something ; but the moment we do that we give him capital, that is, he uses previously stored-up wealth to produce more wealth. All the capital invested in machinery, buildings, shafts, etc., in the coal fields is wealth produced in past time and crystallized in this form, and without these aggregations of stored-up energies of past years the anthracite industry would be at a stand-still.

“Capital in general and labor in general coöperate in the production of the national dividend, and draw from it their earnings in the measure of their respective (marginal) efficiencies. Their mutual dependence is of the closest. Capital without labor is dead ; the laborer, without the aid of his own or some one else’s capital, would not be long alive.” (Prof. Marshall, Prin. of Econ., p. 617.)

It may be asked with logical consistency, if then, these three forces are coördinate in the production of wealth, why should they not be also coördinate in its distribution? If nature, labor and capital are equally essential to the production of the ton of coal, why should they not have equal right in dividing what has been produced? The argument has moral value, and leads up to the questions, how is distribution effected? Who performs the function of distribution? Are there any laws governing distribution? It will be said that the capitalist divides the spoil, and gives to each according to his good pleasure. He holds the key which unlocks the sources of wealth, and it is he who imposes conditions on the land-owner and the laborer, and compels them to serve for his profit. Is it just?

Justice is not the concern of the law of nature. When a fall of rock or coal kills a man in the mines, the law of gravity does not ask whether he was a good man or a bad man, whether he deserved to live or to die. No more does the law of supply



and demand follow the course of justice, and in distribution, each one receives his share by the operation of that law which consults not the claims of morality. The business of production is a game. Each party enters it on the best possible terms he can make, and each one gets out of it as much as he possibly can. The law which regulates the game is that of supply and demand, and in its operation it asks not whether the laborer has bread in his cupboard or not, it does not concern itself whether the capitalist is a millionaire or not. It operates, that is all, and each party makes the best possible terms in the work of production wherein antagonistic interests meet. When the contract is made, distribution follows accordingly. The share of the miner in a month may be \$40, while that of the capitalist is \$40,000; the distribution is according to the law of supply and demand, which has nothing to do with the morality of the case. But the question rings forth from thousands of miners with resolute emphasis, "Is it right? Is it morally right for one man to get \$40,000 and another \$40?" That is another question and one of the most serious ever asked by man.

Before we attempt an answer to this question, let us take a step further and ask, How can we remedy this inequality in the distribution of the productive wealth? What better system of distribution can be introduced? If we say to the capitalist, "You can't stand at that post any longer and dole out this pittance to labor and take the lion's share yourself," he will say, "If I can't, I withdraw"; then we have stagnation, and the capitalists can stand that better than the laborer. Some will say, "All right, let the state operate the mines;" then, as we saw before, we fall into the hands of the politicians. It is comparatively easy to see the injustice of the present method of distribution, but to solve the question, how to secure ideal justice in dividing the productive wealth, has puzzled the keenest minds of both ancient and modern times; and philosophers and economists of the present day are no nearer the solution than were their predecessors of a thousand years ago.

There is one thing which should always be kept in mind, namely, that the amount of wealth to be distributed is limited. "Contrary to the popular belief, the amount of wealth produced is small and insufficient, even in the professedly wealthy countries. Hence the acuteness of the problem of distribution and the difficulty of effecting a solution, for clearly the most skillful distribution in the world will never succeed in allotting large shares when the whole mass to be divided is small." (C. Gide, *Prin. of Pol. Econ.*, p. 406.)

Are we then to lie supinely and let the law of supply and demand operate? No. Workingmen have by combination been able to check the disastrous effect of economic laws, and there is no reason why the anthracite coal miners cannot do the same. There are two lines of activity possible: the one legislative and the other self-help. Some economists have gone so far as to say that a minimum wage ought to be established by law. It can undoubtedly be done, but the probable outcome of such a line of action would be absolute socialism, and capable laborers are not prepared to take the consequences of such an experiment. Any attempt at legislative interference with the rate of wages is fraught with serious consequences to the thrifty, industrious and capable workmen, who make up the rank and file of the industrial army, but whom sentimental reformers too often lose sight of. Fix a living wage by statute, and you place the incapable, who do not earn that rate, on the shoulders of the more efficient, and without their consent bid them carry the burden. But this injustice to the sturdy and steady laborers is not the only one incident to such action. The number of capitalists willing to hire the inefficient will be diminished and the price of commodities will be advanced. It is vain and delusive to look to legislative enactment for relief from the disastrous effect of competition among workmen. England attempted in past centuries to fix a minimum wage, but the growth of industrial liberty and freedom of contract burst these bands which interfered with economic development. To return to these crude methods would be retrogression, and none would resent it more vehemently than the efficient producers in the ranks of laborers.

The better and the surer way is the coöperation of the workmen for self-help. Miners can form an association and thus effectually enforce their claim to a just share in the wealth produced. But in pressing their claims, workingmen should remember that there is a point beyond which they cannot go. There are other claimants whose demands must be satisfied else industrial activity is not possible. Capital consumed in production must be replaced; interest must be paid; land-owners must get royalties to compensate them for depreciation of valuable property; business ability and energy essential to the organization and management of the mining industry must be rewarded. All these demands must be satisfied if mining operations are to be carried on. But laborers in demanding their share of the wealth produced can present a solid front, and defeat the unscrupulous operator who is ever ready to avail himself of disorganized workmen, to cut down prices and to pay starvation wages. Intelligent and persistent combination among miners for the maintenance of prices and rates of wages will secure them a just share of the product, while at the same time it defends them from the objectionable tendency to regard labor as a commodity, subject to the unrestrained operation of the law of supply and demand. Legislative interference has often resulted in evils which were not foreseen; intelligent coöperation of workmen for self-help seldom comes short of effecting its object. No one can help the miner as can the miner himself, and a free association governed by intelligence, far-sightedness and justice, can do more to secure an equitable distribution of the wealth produced in the anthracite coal fields than any appeal to State interference.

CHAPTER IV.

TRANSPORTATION.

1. EARLY MEANS OF TRANSPORTATION. 2. THE DEVELOPMENT OF THE RAILROADS. 3. ATTEMPTS AT REGULATING PRODUCTION. 4. TRANSPORTATION RATES AND PROFITS. 5. THE CLAIMS OF "COMMUNITY OF INTERESTS."
-

In 1840, Scranton was three days' journey from New York City; to-day it is only four hours and a half. Every branch of human industry has felt this great change in the means of transportation, and especially was this the case in the development of canals and railways, whereby the production of the anthracite coal mines could be brought to the cities and towns of the eastern and middle states. The object of this chapter is to trace the development of these means of transportation, and to show their relation to the anthracite coal industry.

The most difficult problem which confronted the pioneer operators in anthracite mining, was that of transportation. To mine coal was comparatively easy, but to get the product to market was a problem which taxed the energies of these men beyond what we can now-a-days imagine. Much money and time and labor were lost before it was successfully solved, and many of the men who conducted these experiments reaped nothing from their efforts but financial ruin and disappointment. To induce capitalists to build these railroads and canals, there must have been a prospect of great and enduring profits.

Especially must this have been the case in the early years of mining, when men were uncertain as to the foundation upon which they built. There are at present some ten railroads transferring coal from the anthracite fields to market, most of which depend on this commodity for their profits. The stocks of these roads stand high in the market, because there is a plentiful supply of anthracite for generations to come, whereby

they may hope to reap profits by transportation. The report of the Secretary of Internal Affairs of the State of Pennsylvania for the year 1897-1898, shows how dependent the railroads of the State are on the product of the mines. In that year, out of the 363,398,410 tons of freight handled, 229,585,840 tons were the produce of the mines of the State: they furnished 63.2 per cent. of the total tonnage. (Pp. 16-17.) The directors of the Reading railroad felt in 1894 that an effort should be made to divert the traffic of their road from being exclusively dependent on coal; and after six years' effort, they had succeeded in changing it only 7.58 per cent. When the coal trade was suspended for five weeks, in the fall of last year (1900), it resulted in a loss of \$1,200,000 to the Lehigh Valley railroad. The financial prosperity of these lines rests on the anthracite coal fields.

EARLY MEANS OF TRANSPORTATION.

We have seen how the Wurts Bros. hauled coal in wagons from their Carbondale mines to Lackawaxen, and transported it thence by water to Philadelphia. That was the method used by the Delaware and Hudson Canal Co. when first the canal was opened, and before the gravity road was completed between Carbondale and Honesdale. Teams charged for hauling a ton of coal for 13 miles, \$2.25 when sledges could be used, and \$2.50 in wagons.

The directors of the company attracted sufficient capital to build the gravity road, by showing that the cost of transportation would be reduced nine-tenths, or brought down to an average of about two cents per ton-mile. As the production of the mines increased it was reduced to one cent. This conservative company adhered to the gravity railroad and canal as means of transportation until the year 1896-7. At that time both were abandoned and all its coal is now shipped to market by rail. In the following year the profits of the Delaware and Hudson Canal Co. increased by \$1,076,124, which was largely due to that change.

In the lower section of the Wyoming coal field the Susquehanna River was regarded as an available means of transport-

ing coal to market, and many attempts were made at an early date to construct rafts to convey the commodity to Philadelphia and Baltimore. That was the way the Smith Bros. sent 50 tons to market in 1807. Sanguine capitalists in Wilkes-Barre thought it possible to construct an inland harbor there, and build boats for the anticipated trade; but their enthusiasm was quenched, as their initial attempt was wrecked on the first voyage. In 1835 the "Susquehanna" came to the above town from Owego. It was built at a cost of \$13,000 and designed expressly for the coal trade, but on its second trip it was wrecked at the Nanticoke Dam. In 1826, a steamboat, the "Codus," came to Wilkes-Barre from York Haven. It travelled at the rate of four miles an hour. After one trip the captain reported that it was a failure. Many experiments were made in boats which carried 15 tons of coal and which took five men to handle them. On their return trip their rate of speed often did not exceed two miles an hour, and the men frequently had to jump into the stream and help the craft along. These experiments continued until the year 1851, when, after a series of disasters, all further efforts in this direction were abandoned.

The failure of attempts to turn the streams to their service impelled men to seek relief in canals, and millions of dollars were expended in their construction. In the year 1846, no less than 643 miles of artificial water-ways had been built, for the purpose of conveying anthracite to the markets, representing a capital of \$22,000,000.

These were not built solely by individual capitalists.

The State of New York aided the Delaware and Hudson Canal Co. by two loans of \$300,000 and \$200,000 each. The State of Pennsylvania also aided other canal companies by similar appropriations.

It is interesting to notice that these canals which were so sorely needed did not escape censure and opposition. The cry of "monopoly" was raised, and the press denounced them as injurious to the public weal. Both press and public in northeastern Pennsylvania expressed such sentiments and vigorously opposed privileges granted the Delaware and Hudson Canal

Co., the Schuylkill Navigation Co., and kindred organizations of capitalists.

A writer in the *North American Review* in 1836 refers "to the mad outcry against corporate investments of property, issuing from that extravagant spirit of ultraism in all things, good and evil, which at this time agitates the public mind in one part or another of the United States." He speaks of the canals as "open highways, free to all the world, at the regular rate of tolls," and the benefit conferred by them on the State is pointed out in the fact, that in the year 1835 "the exports of coal from Pennsylvania (was) not far short of half a million of tons, bringing a return of two millions of dollars to that State," upon which industry depended "the prosperity of the manufactories of Lowell," Mass.

The cost of transportation by these canals varied. In 1826, it was 1.5 cents per ton-mile; in 1843, 1.25 cents; in 1845, 1 cent.

When, in 1846, the Schuylkill Canal was enlarged, so that boats of 180 tons capacity could be navigated, the expectation was that the rates would be lower, but that hope was not realized. In 1861 the cost per ton-mile on the Delaware and Hudson Canal was 9.4 mills. In the same year an investigating committee appointed by the State of New York computed rates on 26 canals, and found that the average was 8.86 mills per ton-mile. A special committee appointed by the same State in 1865 to investigate the coal trade, reports: "the mistaken policy of the State of Pennsylvania, in selling her canals, not only placed herself at the mercy and interests of private corporations, but by this act imposed heavy burdens upon the coal consumers of this and adjoining States—they being compelled to submit to the combinations of companies who connect the cheap with the expensive routes of transportation. In justice, Pennsylvania should impose restrictions upon these unjust monopolies."

The Legislature of Pennsylvania was, by the pressure of public sentiment, moved to action against these monopolies. As early as 1833 an attempt was made to restrict their rights, by limiting

their powers to either mining or transporting coal, and refusing to confer the two-fold character on the same party. The attempt was futile. The industry needed capital for its development, and men would not risk their wealth unless they were given rights which would secure them the largest possible returns, as well as perfect control over their property.

THE DEVELOPMENT OF THE RAILROADS.

The first railroad built in the anthracite coal fields was in 1832, by the Lehigh Navigation Co., connecting its mines at Summit Hill with the canal. After this date, new lines were annually built in different parts of the coal fields, until in 1846, they amounted to 436 miles, representing a capital of nearly \$18,000,000. In the report of the Auditor General for the year 1863, we have mention of over a thousand miles of railroad in the anthracite coal fields, representing a capital of over \$50,000,000. In 1873, the *American Encyclopædia* estimated the miles of railroad at 2,290, representing a capital of \$128,000,000. At present the following railroads are more or less interested in the anthracite coal fields, and each of them holds some coal land: Delaware, Lackawanna and Western; Delaware and Hudson; Erie and Wyoming Valley*; Erie; New York, Ontario and Western; New York, Susquehanna and Western; Delaware, Susquehanna and Schuylkill; Pennsylvania; Central of New Jersey; Lehigh Valley; and Philadelphia and Reading. Each of these has branches extending to collieries along its main line through the coal fields. Each railroad also extends beyond the coal fields, so that it is difficult to give any accurate estimate of the capital represented by them, directly connected with anthracite mining.

In the year 1896, Wm. Griffiths, mining engineer, said that 96.29 per cent. of all the anthracite coal fields were controlled directly or indirectly by the railroad companies. Since then, they have enlarged their control, so that virtually all the coal fields are to-day in the hands of the railroad corporations men-

* This railroad, together with the mining interests of the Pennsylvania Coal Co., were sold to the Erie Railroad last January.

tioned above, five of which control 90 per cent. of the total area. The following is the percentage controlled by the various lines as given by Mr. Griffiths :

Delaware, Lackawanna and Western Railroad	6.55 per cent.
Pennsylvania Railroad	6.24 per cent.
Central Railroad of New Jersey	17.30 per cent.
Lehigh Valley Railroad	16.87 per cent.
Philadelphia and Reading Railroad.....	42.25 per cent.
Delaware and Hudson Canal Co.....	2.29 per cent.
Erie and Wyoming Valley Railroad.....	1.82 per cent.
Erie Railroad.....	.77 per cent.
New York, Ontario and Western Railroad.....	.28 per cent.
New York, Susquehanna and Western Railroad.....	.54 per cent.
Delaware, Susquehanna and Schuylkill Railroad....	1.38 per cent.
Uncontrolled tonnage.....	3.71 per cent.
Total.....	<u>100.00 per cent.</u>

By the financiering of J. P. Morgan, at the beginning of this year, it is claimed that a community of interests between the Erie, the Erie and Wyoming, the Lehigh Valley, the Central of New Jersey and the Philadelphia and Reading, has been brought about which will give the syndicate control over 79.01 per cent. of the total contents of the coal fields.

In 1846, the 436 miles of railroad were owned by 20 separate companies. In 1863, the 1,000 miles of railroad were owned by 18 companies. In 1872, six railroads had secured sufficient control of the coal fields to attempt to regulate production and to fix transportation rates. In 1890, there were 12 companies interested, but in 1901 they have virtually been reduced to four. No one need claim the title of prophet to predict that the anthracite coal fields are destined in the near future to come under the control of one hand, when all conflict, breach of faith, and cut-throat prices will have ceased.

The railroads have superseded the canals. The last of these water-ways was abandoned by the Delaware and Hudson Canal Co. four years ago. Transportation by rail is cheaper, speedier and open all the year. The old gravity road of the Delaware and Hudson Canal Co. was expensive and antiquated, and the

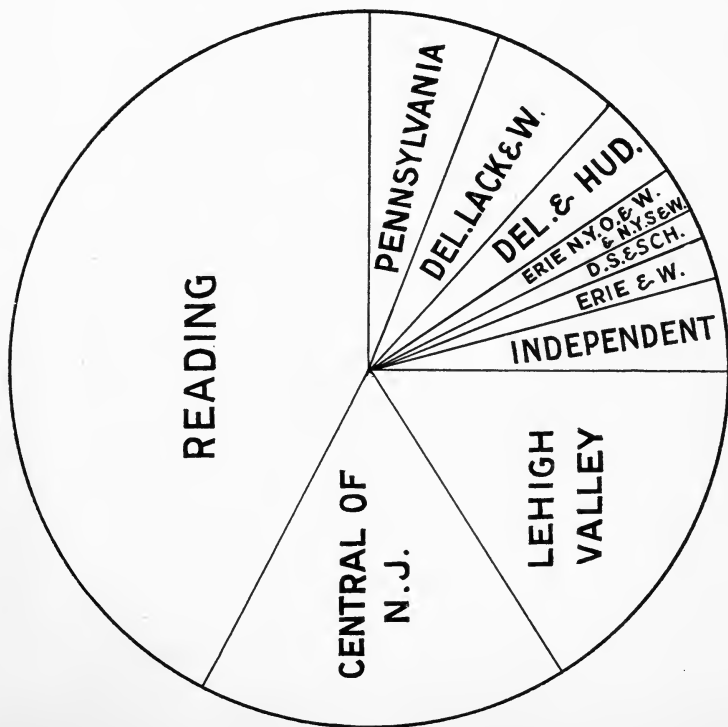


DIAGRAM SHOWING RAILROADS IN COMMAND OF THE FUTURE SUPPLY OF COAL, ACCORDING TO W.M. GRIFFITHS' COMPUTATION.

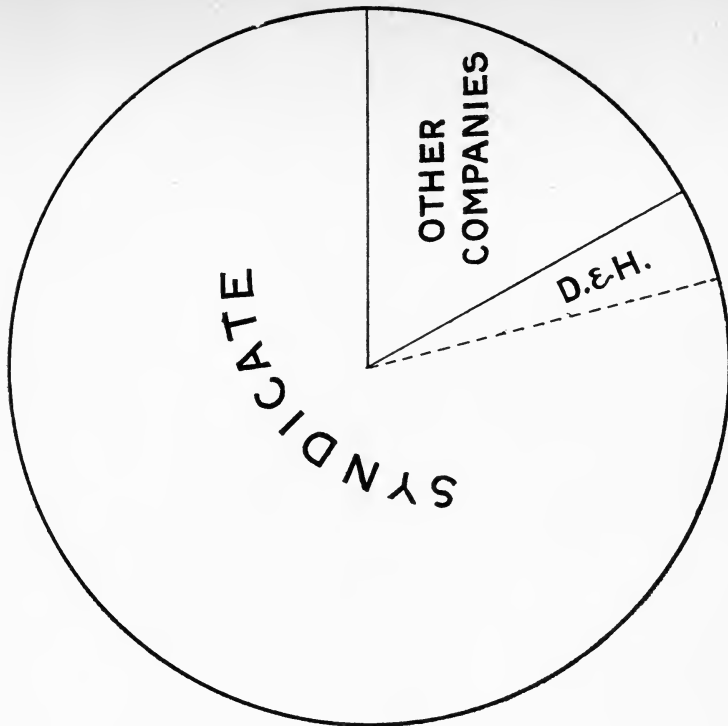


DIAGRAM SHOWING THE SYNDICATE'S CONTROL OF THE FUTURE SUPPLY OF COAL. IT IS 79.01%. IF THE DELAWARE & HUDSON IS ABSORBED IT WILL BE 81.3%.



same was true of the canal. The stress of competition, as well as self-interest, led the company to make a change, which, though it involved great expenditure, brought quick returns.

For many years the Reading Railroad found a strong competitor in the Schuylkill Canal, but in 1870 it leased that water-way and thus removed its rival from the field.

The process of consolidating the several small railroads has been the work of years. The example of the Delaware, Lackawanna and Western, which effected this by 1881, is typical. In 1851 the Lackawanna and Western Railroad from Scranton to Great Bend was chartered, and known as the northern division. In 1849 the Delaware and Copp's Gap Railroad was chartered, and known as the southern division, extending from Scranton to Delaware River. In 1852, the Bloomsburg division was constructed from Scranton to Sunbury. In 1853 the northern and southern divisions were consolidated under the name of the Delaware, Lackawanna and Western Railroad. In 1856 the Warren Railroad, extending from the Delaware River to a junction with the Central Railroad of New Jersey, was leased. In 1868 the Morris and Essex Railroad was leased, which, with the Warren Railroad, brought the company's line to the Hudson River. In 1855 a perpetual lease was taken of the Cayuga and Susquehanna Railroad. In 1869 control was obtained of the Syracuse, Binghamton and New York Railroad by purchasing a major part of its stock. In 1873 the Delaware, Lackawanna and Western and the Bloomsburg companies were consolidated. In 1881 control was obtained of the Sussex Railroad by purchasing a major part of its stock, and in the following year a lease was taken of the New York, Lackawanna and Western Railroad, which brought the company to Buffalo.

Thus was evolved a strong railroad company, operating about 900 miles of railroad, and capable of meeting the requirements of the anthracite coal trade of the Wyoming and Lackawanna Valleys.

The Lehigh Valley also in the Middle coal field conducted the process of consolidation about the same time.

In the year 1861, the Reading Railroad began to absorb the

small lines in Schuylkill county, and about the same time it frustrated the attempt of individual operators to build an independent line to tide-water, by securing control of the stock. In the year 1871 this company, after thirty years of life as a carrier only, resolved to enter into the business of mining coal, and bought 100,000 acres of coal land for \$40,000,000. In 1873 it loaned \$800,000 to individual operators who were in financial distress because of industrial friction and competition. The Reading ultimately bought out the interests of these men.

The policy of the railroads at this time was expressed by a writer in the Pottsville *Miner's Journal* of Dec., 1868, who said "the carrier, it would appear, ought to be master of the situation and not the victim of vascillating circumstances." Others, however, held a different opinion, for in the issue of Nov. 21, 1868, of the same periodical, a writer, referring to the dullness of the coal trade in Schuylkill county, attributes it to the action of the Reading: "It is simply because we are bound down by an immense corporation which is endeavoring to wind its coils around our limbs and hold us in complete bondage, while it eats out all our substance." The complainant might have consoled himself with the fact that the corporation in the pursuit of such a policy ruined itself.

In the business of transportation, the aim is to reduce the cost as much as possible. This was the aim of the old canal companies in enlarging their boats from 50 tons capacity to 300. This was done by the Schuylkill Canal Co. in 1846, and by the Delaware and Hudson Canal Co. in 1849. The same aim governs the action of railroad carriers. In the early years of railroad transportation, the cars called "jimmies," only carried 12,000 pounds. The first engine the Delaware, Lackawanna and Western put on the road in 1853, the "Spitfire," cost in operating expenses, 11.28 cents per mile. As stronger and better engines were built, the "jimmies" gave way to gondolas, with a capacity of from 60,000 to 80,000 pounds. Still larger engines have been built, which the employes have dubbed "hogs," and steel gondolas have been introduced with a capacity of 100,000 pounds. The old engines drew from eight to

ten gondolas of 80,000 pounds capacity, but the "hogs" draw from thirteen to sixteen of them. The use of the air-brake has also reduced the number of employes necessary to handle the larger trip of cars taken to tide-water. The object is to cut down transportation expenses in carrying anthracite coal to market.

ATTEMPTS AT REGULATING PRODUCTION.

When the production of the mines reached a magnitude which proved profitable to carriers, rivalry between the transporting companies began, and from the forties on we find some of the railroad companies pleading for a common understanding, in order that the markets might not be glutted, and that prices might be kept at remunerative points. The difficulty in reaching a common understanding has always lain in the fact that the capacity of the mines was greater than the market demand at profitable rates. When the carriers were free to act as they chose, each was eager to increase its profits, and did so by furnishing all the cars needed by individual operators. The inevitable result was over-production and a fall in prices which reduced the profits of both operators and carriers. In the year 1895 free competition among the carriers reduced their returns by over \$4,000,000. During the last sixty years free competition and regulation of production have succeeded each other, and the ruinous effect of the former has been the cause of the latter. In the fifties and sixties sectional rivalries prevailed. The southern and northern operators competed for the markets of the East, and the spirited rivalry which existed between them engendered much antagonism.

From 1868 to 1875 the presence of a common foe which disregarded the boundary line between the Northern and Southern coal fields brought the operators together. In 1868-1870 the mine employes were organized and for half a decade the Workman's Benevolent Association flourished. But as soon as that organization was dissolved the operators' association was also disbanded, and the years 1876-1877 were years of competition. In 1878 an agreement was effected which lasted for

five years, followed again in 1883-4 by free competition. In 1885 the carriers tried another agreement which lasted until 1887, when the Inter-state Commerce Law dissolved it, and competition again held sway. In 1892, the M'Leod scheme of consolidation was launched, which failed after eighteen months' trial because of the financial inability of the Reading to carry it out, and again competition came into play. In 1896 the companies again came to an agreement, which has culminated in the syndicate formed at the beginning of this year, and which controls about 79 per cent. of the coal land. The disastrous effect of free competition is apparent in the history of the financial difficulties of the Reading Railroad, which has passed into the hands of receivers four times during the last twenty years, each date bearing close connection with the periods of free competition, as may be seen from the following :

Years of Free Competition.	Years of Reading Bankruptcy.
1876-1877	1880
1883-1884	1884
1893-1895	1893 and 1896.

The disastrous effects of competition have been set forth by Jos. S. Harris and A. A. M'Leod in the *Forum* (Vol. 13). The last named gentleman denied that the attempt at consolidation in 1892 was a trust. He claimed it was rather a step forward in national progress in the problem of transportation, upon which the prosperity of the country largely depends. Mr. M'Leod said that competition between the several railroads was not very keen; they were in close touch with each other; but the individual operators and the corporations entered into spirited competition in producing and selling coal.

The first attempt among operators to seek community of interests ~~dates back to 1849~~, the year when the Bates Union among the miners of Schuylkill county flourished. In March and July of that year, the operators met in Pottsville. The object was to fix the prices at which coal should be sold at Port Carbon. To maintain these prices—\$2.25 for Red Ash and \$2.00 for White Ash—they resolved that all shipment of coal should cease for three weeks, beginning March 19th. All the

members signed the agreement before they left the room. In the month of July following, signs of dissolution were apparent, and strenuous efforts were made to perpetuate the organization. In November, 1850, they met again for the purpose of adjusting prices and securing better accommodation for the handling of coal at the wharfs.

In 1856 another attempt was made to organize the operators of Schuylkill county, who were hard pressed by the operators of the Northern coal field. In the following year, the Coal Association sought relief from the pending ruin of the coal trade by placing John Tucker, President of the Philadelphia and Reading Railroad, at its head. In 1859 the individual operators, crushed between competition and high transportation rates, again tried organization; but most of them were unable to stem the opposing currents.

Schuylkill county, at this time, was afflicted by the "Mollie Maguires," and many individual operators could not say their collieries were their own; the "Mollies" by intimidation and violence ruled, and a reign of terror prevailed in many localities. Competition, high railroad charges, and labor troubles made it impossible for individual operators in the Schuylkill region to conduct operations, and most of them sold out in the sixties.

From 1868 to 1875 the Workingmen's Benevolent Association took in the whole of the anthracite coal fields. All the employes were united, their representatives met in convention and drafted a list of grievances which were presented to all the operators in the anthracite regions. The presence of a common foe brought together the rival operators and carriers, who had hitherto antagonized each other. They combined against a common enemy, and in March, 1869, the different carrying companies met in New York City, for the first time, to fix rates. In November following, the Anthracite Board of Trade was organized in Schuylkill county, whose object was to deal with the representatives of the Workingmen's Benevolent Association and adjust prices.

This organization acted in conjunction with some of the operators of the Northern coal field, but the old antagonism

between rival mining companies prevented perfect understanding, and in May, 1870, the association passed a vote of censure on the action of the Pennsylvania Coal Co. in conceding to the demand of the miners. During these years, notwithstanding the fact that the operators felt the need of united action, their anxiety to turn their neighbor's difficulties to their own profit, induced many of them to conciliate their employes by offering liberal terms to them. The Delaware, Lackawanna and Western, the Delaware and Hudson, and the Pennsylvania Coal Co., acted in concert in the Northern field, but these companies did not consult the wishes of the operators in the Southern and Middle fields when they effected an agreement with their employes. The Lehigh and Wilkes-Barre Coal Co. acted in conjunction with the Schuylkill operators. This explains the two systems of wages which prevailed in the anthracite coal fields till the last strike.

The operators in the Southern and Middle coal fields as well as the Lehigh and Wilkes-Barre Coal Co. in the Middle and Northern coal fields effected a settlement with their men on a sliding scale, based on the price of coal at different centers where the commodity was sold; the three companies in the Northern field settled with their men by paying them so much per car for mining coal. This shows how the operators were divided. Up to the seventies there were too many individual operators, dominated by self-interest, to make a community of interests possible. But the work of consolidation was making rapid strides.

In 1867 the Delaware and Hudson Canal Co. bought out the interests of the Union Coal Co. for the consideration of \$1,575,000. The Lehigh Valley, about the same time, got control of many individual collieries in the Wyoming Valley, while the same company, together with the Pennsylvania railroad, were rivals in securing coal land and in absorbing or controlling independent collieries in the Southern and Middle coal fields. In Schuylkill county the Reading had done the same, so that by 1870, according to the statement of the Pottsville *Journal*, 75 per cent. of the collieries of the county was under its control.

The leading railroads in the latter sixties and early seventies felt that their interests necessitated an understanding as to the amount of coal to be carried to market. These were years replete with labor troubles, and local associations of operators in the Southern and Northern fields were wrestling with their employes, who precipitated strike after strike, because of misunderstandings. It was apparent to all that some general understanding was needed, for the rivalries of operators and the cunning devices to which they resorted to increase their production were demoralizing and ruinous. Hence, in 1872, the carriers effected an agreement which lasted until the year 1875. That year the Workingmen's Benevolent Association dissolved, and, with the disappearance of the common enemy, the old rivalries between operators reappeared, and the carriers' agreement as well as the local combinations of employers were abandoned. Since then agreement after agreement has been entered into, each in turn to be broken by bad faith on the part of some of the carrying companies. During the Presidency of Mr. Roberts over the Pennsylvania railroad, that line generally acted independently, and sent to market a larger tonnage than its importance in the anthracite coal fields warranted. For over twenty-five years (1864-1890) the company, to the gratification and profit of its employes, operated its two collieries in Lykens Valley almost full time, producing annually for the major part of that period about 500,000 tons of coal.

Each one of the railroads, excepting the Reading, has been guilty of breach of faith in shipping more than the percentage assigned it by the combination. The futile attempts at regulating production clearly indicate that it is only possible by centralization of control, and this is the result to which events have led. The present syndicate is only the natural result of the experience of anthracite transporting companies for the last half century.

The basis on which the amount to be produced is allotted to the several railroads is the capacity of the plants under their several control. If one railroad has under its control plants capable of producing 1,000,000 tons a month, and another car-

rier only controls mines with a capacity of 500,000 tons a month, the allotment of the first would be double that of the second. When the allotment has been assigned to a railroad, the individual operator in its territory is assigned his quota of cars according to the capacity of the plant operated by him.

The following table shows the shipment and allotment of the several roads for the years specified :

Railroad.	Shipment of 1895.	Allotment of 1896.	Allotment of 1898.	Shipment of 1898.	Shipment of 1900.
P. & R.	21.47%	20.50%	20.50%	19.62%	20.70%
L. V.	15.81	15.65	15.65	16.43	15.32
C. of N. J.	11.51	11.70	11.70	11.04	11.77
D. L. & W.	13.16	13.35	13.35	13.83	13.33
D. & H.	9.34	9.60	9.60	9.29	8.81
Pa.	10.59	11.40	11.40	11.46	11.46
E. & W.	3.75	4.00	4.00	4.43	4.64
Erie.	3.91	4.00	4.00	3.81	3.86
N. Y. O. & W.	3.06	3.10	3.10	3.27	3.68
D. S. & Sch.	4.11	3.50	3.50	3.71	3.48
N. Y. S. & W.	3.02	3.20	3.20	3.11	2.95

TRANSPORTATION RATES.

The one factor which has drawn these companies together to regulate production is the hope of increased profits ; and this same desire, by transgressing the boundary lines laid down by the combination, has disrupted the organization. When production was curtailed and prices advanced, the temptation to reap large profits while prices were high led each line, with the exception of the Reading, to a breach of faith.

The profits reaped by railroads have been great when they have been able to maintain prices. Free competition in 1877-79 brought down prices from \$4.18 a ton to \$2.55 and \$2.60. In 1884-85 prices came down \$1.00 a ton, and preceding the M'Leod attempt at combination, coal was sold at \$3.10 a ton. In 1895 it was down to \$3.08. When we remember that the cost of mining and royalty, etc., is about \$1.70 a ton, the profits during these years of competition were not large. But in the years of curtailment of production, prices were between \$4.00 and \$5.00 a ton, which increased the returns of the companies on an average of over \$1.00 a ton.

It has been affirmed that the railroads can raise prices as they



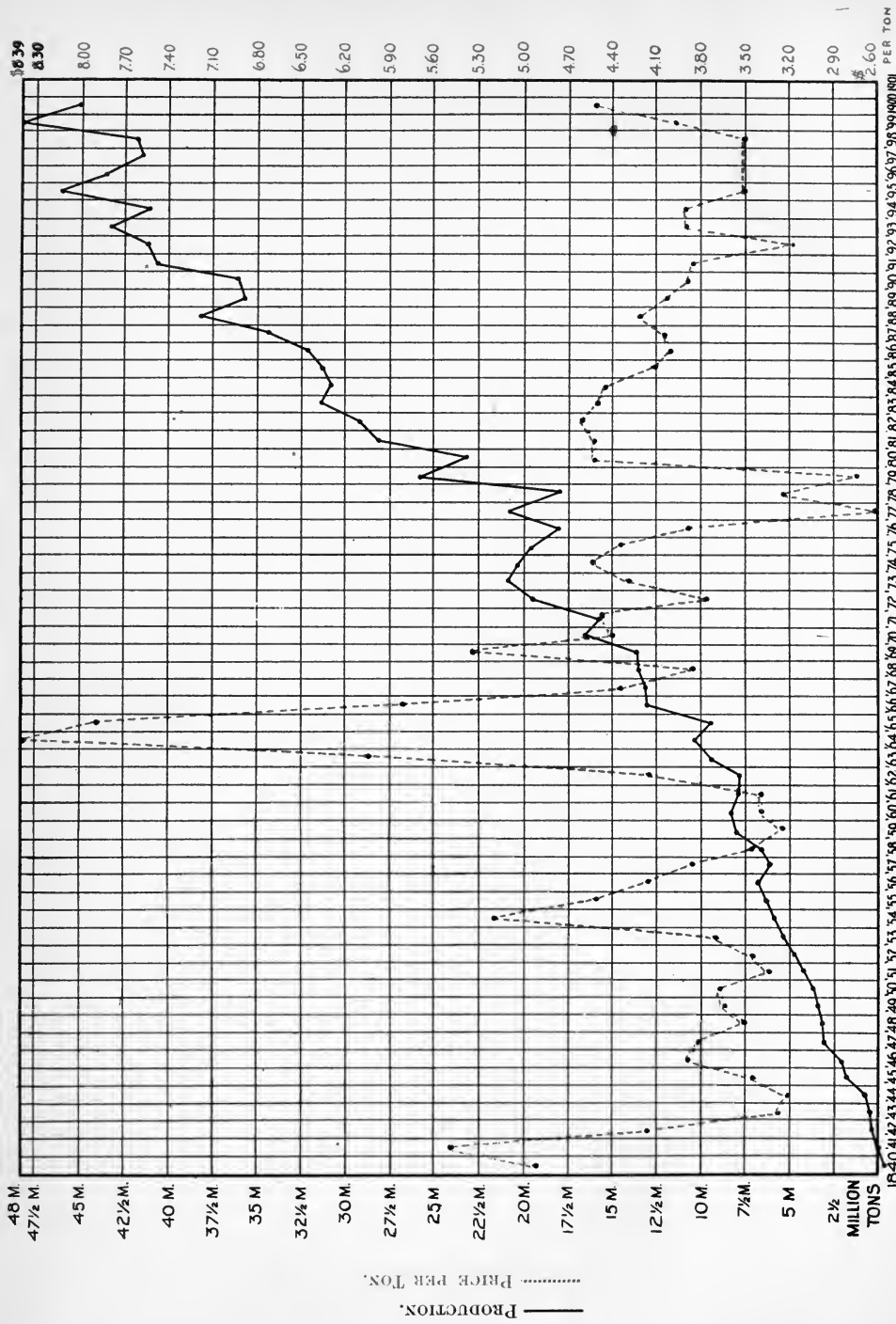


CHART SHOWING THE PRICE OF COAL AT PHILADELPHIA AND PRODUCTION FROM 1840-1899.

choose, when an understanding prevails. A. A. M'Leod said that this is a mistake, for the presence of bituminous coal "in every market operates as a prohibition upon any unreasonable advance in the price of anthracite coal, even if the power and disposition to make such an advance, existed."

Railroads have two methods of dealing with individual operators; they either buy their production at the breaker, giving them a stated price per ton or a percentage of tide-water prices, or they carry their coal to market at certain rates which vary with the seasons.

The individual operator has always fought for low transportation rates to market. In 1850 the railroads charged \$1.70 a ton to New York City, and the operators fought for \$1.60, and bitterly complained of unjust distribution of cars. When, in the year 1868, coal advanced 75 cents a ton in the market, the railroads took 40 cents of it by advancing the rates. During that year the Reading Railroad advanced transportation rates 52 cents a ton. In the year 1869 this same railroad charged \$2.43 a ton for a distance of 93 miles, or an average of 2.61 cents a ton-mile; and the president of this company testified before an investigating committee of the State legislature, that the railroad advanced rates from \$2.08 to \$4.08 and as high as \$6.08 in a few days, for 93 miles, between Port Carbon and Philadelphia. Mr. Gowan justified this, by stating that according to the decision of the courts of the State, the railroad company had a right to charge any sum it pleased.

Before the same legislative committee, an officer of the Delaware, Lackawanna and Western Railroad testified that they had charged \$2.00 a ton for 9 miles distance, or an average of 22.22 cents per ton-mile.

The receipts of some of the companies show how profitable is the carrying trade. We saw how the Delaware & Hudson cleared all its indebtedness within ten years after its gravity road and canal were opened. In 1869 the same company paid $11\frac{1}{4}$ per cent. on its capital stock. In 1870 the Delaware, Lackawanna and Western paid 16 per cent. dividends to its stockholders. In 1865 its capital stock was estimated at

\$10,247,050. During the following six years, according to the testimony of the chief clerk of the company before an investigating committee, the stockholders had realized in returns a sum aggregating \$9,307,174.69. And the high quotations of the stock of this company during recent years, prove that its profits are still large. The Delaware & Hudson earned 9.16 per cent. on its capital stock in 1900. In 1898 the Delaware, Lackawanna & Western realized on the transportation of coal 11.62 mills per ton-mile, and in 1899, 9.46 mills. It is stated that railroad companies do not make money on their mining operations, but that the returns on freight recoup them. In 1898, the Delaware, Lackawanna & Western lost \$1,726,093 on its mining operations, but, in 1899, it realized a profit on them of \$904,173. The Pennsylvania Coal Co., in 1899, lost \$400,000 on its mining operations and still it was recently able to sell its coal land and mining plants, at a higher figure than was ever before paid for such properties in the anthracite coal fields. Railroads such as the Reading suffer from over-capitalization; for thirty years this road kept strictly to its transportation duties, but when the Lehigh Valley and the Pennsylvania threatened to invade its territory, its only hope of existence was to enter into the mining industry.

During its eventful career in the industry it has suffered from what Paul de Rosiers has called "mégalomane," and under the excitement of this disease, it bought hundreds of acres of (coal) land which did not contain a pound of coal.

The rates paid by the railroads to the individual operators computed in percentage on tide-water prices were: before 1892, 50 per cent.; in 1892 M'Leod raised it to 60 per cent.; and in the agreement made between J. P. Morgan and the individual operators last October the rates were advanced to 65 per cent. Under these rates it is more profitable for the individual operator to sell his production at the breaker to the railroad company than pay freight rates and personally sell the commodity in the markets.

The carriers of coal have not had their own way. The legislatures of New York and Pennsylvania have frequently conducted investigations into their transactions, and passed laws

to restrain their greed or make their combinations illegal. In 1865 a legislative committee from Albany investigated railroad charges, and showed that they had, during the years 1861-64, advanced prices 145 per cent. It raised a warning voice against the monopolizing of the carrying routes to market. In 1871 a legislative committee of Pennsylvania investigated the consolidation effected by the Reading, and took testimony from other carrying companies. In 1873 the constitution of the State was revised, and a clause inserted prohibiting the granting of mining and carrying privileges to the same company. But the evil was done in former years and was then past redemption. In 1885 a law was passed making it unlawful for railroad companies to lease their collieries to other companies. In the same year the Attorney General of Pennsylvania brought suit against the combination on the plea that canals and railroads should be public highways and all railroads and canal companies common carriers. In 1887 the Inter-state Commerce law was passed, and the legislatures of both New York and Pennsylvania again investigated the combination which then existed. In 1892 suit was brought against the bold scheme of M'Leod to combine the anthracite-carrying companies, and a few years later a legislative committee of Pennsylvania investigated the methods of business of the anthracite railroad companies. In 1897 the Attorney General of New York tried to compel the presidents of the anthracite railroads to answer before court to the charge of hindering competition and enhancing prices. And this year officials of these same railroads have been summoned before the Sub-Committee on Transportation of the Industrial Commission. But notwithstanding all these attempts corporate lines have been annually drawn tighter and more tight around these coal fields, and the dawn of the twentieth century has seen the highest point reached in perfecting monopolistic control of the anthracite coal industry.

THE CLAIMS OF "COMMUNITY OF INTERESTS."

We see from the preceding sketch that a persistent effort, extending over half a century, has been made to control pro-

duction and maintain prices. Several forces impelled the carriers to this effort. Consolidation went on rapidly during the active years of the Workingmen's Benevolent Association ; and the highest point attained in this direction is coincident with the most perfect organization of employes ever seen in the anthracite coal fields. Unionism among the employes has been a prime cause in the development of the anthracite syndicate. Another cause was the thirst for gain on the part of individual operators, which could not be restrained save by the strong hand of the carrying companies. Other causes were over-production, and the necessity of railroads, heavily burdened with debt, to maintain prices and thus save themselves from insolvency.

The benefits to be achieved by consolidation are : (1) A better system of transportation, a more regular movement of the production and a saving in the transportation equipment, which will reduce the cost of bringing coal to market. (2) The doing away with coal agents and hence the cheaper marketing of coal. (3) The working of the most profitable collieries and the shutting down of the more expensive ones. In this way, by mining coal under the most favorable conditions possible and using mining plants to the greatest profit, the cost of production will be reduced. (4) Greatly reducing the cost of management by centralization, for much of the expenses now incurred by divided interests in collieries and railroads, would thus be avoided. (5) The maintenance of prices at a steady scale, which would yield reasonable returns to labor, management and capital.

The forces compelling consolidation were irresistible ; the benefits aimed at were laudable. One of the witnesses before the Industrial Commission expressed an opinion that a saving of \$1.00 a ton could be effected by community of interests. Three facts stand out clearly from the historical sketch given above.

1. That the anthracite coal railroads would be ruined under free and unrestricted competition. The years when it was indulged in ended in disaster and confusion, and the railroad companies were convinced by costly experience that the only possible way to evade hopeless ruin was to effect some agreement.

2. That as long as the railroads were under separate and independent management, no reliance could be placed on the voluntary agreement entered into. Every one of the railroads save the Reading was guilty of breach of faith in shipping more coal than its assigned quota. Various methods proposed were defeated by subterfuge and bad faith. An attempt to impose a fine for every ton shipped above the allotment was impracticable. No scheme to restrain the unscrupulous was effective, and each agreement resulted in a disagreement because of the breach of trust of some of the recalcitrant members of the combination.

3. That no legislative interference has been able to prevent the development of industrial combination because the conditions of the trade and the interests of the coöperative parties producing coal demanded it. Vain have been the attempts of the legislatures of both New York and Pennsylvania to restrain the combinations of anthracite carriers, and the cause is that the industry must be protected in some way from ruinous competition if it is to be continued.

The syndicate exists for profit. The end in view in its creation is to increase profits. It can do this in two ways, (*a*) by reducing expenses of management and cost of production, and (*b*) by curtailing production and raising prices. In the first it serves a legitimate and useful end; in the second it taxes the public and establishes unjust rates. The anthracite syndicate is likely to seek profits in both these ways. It has many advantages. Command of the anthracite coal fields gives it a commodity which cannot be duplicated. The railroads which seek community of interests are the only avenues of communication entering these coal fields. And a well-established market whose demand is constantly increasing affords them a field of operation which yields safe and large returns. If the syndicate serves the public by giving the consumer a part of the benefit acquired by better management, it will place itself above criticism; but if instead of being governed by far-sighted management, it shall place an unjust burden on the public, then it will be wrecked upon the rock of public policy which has proved disastrous to combinations which exploit consumers. Com-

petition, when ruinous to employers, cannot benefit either the employe or the consumer. But a syndicate which assumes more the character of a parasite than that of an organism which benefits society, is a public curse and must perish in the business world because of its gross disregard of commercial morality.

The syndicate will adjust supply to demand. It will not be many years hence, however, when the production of the collieries will not exceed the demand. Mining engineers are of the opinion that the anthracite coal fields are fast reaching the point of maximum production. When once that is reached, the market demand for anthracite may exceed the capacity of the collieries, and then "stone coal" will command prices which may exceed the cost of production. It is a commodity which cannot be duplicated, and it will be to the interest of the syndicate to extend the limited supply at fancy prices over as long a period as possible. Thus, there is a possibility of the Reading occupying as enviable a position fifty years hence, as it has occupied an unenviable one in the past generation. It commands the largest supply of coal, which will last a hundred years, while that of the other railroads in the community of interests will last little over half that time.

In the meantime, monopoly prices cannot rise indefinitely, for the syndicate must market a tonnage large enough to secure the maximum revenue. The collieries can now produce more than can be profitably marketed. To keep production at the maximum net profit point is the aim of the business men at the head of this concern.

Their commercial instincts based on long experience are their guides, and it is a mistake to imagine that they can raise prices as they wish. The laws of supply and demand govern them, and the presence of bituminous coal will ever compel the anthracite monopolists to sell their commodity at prices which will secure them the greatest returns on their investment. When production shall fall far below the market demand at prices which prevail to-day, anthracite will be a luxury and find its way to the homes of those who will be able to pay the fancy price it will command, according to the law that the smaller

the supply in relation to the demand, the higher the price. This will compensate the operators, who, as the supply diminishes, will find the cost of production increasing, and it will enable them to defer the point of marginal returns in the working of thin seams of coal.

The tendency of all departments of industry is to consolidation, and State interference has not been able to check it. It is not likely that the present anthracite syndicate will be prevented from carrying out its scheme by the power of the State. The condition of the industry necessitates combination, and if the men at the helm are governed by far-sighted policy, the public will be better served, and this store of wealth will render greater social utility. There is a possibility of the syndicate abusing its power, and the State can render public service to the consumers by exercising supervision over the monopoly and seeing that the public is served and not bled. Authorities differ as to the power the State should exercise. A radical cure would be for the State to assume control of the syndicate and run it in the interest of the people; but as we have formerly shown, under our present political régime, that cure would be worse than the disease.

Any attempt on the part of the State to fix profits would be defeated by watering stocks and increasing costs of management.

The attempt by the Commonwealth to fix rates would be useless in this instance, for most of the railroads carry their own product to market. If the State attempted to fix market prices it would be an interference with commercial liberty which would lead to confusion and disaster, and could never be enforced.

What the State can do is to remove all restriction to possible competition from other coal fields; to see that the syndicate deals fairly with the individual producer, the employe and the consumer; to hold the members of the syndicate responsible for any breach of trust injurious to public policy; and to force publicity as to capitalization and profits. Any larger interference than this is fraught with grave danger, and, under present commercial custom, would not be tolerated. The anthracite

industry may be compared to a ship: left to free competition, it is the ship driven hither and thither by the laws of nature: under the control of a syndicate, it is the ship ably manned and directed by instincts based on experience for a definite end; the sphere of the State is to see that the timber in the ship is sound, that it be not over-loaded, that the employes be treated justly, and that, in its commercial activity, it does not play the pirate.

CHAPTER V.

MINING MANAGEMENT AND INSPECTION.

1. THE NEED OF DISCIPLINE. 2. THE DUTIES OF INSIDE FOREMEN. 3. THE DUTIES OF MINERS. 4. THE DUTIES OF OUTSIDE FOREMEN. 5. LEGISLATIVE INTERFERENCE.
-

An army in the field must be under strict discipline. Its efficiency largely depends upon its capacity to faithfully carry out the commands of its general. The army mining coal in the anthracite fields must also be subject to discipline, and the efficiency of every colliery largely depends upon the observation of rules and regulations gained by experience for the safety of life, limb and property. All mines are not equally dangerous, so that some regulations strictly enforced in one locality need not be an object of solicitude in another. But in every colliery there is so large an element of danger that constant care must be exercised by foremen and laborers, in order to protect themselves. No coal field in the country is as gaseous as that part of the anthracite fields between Pittston and Nanticoke. In this section it is not unusual to see an iron pipe stuck in the soil, whence comes a sufficient quantity of gas to burn without intermission for weeks if ignited. To work mines located in this section needs constant discipline, and the greatest care must be exercised.

A moment's neglect on the part of one man may suffice to cause the death of many. The number of accidents in mining is large, but the fact that an industry fraught with such grave danger is successfully carried on without more appalling calamities than befall the miners, is a high tribute to the intelligence of those in charge as well as to the discipline maintained among the men. One of the inspectors says in his report of 1898, that "it is nothing uncommon to find mines where two-thirds of the miners know not the English language, and where they

are directed by the foreman by signs ;” and notwithstanding this, the number of accidents among these men, if computed according to the number of Slavs employed, does not exceed that among English-speaking miners. Such conditions, however, involve greater responsibility on the part of the foreman, who, in the discharge of his duty, finds greater willingness to obey and submit to discipline among the Slavs than among men of greater familiarity with mining.

It is not easy to enforce discipline. Men resent it, even when it is their interest to obey. It would be easy to multiply instances of gross neglect due to thoughtlessness. A foreman of wide experience said “not a day passes in my life but I have to stop one or two miners, because they will not put up the necessary props in their chambers to protect themselves.”

Men differ greatly. Some miners by nature put safety of life and limb first, others seem almost oblivious of this in their eagerness to get through their day’s work, and the foreman can only enforce his commands by stern discipline. Most men are governed more by sentiment than by reason, which makes it the more difficult to enforce wise laws. Sometimes, when men are discharged for gross neglect, the hostility of their fellow workmen is aroused and trouble results.

How best to enforce discipline is a question often discussed, and some have advocated prosecution by law when mining regulations are disregarded. The personal element in the character of the foreman has much to do with efficiency of management ; one man can enforce discipline by a sign, another cannot effect it even by stentorian expletives. Our object in this chapter is to describe the system of mine management and inspection.

THE NEED OF DISCIPLINE.

There are some mines which have fourteen miles of track underground. Here is a “mystic maze” par excellence. We have known superintendents and old experienced miners, who entered an unfamiliar section of a colliery, to have lost their way and been unable to get out, until found by a search party. Men who have spent their lives in superintending col-



lieries are bewildered when they enter a new mine for the first time. It takes several trips before they know their way through the workings. Now, coal land is valuable, and there is hardly a colliery of any extent in the Northern coal field, but has some leased property, which necessitates the keeping of an accurate account of all the coal mined. Amid such a maze of entanglements how can it be done? By discipline and enforced regulations.

Every foreman knows where he stands in the mines, and can point out the boundary lines as accurately as they are drawn on the surface. The self-interest of the land proprietors demands it, science offers the solution, and the law commands that every line be accurately drawn, periodically revised and carefully preserved.

The work of surveying engineers in the anthracite coal fields is not excelled in any part of the United States. It has been brought to a high degree of accuracy, and has received the commendation of scientific men. This was not the case in the early history of anthracite mining. Then, no maps were kept; few records of old workings can be found; but in recent years accurate records are kept both by the State and by the companies who operate the mines.

In this way the boundaries of the several properties are determined, the right of each land-owner is preserved, and the danger, arising from old workings whose position is unknown and which are filled with water and gas, is eliminated. To-day scientific principles prevail. Fixed rules are followed, so that a uniform system exists, and better results are attained. Every foreman has his drawings, which represent the workings, and in cutting coal every miner must drive his chamber according to directions. Every part of the mine is worked by rule, and the pillars left are regular and run in a parallel direction. An accurate account is kept of the coal mined from every section, and from every vein. Every six months surveying engineers make an accurate survey of all the workings; two perfect copies are made, one for the operator and one for the office of the inspector of the district. If the inspector has an impression

that any deception is practised, he has the power to cause a special survey to be made at the expense of the operator if there is inaccuracy, and if not, the Commonwealth foots the bill. When we remember that the coal strata pitch at all possible angles, we may well imagine the difficulties surveying engineers have to contend with. Science and the ingenuity of man have triumphed, so that the rights of men, the safety of employes, and the greatest economy in mining, are secured.

Another department which requires scientific knowledge is ventilation, and where there is much gas the regulations laid down must be strictly obeyed and the laws faithfully adhered to. Not only does the presence of explosive gases demand an abundant supply of air, but also the smoke of powder used in blasting coal necessitates it. Two hundred men using powder in a colliery create a quantity of powder smoke which requires a large volume of air in order that it may be carried away. Then we have to remember that some mines are several miles in length, and the air must be carried to the farthest part where the workings generally are, in order to remove powder smoke and noxious gases. These causes make the problem of ventilation a very intricate one.

When mining was in its early stages very simple devices were used for ventilation. Some mines in the Lehigh region, which were not very deep, depended wholly upon natural agencies. Many of the mines in the Northern coal field, in the sixties and early seventies, used a steam jet, or kept a furnace at the foot of the up-cast to generate the necessary circulation. When the Avondale disaster occurred in September, 1869, many of the mines were in a wretched condition as to ventilation. This was especially the case in mines which were not troubled by dangerous gases. Poor ventilation, however, worked havoc among the men; many of them contracted miners' asthma which brought them to an untimely grave. Some men employed in these mines would go to work at three o'clock in the morning in order that they might blast the necessary amount of coal before the mine was filled with powder smoke, in which it was almost impossible for man or beast to live. Those days are

past. The law demands better conditions to-day, and operators themselves have proved by experience that men and animals can do better work when provided with a plentiful supply of pure air. Hence, few are the operators who do not equip their collieries with a fan apparatus which furnishes abundant ventilation so that their employes are able to work with naked light in gaseous mines.

In large collieries, the workings are divided into districts, in each of which 75 persons are permitted to work. The law requires that each person is to be provided with 200 cubic feet of pure air every minute, and as much more as circumstances demand.

The air having passed through one district, must pass out of the mines. Some collieries have a separate fan for each district ; others have one large plant capable of creating a current of from 200,000 to 250,000 cubic feet per minute ; this volume is then divided, and each district is supplied with the necessary amount.

The system of ventilation varies with the conditions of the mines and the skill of the foreman. The qualifications of the foreman in charge of a colliery are tested by his capacity to arrange his air-courses in such a way as to give his men the necessary supply of pure air. Incompetency in this regard has been the ruin of many. The problem of ventilation in some of the thick pitching veins of the Southern coal field is perplexing and often expensive. If the veins emit much gas, the system of ventilating each chamber separately is adopted. In the Wilkes-Barre district, where a large quantity of gas prevails, the problem of securing proper ventilation is the most important one to be solved by the operators. Such a quantity of gas is met with here that two airways are sometimes opened, one on each side of the gangway, and, after they are driven, they are left for several months before chambers are opened, so as to drain off the gas. In many mines in this region, the men who drive the gangways and airways are furnished with an abundant supply of water and a hose attachment ; for in blasting, the powder flash ignites the gas, which they must extinguish by the use of the hose.

In order to carry the air to the face of the workings, doors are erected on the gangways to prevent it from returning by the nearest route to the up-cast. The number of these doors depends partly on the system of ventilation adopted. In fiery mines, many more are needed than in mines where the gases are not dangerous. Each of these doors opens against the air current, and although hung so as to be self-closing, it must be attended by a boy or an old man, whose duty it is to see that the door is properly closed after being opened. These doors, as well as any other appliance for carrying the air forward, are built as nearly air-tight as possible. In opening new workings where gas prevails, safety lamps are used. Generally, however, naked lights are used in mining, which demands a sufficient quantity of air to scatter the gas and render it harmless.

THE DUTIES OF INSIDE FOREMEN.

Each colliery has its corps of foremen of various grades. In every colliery there is an inside foreman with one or two assistants, the driver-boss, the barn-boss, and other petty bosses in charge of troops of men in various parts of the mines. Outside the colliery there is a foreman in charge, and under him are the breaker-boss and the chief mechanic.

The inside foremen and assistant foremen must pass an examination before they can hold the position. If they are employed without this necessary qualification, the operator is liable to a fine. The examination for mine foreman is conducted by the inspector of the district, two practical miners and one operator. The candidate must have had five years' experience in mining, must be familiar with the laws of ventilation and know the various gases which are to be met with. Three of the board must attest to his qualifications, upon which the Secretary of Internal Affairs issues to him a certificate bearing the seal of the State. This law demanding competency in foremen was designed for the safety of employes, but a use has been made of it which was not foreseen by its originator. One of the inspectors speaks as follows of it: "The law requiring the mine foremen to have a certificate from the State,

places the burden of responsibility on the State, and those injured through their incompetency, have no way of redress from the parties who employ them. The same is true of the fire-boss, and the same also is true of the miners who hold certificates. Before this act was passed, the burden of responsibility rested on the companies and they were more careful."

The inside foreman is held responsible for the condition of the workings. He is supposed to see that the roads are in proper condition, to examine the roof of every working, to guard against dangers from poisonous or explosive gases, and to exercise general supervision over the miners so that they put in the necessary supply of timber. Every morning before the men go to work, he is supposed to know that every place is safe for the miners to enter, or give warning to the man whose place is not safe. At the close of every day, he or his assistant has to go through the main thoroughfares to see that every door is in proper position and that the brattices are in place. He must measure the ventilation at the inlet and outlet once a week and forward a report once a month to the operator. He keeps the time of the company hands, and adjusts prices for extra work with the miners. All pumps and appliances underground are in his charge. Every two weeks he must measure the yardage for the men and turn in their accounts to the office.

The progress made in the workings is to be marked by him on the map of the colliery. He orders the necessary supplies for the colliery once a month, and, at the close of every month, he has to fill out a blank form, giving the aggregate expenses under each department during the month and its average per ton of the coal mined. This sheet he forwards to the office of the company.

The fire-boss is the foreman's assistant. He also holds a certificate from the State affirming his competency to hold the position. Every morning he goes through the section of the mines assigned him, visiting every place where the men are working, and then reports the condition of the workings at the foot of the shaft or slope before the men enter. If any place is dangerous, he marks a board kept for the purpose, op-

posite the number of the miner who works in that place. The miner then must see either the foreman or his assistant before he goes to his work, to ascertain the cause of the danger. If he neglects to do this, he is liable to be discharged. The mark generally used is a + placed on the signal board, one + signifies danger, but not of a serious character; two + + warn the man to be particularly careful; three + + + designate that his place is in such a condition that it cannot be worked. In his routes the fire-boss is supposed to mark in chalk the date of his visit to each place, and when he sees that props are necessary in a chamber, he puts a mark on the roof where one should be placed. The assistant foreman is expected to keep strict watch over all doors and brattices, so that the ventilation may take its proper course. Where safety lamps are used, it is his business also to see that each lamp is in proper condition before it is given out in the morning.

The driver-boss has charge of all the drivers, runners and door-boys. He is to see that each is at his post every morning before the mine starts. He also exercises supervision over the mules used underground, that they are not maltreated by the boys in charge of them, that the roads where they work are in good condition, and that none of them is overworked. The barn-boss also exercises supervision over the mules. If one of them breaks down, he reports to the veterinary surgeon, who immediately visits the animal, investigates the cause of the complaint, and if possible remedies it. He visits the place where the animal works and if it is not in good condition, he informs the foreman, who is expected to immediately remove the difficulty; if he neglects to do this after being notified, the superior authorities are at once informed. If any one of the drivers is guilty of abusing the animals in his care, he is discharged; if a mule is killed by the driver's negligence, he must pay for it. On all the roads which have grades, safety-blocks or latches are thrown across the track, so that a trip of cars which might return when a rope or a coupling breaks, will be thrown off the track before it does much damage. The driver-boss is held responsible for the adjustment of these.

There is in some mines what is known as the slate-boss. It is his duty to go from place to place in order to examine the cars and see whether the laborers load clean coal or not. This petty official can make himself very obnoxious to the men. An arrogant fellow holding this position in a shaft in the Northern coal field made it a practice to enter a chamber where a car was loaded ready to go on its way to the breaker. He would strike up the latch holding fast the door at the end of the car, and half the contents would fall out on the roadway. The laborer was then obliged to load the car the second time. A certain slate-boss precipitated a strike by examining cars in the above manner when they were on their way to the breaker. Such needless exercise of authority made saints to swear and imperiled the health of the slate-boss.

THE DUTIES OF MINERS.

Since the law of 1897, no operator can employ any person as a miner unless he presents a certificate of competency to mine coal. Each district in the anthracite coal fields has a board of examiners comprised of nine practical miners appointed by the courts of the several counties at the recommendation of competent advisers. The board divides itself into three sub-committees, which hold meetings at specified localities—the most convenient for the applicants. The time and place of meeting are published in the local press. Each applicant for a certificate must have labored with a practical miner in the anthracite coal fields for at least two years before he is eligible for examination. In order to secure a certificate he must answer twelve questions in the English language as to the practice and duties of mining. The certificate costs him a dollar.

In 1898 hundreds of certificates were issued, but in the annual report of the Bureau of Mines for that year only two boards give reports which have any statistical value. They are the boards of the Fourth and Seventh Districts. In the Fourth, 294 certificates were issued; in the Seventh, 214. The nationality of the men was as follows:

1898

Nationality.	Fourth District.	Seventh District.
American	36	127
English	20	14
Irish.....	7	3
Welsh.....	22	7
German	26	6
Little Russian.....	143	16
Hungarian	9	10
Austrian	28	26
Italian	3	2
Bohemian	0	1
French.....	0	1
Scotch	0	1
Total	294	214

No report from any of the boards is found in the "Report of the Bureau of Mines" for 1899.

When the miner enters his chamber to begin the day's work, he must first examine the roof and see that it is safe. When he leaves, which is soon after he has cut sufficient coal for that day, he is supposed to leave the place in a safe condition for the laborer.

The miner, as a rule, is in a hurry to get out, and this is declared by the inspectors in the Northern coal field to be one of the most prolific causes of accidents. Powder used in blasting must be kept in a box under lock and key, and is only to be handled by the miner, but many of the men disregard this law. Rock must be blasted in the majority of places at present, and it is generally done after the coal for the day is loaded. Many miners, anxious to get out early, prepare the hole in the rock and have the charge ready; they then give instruction to the laborer to put it in place and blast the rock, while they go home.

When a charge is ignited, warning must be given, and the mouth of the chamber must be guarded lest any one enters in when the coal is being blasted. Sometimes the charge misses fire, then the miner must be very careful in returning to it. Many are the victims of serious accidents from this cause. When they return to take out the charge, the powder ignites, hurling the coal and fire into their faces. After the charge is

passed, the miner must examine whether any of the props have been blown out or the gas ignited, and if that be the case he must replace the one and extinguish the other. Printed rules are posted in every mine as to the care of tools, the handling of powder, the position of the car, the treatment of gases, etc.; admirable rules in every respect, but a dead letter to most of the English-speaking miners, not to say anything of the hundreds of Slavs to whom the English tongue is unknown.

Most of the miners in the Northern coal field employ laborers to load coal. It is their duty to load clean coal. The printed rules carefully describe the duties of laborers also, 95 per cent. of whom are Slavs, and whose knowledge of the English language for the greater part comprises only of such phrases as "get car," "load coal," "clean coal," "fire hole," "look out." When the laws are obeyed, it is by spirit and not by letter, for to these men the law is a dead letter.

The duties of the footman at the shaft are prescribed. He must see that the signaling apparatus is in good working order, must follow the specified signals and give the right signals when the colliery is working. When men are hoisted or left down the shaft, the footman and the headman must see that no more than ten persons get on the carriage at the same time.

THE DUTIES OF OUTSIDE FOREMEN.

The outside foreman has charge of all the machinery on the surface. There is close connection between the inside and outside departments in a colliery. When the men in charge are good friends things go on smoothly, but it sometimes happens that the inside and outside foremen are not friends, and considerable friction is the result.

The rules and regulations of the colliery minutely prescribe the duties of the hoisting engineer. He is to keep watch over the boilers, to examine the carriages, ropes, catches, drums, etc., to see that they are in working order every day before work begins.

In the breaker a large amount of machinery is placed for the breaking, cleaning, and washing of coal. Here from 50 to 60

boys are employed, so that the greatest care must be exercised lest some of the small lads get into the machinery. Hence the man in charge of the breaker engine must go according to signals and never start the machinery without the word of command from the foreman. Every part of the machinery is safely fenced in, and no slate-picker is allowed to oil any portion of it. That duty is assigned to a young man competent to do the work.

The coal in the breaker is reduced to the following sizes : lump, grate, stove, egg, chestnut, peanut, buckwheat and birds-eye or rice.

The proportion of these sizes sent to market is not uniform in every colliery. It depends partly on the nature of the coal, on the machinery used in preparing it, and on the kind most needed in the market. The following is the proportion of one of the breakers in the Lackawanna Valley :

Large Sizes.	Percentage.	Small Sizes.	Percentage.
Lump	3 %	Peanut	11 %
Egg	16 %	Buckwheat	13 %
Stove	32 %	Rice or Birds-eye	3 %
Chestnut	22 %		
	<hr/>		<hr/>
	73 %		27 %

The outside foreman is held responsible that clean coal is sent to market. Coal inspectors are kept at the collieries whose duty it is to examine the contents of the cars. If cars of stove and egg sizes contain more than 4 per cent. of slate and bony coal, they are condemned. The same is done with chestnut if it contains more than 6 per cent. and with peanut coal if it has more than 10 per cent. of impurities.

During the last decade the responsibility of the outside foreman as to clean coal is greater than it was fifteen or twenty years ago. There are two reasons for this. On the one hand, the veins of coal now being mined are not as clean as those formerly operated, and on the other hand, the consumer is more fastidious and demands cleaner coal than he did in the seventies and early eighties. For these reasons, improved appliances have in recent years been introduced into breakers for the cleaning and

washing of coal, which demand a large outlay. And in this respect, the large corporations have the advantage over individual operators. Strong mining companies in recent years put up one mammoth breaker which is supplied with coal from three or four collieries. They are able thus to put in the latest and best machinery, and get far more out of the plant than if they built four small breakers. It is safe to say that the ingenuity of mining engineers is as well displayed in the marvelous devices invented for cleaning and washing coal, as in any department of mining. Indeed some of these seem to act too well to please the operators. When a simple device was put into a breaker by one of the outside foremen in Lackawanna county, which picked out the slate far better than any appliance previously used, the operator, seeing the pile of slate taken out, said "D—n it, it takes too much out." One of the younger men in the coal business, enthusiastic over the new appliances for cleaning coal, undertook, in a kindly spirit, to instruct an old operator how to clean the coal he sent to market, about which complaints were made. The young man spent a whole afternoon explaining how the devices could be introduced into the breaker. The old operator was very thankful, but as he shook hands with the young man he said: "Thank you very much, but I think I have sold more slate than you ever will."

LEGISLATIVE INTERFERENCE.

The activity of legislators in Harrisburg is so great that the multiplicity of laws turned out by them defies any man to keep track of them. It is the spirit of the age, coupled with the political system dominating the State of Pennsylvania, which makes every representative sent to the Legislature anxious to do something for his constituency. That has been the case with the honorable men sent from the anthracite coal fields. Every one of them has tried to get some measure through during his term of office, bearing directly on the mining interests of the State, so that he may say that his election has not been in vain. The result is, that the mining interests are suffering from over-legislation, and many of the laws passed have

produced results wholly contrary to the intention of the originator, and worked considerable mischief to both employer and employe.

During the first fifty years of anthracite mining, nothing was done in the way of legislation bearing directly on mining; but in the last thirty years in every session of the Legislature some measure relative to the mining industry of the State was either passed or discussed.

The first law passed relative to the anthracite coal fields was in 1869, which was only applicable to Schuylkill county. In the following year it was made general and designed for the preservation of "health and safety of persons employed in anthracite coal mines." These laws were revised, extended and reënacted in the year 1885; six years later (1891), it was deemed expedient to again revise and enlarge the regulations, which is the form in which they are to-day, and declared to be "the crowning result of many years of experience and investigation on the subject." Since 1891 additions have been made in the years 1895, 1897, 1899 and 1901.

When the State entered this field of action, it was necessary to appoint officials to see that the laws of the Commonwealth were faithfully carried out. This department of Internal Affairs has developed to considerable importance, and last year the "Report of the Bureau of Mines" issued by it is a quarto volume of over 1,100 pages. In 1869, when the State passed laws regulating mining in Schuylkill county, three inspectors were appointed. When these regulations were made general, three others were added. In 1891 the number was increased to eight, and in 1897 the "Bureau of Mines" was created as a department of Internal Affairs, which is presided over by a Chief of the Bureau. His duty is to watch over the several inspectors and see that they prepare reports, etc., according to the provisions laid down in the law.

The inspectors must pass an examination before they can hold office. The examiners are two mining engineers and three practical miners, who are appointed by the courts of the several counties, and at the recommendation of operators and

workmen. The candidate must be thirty years of age, a citizen of Pennsylvania, and must have had at least five years' experience in anthracite coal mines. He must merit ninety-per-cent. marks in the examination, and be recommended by all the members of the board of examiners, before the Governor of the State will make the appointment. The inspectors hold office for five years and receive a salary of \$3,000 a year.* The chief of the Bureau must be a man of scientific knowledge of mining and must have had at least 10 years' experience in anthracite coal mines. He is appointed by the Governor for a period of four years at a salary of \$3,000 a year and traveling expenses. He also has an assistant who receives a salary of \$1,400 a year and a messenger who gets \$300 a year. Thus we have developed a system of mine inspection that consumes in salaries every year about \$30,000,† not counting the outlay in printing 7,810

* The Garner Mine Inspection Bill was passed last June, and will go into effect January 1, 1902. It was drafted by the representatives of the Miners' Union, whose committee at Harrisburg carefully watched its progress through the Legislature. The bill changes the manner of electing the mine inspectors. Its chief provisions are:

1. The Anthracite Coal Fields are divided into six districts instead of eight. The counties of Luzerne, Lackawanna, Schuylkill, Carbon, Northumberland and Columbia make up the new districts.

2. The total number of inspectors is to be increased to sixteen and to be elected by popular vote. Luzerne county to elect five; Lackawanna and Schuylkill counties, four each; Carbon, Northumberland and Columbia counties, one each. Each inspector will have a salary of \$3,000 a year and expenses, and will hold office for three years.

3. The candidates for the office must pass a satisfactory examination before a Board of Examiners which is appointed by court. They must then file their certificates of qualification with the County Commissioner before their names can be placed on the ballot.

4. The examination must be held at least six months before the general election in November.

5. A duplicate of the inspector's report of the air currents in each colliery must be posted in a convenient place so that the employes of that colliery may consult it.

According to the provisions of this bill, Northumberland county with 14,697 mine employes elects one inspector. Columbia county with 2,138 mine workers has the same privilege, while Dauphin county with 2,390 employes has no voice in the choice of inspectors. Each inspector of Luzerne county will have about 31 mines to look after, while those elected for Carbon and Columbia counties will have 14 and 12 mines respectively.

† The Garner Bill doubles the number of inspectors and hence adds \$24,000 annually to the above sum.



volumes of the annual report, and other incidental expenses. Besides these officials, there are two clerks employed, one at Pottsville and another at Wilkes-Barre, appointed by the court of the county in which they hold office, to whom the inspectors are to send "all data, statistics, matter and thing of which they severally are required to take notice and record" on or before the first Monday in each and every month. The clerk must be a citizen of the United States and has a salary of \$1,500 a year.

The Bureau of Mines has been expressly created for the preservation of the health and safety of mine employes. The inspectors are able men and discharge their duties with discretion and judgment; but the impression which generally prevails among mine employes is, that they are in the hands of the employers and are more or less connected with political rings. This sentiment was expressed in a mass meeting of miners addressed by one of the labor leaders last September, who was applauded when he said that he only knew one law pertaining to the mines which was obeyed, namely, that the inspector should draw \$3,000 a year salary. How much politics there is in the Bureau of Mines it is hard to say, but we can safely presume that no department of State is free from political influence in a Commonwealth which has one of the most perfectly organized political machines in the country. How far the inspectors are in the hands of the operators is also difficult to discover. Here again we can be assured that the operators cannot be expected to look idly on, when an official who is to come into such close contact with their industry is being elected. They have millions of dollars in the business, and an obnoxious, impertinent and indiscreet State officer could, when armed with authority, make himself very disagreeable and cause a great amount of trouble. If the operators guard against such a contingency, they simply act to the best interest of the industry and not from sinister motives in order that they may with impunity disregard the mining laws of the State. The miners know that the mining laws, essential to health and safety, are, on the whole, carried out. The first duty imposed

upon the foreman by the corporations is, that he must abide by the mining laws of the State. These are wise provisions for safety and efficiency in mining, and considerations of self-interest, not to say anything of humanitarian ones, impel the operators to live up to the requirements of the law. There are exceptions, however. Inspectors affirm that they have more trouble with individual operators than with large corporations in securing compliance with mining laws and regulations. Occasionally they have to resort to the courts to enforce provisions designed by the State for the safety and health of mine employes.

Many of these laws have been occasioned by terrible disasters. That was the case with the one demanding a second opening in anthracite collieries where more than ten men are employed. One hundred and eight men lost their lives in the fall of 1869 in Avondale, Luzerne county, because they had no way of escape when the main shaft took fire. This disaster also directed attention to the subject of ventilation, which was in a wretched condition at that date in most mines in these coal fields. To-day not a colliery is operated without a second opening, and the ventilation, generally speaking, is good. A wise law was passed in 1891, compelling the companies to cut the timber needed in the chambers to the proper length and to transport them to the face of the workings. Before that act was passed, the men themselves had to cut the props, which they often did in the depth of winter as they came from the mines clothed in wet garments. Many of the laws have had a beneficent influence on the health and safety of the men in modifying conditions which were injurious to employes. But amid the heap of legal regulations there is much trash also; some laws perished at the hour of inception, while others were operative for a season and when their baneful effect was felt, they died an innocuous death. A law was passed in 1891 to compel the operators to provide wash-houses at every colliery where the men may wash and change their garments before they go home. It has never been practicable.

In 1883, a law was passed to compel the companies to pay

for every pound of clean coal sent out by the miner—another impracticable law in a colliery which turns out 1,500 tons a day. In September last, a parade of breaker boys took place in Scranton, when the labor leaders showed the people of that city how many boys from the age of 8 to 12 were employed in the breakers. The State law provides that no child under 12 years can be employed. The operators comply with the law in demanding from the parents of the child a sworn statement that the lad is 12 years of age. If boys under that age are employed, it is because of the wilful perjury perpetrated by their parents, and the number of perjuries was exactly equal to the number of children in the parade under twelve years working in the breaker. An act in 1881 to regulate the method of payment, etc., was denounced by the court as an “infringement alike of the right of the employer and employe; more than this, it is an insulting attempt to put a laborer under legislative tutelage, which is not only degrading to his manhood, but subversive of his rights as a citizen of the United States.” The law of 1897 to secure competent miners is in contempt among the men, and is only well spoken of by those who got the first appointment and went from shaft to shaft issuing certificates to miners at the rate of one hundred a day, for twenty-five cents a head. One of the inspectors refers to this law as follows: “How men such as these [Sclavs] get their certificates, I do not know, but I do know that the law granting them was one of the worst pieces of legislation that was ever passed for this region, as it has driven competent miners coming to these coal fields away, as they refuse to labor for two years with this class of miners before they can have a place for themselves to work.” Many of the certificates are secured by false swearing.

These are a few examples of unwise legislation which misses the mark and inflicts grave injury on workmen. Other laws are a dead letter. They are disregarded by both employers and employes. This also has its baneful influence. It were far better that no law were passed, than have it a dead letter. In the latter case, it conveys the impression that the laws of the

Commonwealth can be disregarded with impunity. This engenders contempt of law, and the executive power of the State becomes an object of derision. When the Commonwealth is regarded as feeble and the laws a shuttlecock of magnates, due reverence for State authority declines and the way is paved for anarchy. Citizens ought to be able to look to the Government for protection and justice, but when an impression prevails that the power of the State is executed in the interest of the few, then the people lose faith in law and order, and in the hour of crisis they will resort to force and mob rule. Here in the anthracite coal fields, we have a mixed population of 100,000 youths growing up under influences which do not deepen their reverence for law and enhance their confidence in executive justice. They imagine that a capitalist can do as he pleases, either obey or disobey the law. They have little faith in the courts, and are taught that between the economic and legislative mill-stones they are ground to powder. This state of affairs ought to make legislators cautious, courts sober and capitalists more conscientious as citizens and employers.

Men who imbibe such principles and cherish such views will, in the hour of conflict, invariably appeal to the arbitrament of physical force. The thousands of youths growing into manhood need better environment to develop those qualities which will make them loyal citizens in the Commonwealth of Pennsylvania where they will soon exercise the right of franchise. It is in social conditions such as prevail in many mining towns that socialism takes root and blossoms. As the youths of foreign parentage increase in intelligence, the anthracite coal fields will offer favorable conditions for the propagation of extravagant socialistic doctrines, unless counter influences are brought to bear upon the rising generation of mine employes, which will preserve and safeguard the conservative principles which secure peace and industrial prosperity.

CHAPTER VI.

EMPLOYEES AND WAGES.

1. PERSONNEL OF THE EMPLOYEES.
 2. HISTORICAL SKETCH OF WAGES.
 3. PRESENT DAY WAGES.
 4. VARIATIONS IN WAGES.
 5. CUTTING DOWN ALLOWANCES.
 6. FACTORS AFFECTING THE NOMINAL WAGE.
 7. SUGGESTIONS.
-

The chief question of the anthracite coal industry is the wage question. Wages are the remuneration of the laborer, and furnish him and his family the means of life. Men will tolerate many inconveniences if their wages are high, but any attempt to cut down their earnings produces discontent and friction. We have seen that physical conditions vary greatly in the anthracite coal fields. In the course of this chapter it will be made clear that wages also vary greatly, and both variations are closely connected with each other.

The aleatory element enters largely into labor as well as capital. A miner may in one month hardly clear expenses, while in another he may earn \$150 clear of all expenses. The possibility of such variations gives foremen opportunities to favor friends, which breeds discontent among the men.

There is a vast difference in miners. One man engaged in narrow work can hardly make a living, while another in the same place will make large wages. Foremen differ greatly. Some act as if they were engaged to grind the faces of the workmen, while others deal justly by the men and know exactly what a piece of work is worth. There are bosses who try to cheat the men, and men who try to cheat the boss. Operators differ very much. The Reading Company, for instance, has the reputation of dealing justly and liberally by its employes; other companies are notorious for low prices, inaccuracies in wage accounts and unworthy schemes to defraud laborers. If these differences in laborers, foremen and operators are taken into consideration, it will at once appear evident that no gen-

eral account of wages can be given which accurately corresponds to that of any one colliery. In no other industry is there so great a variety in the incomes of employes as there is in anthracite mining, and in order to give an exact account of wages in this industry, it would be necessary to give that of each colliery separately. This possibly explains the fact that in the volume on "Industrial Statistics" of the "Report of the Secretary of Internal Affairs" of Pennsylvania, about four pages are given to the earnings of anthracite coal employes, while over forty are given to the paper manufacturing industry, although the latter only employs about one-fiftieth the number of persons found, and represents about one-fortieth the amount of capital invested, in the former.

*perhaps
on variety
in w*

THE PERSONNEL OF THE EMPLOYES.

Thirty years ago the employes of the anthracite coal fields were chiefly English, Irish, Scotch, Welsh and German. To-day, in addition to representatives of these nations, are Poles, Little Russians, Hungarians, Magyars, Lithuanians, Slovacks, Bohemians, Italians, and Swiss, employed in and around the mines.

In the town of Shenandoah twenty different languages are spoken. The complexion of the anthracite mining towns has changed wholly in the last thirty years. On the streets foreign tongues are heard; the tall, dark-complexioned and dolichocephalic Anglo-Saxon is largely supplanted by the thick-set, light-haired, brachycephalic Slav; the Polish and Russian Jew have accompanied these peoples; they hold possession of prominent business sites in mining towns and do a thriving business. The Slavs* have brought their religion with them, and have erected imposing church edifices which they liberally support. The Slav has come to stay, and a generation hence the vast majority of laborers in the anthracite mines will be of that character.

Cheap labor was first introduced into these coal fields because of friction between capitalists and laborers. Before the Civil

*The word Slavs is used in this work as a general term to designate immigrants to the anthracite coal fields from Russia, Austro-Hungary, etc., although some of them—Lithuanians, Bohemians, etc., do not belong to the Slav nations.

War amicable relations prevailed between the coöperative forces. Then in the majority of collieries employer and employes lived side by side and could peacefully adjust their differences. But as concentration of capital went on, and the disturbing influences, due to scarcity of labor, checked immigration and increased demand for coal, were felt, distrust supplanted confidence, antagonism took the place of coöperation, and for a decade, from 1865-1875, strikes, lock-outs, suspensions, prevailed everywhere. The operators naturally looked for relief. Labor had largely passed beyond their control. Superintendent Kulich, of Coxe & Co., is said to have been the first to bring over some of his fellow countrymen from Hungary, in the year 1870. The following is the statement of T. V. Powderly in his "Thirty Years of Labor" (pages 428-429). "The immigration from Poland began to make itself felt in 1872, and though the Poles were poor and ignorant of our laws they were anxious to learn, and soon began to improve their condition. The tide began to set in from Hungary in 1877. The railroad strike of that year created a desire on the part of railroad operators to secure the services of cheap, docile men, who would tamely submit to restrictions and impositions. Hungary was flooded with advertisements which set forth the great advantages to be gained by emigration to America. The Italian immigration had been going on for several years, but no authentic record of the actual hiring of men abroad for service in the United States is obtainable beyond the year 1880."

The expressed purpose of introducing these peoples into the anthracite coal fields was to break the power of Anglo-Saxon employes, who had become, during the years of prosperity, intolerably arrogant and arbitrary.

There is to-day in the anthracite coal fields a population of nearly 100,000 Slavs. Statistics taken of 150 shafts in 1897, employing 59,823 persons, showed 23,402 native born, 13,521 native citizens and 22,860 aliens. In three shafts in Lackawanna county, over 75 per cent. of the employes are Slavs. Under the Delaware and Hudson Company, 40 per cent. of the mining force is of this class. Under the Reading from 20 to 25 per cent. of the force underground are Slavs.

In 1898, out of 294 miners' certificates issued in the Fourth District, 183, or 62.24 per cent., were given to this class of laborers. In stripping mining in the Fifth District not a single English-speaking employe, except the foreman, is engaged. In three shafts in Schuylkill county operated by individuals, the force underground was over 70 per cent. Slav. If we leave out the breaker boys, who form about 13 per cent. of the anthracite employes, and count only laborers over 16 years of age, from 25 to 30 per cent. of the employes in the anthracite coal fields are Slavs, or between 30,000 and 35,000 in all. They are not uniformly distributed. In the Lykens and Panther Creek Valleys very few are to be found, while in Shenandoah and Nanticoke they are largely in the majority. Scores of collieries to-day cannot work when the Slavs observe a religious holiday. Anthracite mining cannot at present get along without the Slav.

The anthracite industry seems to have been always afflicted with surplus labor. In 1849, the *Pottsville Miners' Journal* says that half the number of collieries in Schuylkill could supply the market demand. Now-a-days also, the general complaint is that there are too many men.

This surplus labor has been able to exist in the anthracite coal fields because of the unnecessary increase in the number of collieries, which was partly due to the desire for gain, and partly to the system of distribution of railroad cars adopted by the carrying companies. The annual tonnage to be marketed is, during years when a community of interests exists between the railroads, divided between the various carrying companies according to the capacity of the breakers in the territory controlled by them. According to this system of distribution the larger the capacity of the collieries of any corporation or individual operator, the larger share can he claim of the tonnage to be produced. This induced many operators to open collieries which were not necessary to meet the market demand, and which they could not, in years when prices were kept at a remunerative point, hope to operate more than half or two-thirds time. All these collieries, however, employed a

force adequate to operate them to the full extent of their capacity, but the demand for coal not permitting this, the necessary result was intermittent labor. The number of men employed could produce at half time the supply the market demanded at remunerative prices.

The nature of the coal trade also favors surplus labor. Anthracite is chiefly used for domestic consumption, which varies with the seasons of the year. A hard winter will enable all the mines to work nine hours a day for possibly three or four months in succession. Then comes a falling off in the demand as the weather grows milder, and the result is intermittent labor. Coal cannot, to any large extent, be produced in summer and stored away for winter. It is best stored in the mines. It is too bulky for yards in close proximity to cities, and the work of loading and unloading is expensive. These difficulties make it impossible to regulate production, so as to give the employes regular work the year round. Hence, when a rush of orders comes, all hands are employed. When demand is at its lowest ebb, the breakers are put on half time.

The table on the opposite page shows the annual increase or decrease in the number of employes and of tons produced from the year 1870 to 1899 inclusive. The accompanying chart also shows how labor during these years fluctuated with production. All through these years there has been surplus labor. More labor is needed to produce coal from the deeper seams, but improvement in the art of mining has more than offset the extra demand for labor on this account.

The table shows that the average net increase per year for the 29 years in the number of employes was 4.92 per cent.; while the average net increase per year in the amount of production was 6.154 per cent. A conservative estimate of the increased production due to improvement in machinery during the last quarter of a century is put at 50 per cent. This is the reason why the number of tons produced and the number of men employed have been kept at about the same ratio, notwithstanding the increased difficulties to be contended with in mining.

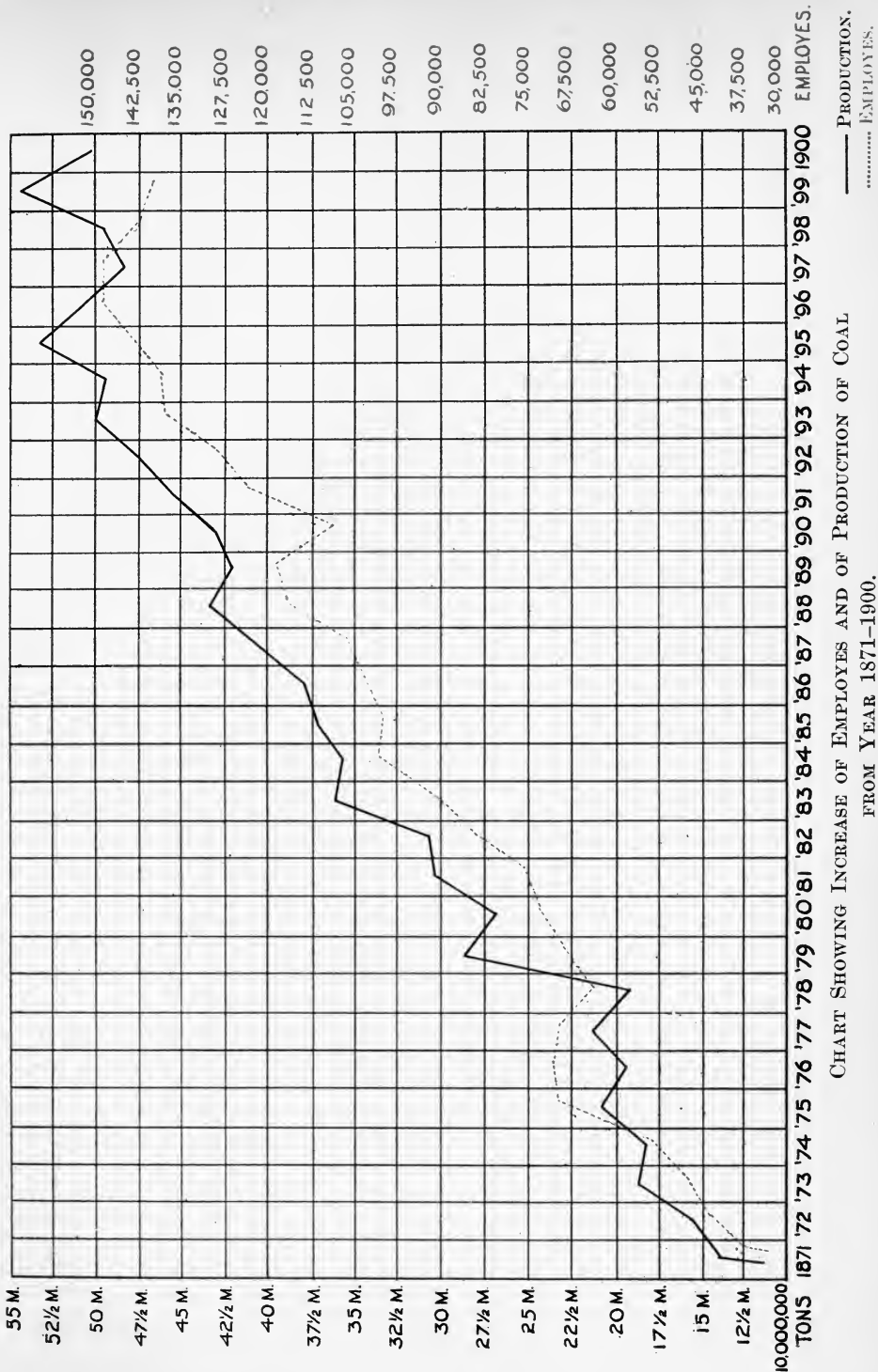


CHART SHOWING INCREASE OF EMPLOYEES AND OF PRODUCTION OF COAL FROM YEAR 1871-1900.

—— PRODUCTION.
 EMPLOYEES.

TABLE SHOWING INCREASE IN NUMBER OF EMPLOYES AND IN AMOUNT OF PRODUCTION.

Year.	Number of Employees.	Per cent. of Increase.	Per cent. of Decrease.	Tons of Production.	Per cent. of Increase.	Per cent. of Decrease.
1870	35,600			12,653,575		
1871	37,488	5.3%		13,868,087	9.6%	
1872	44,745	19.4		13,899,976	.2	
1873	48,199	7.7		18,751,358	34.9	
1874	53,402	10.8		17,794,857		5.1%
1875	69,966	31.0		20,895,220	17.4	
1876	70,474	.72		19,611,071		6.1
1877	66,842		5.1%	22,077,869	12.6	
1878	63,964		4.2	18,661,577		15.4
1879	68,847	7.6		27,711,250	48.0	
1880	73,373	6.6		24,843,476		10.3
1881	76,031	3.6		30,210,018	21.6	
1882	83,242	9.5		30,867,301	2.2	
1883	91,411	9.8		33,200,608	7.5	
1884	101,078	10.5		33,561,390		1.9
1885	100,534		.5	33,520,941	2.9	
1886	103,034	2.5		34,064,543	1.6	
1887	106,574	3.4		37,137,251	9.0	
1888	117,290	10.0		41,638,426	12.1	
1889	119,007	1.5		30,015,835		27.9
1890	109,166		8.2	40,080,355	33.5	
1891	123,345	13.0		44,320,967	10.6	
1892	129,797	5.2		45,738,373	3.2	
1893	138,002	6.3		47,179,563	3.2	
1894	139,655	1.2		45,506,179		3.5
1895	143,610	2.8		51,207,000	12.5	
1896	149,670	4.2		48,074,330		6.1
1897	149,557		.07	46,947,354		2.3
1898	142,420		5.4	47,145,174	.42	
1899	140,583		1.29	54,034,224	14.61	

The employees are generally classified into inside and outside laborers. They are then subdivided according to the work they do, as follows :

CLASSIFICATION OF EMPLOYES.

Inside Employees.	Number.	Outside Employees.	Number.
Miners	36,000	Mechanics	2,000
Miners' Laborers.....	24,000	Company Laborers.....	8,000
Plateman.....	750	Breaker-boys	16,000
Drivers	10,000	Headmen	750
Runners	1,000	Engineers.....	1,200
Engineers.....	1,500	Firemen	3,300
Door-boys.....	3,000	Runners.....	
Brattice-men		Barn-men	
Timbermen.....		Culm-men.....	
Trackmen.....	12,562	Drivers	18,703
Pump-runners.....		Chute-men	
Company Laborers.....		Clerks	
Bosses	1,300	Bosses, etc.....	797

A colliery producing 1,300 tons a day of eight hours would employ about 800 persons, of whom 150 would be miners, 150 laborers, 300 company men inside, and 200 outside. These proportions would vary according to the conditions of the colliery. In the Northern coal field, a miner and laborer generally work together. In the Southern and Middle coal fields, this is the case when the miners work by the car, but if they cut coal by the yard, they generally work in "butties." Miners sometimes cut coal and load it, in order to increase their wages. This practice, however, is discountenanced by the men as unbecoming the dignity of miners.

HISTORICAL SKETCH OF WAGES.

Old miners say that the real wages of men in the coal fields are as high to-day as they have ever been. In this estimate they compute the amount of commodities men can procure with the money they earn. The history of the wages paid in this industry during the last sixty years shows great fluctuation, as may be seen from the accompanying chart; but the difference during this period in the purchasing power of the dollar makes the difference in the amounts received by the workmen far less significant than at first would appear. Three periods of twenty years each stand out distinctly in the chart: From 1840 to 1860, wages were low, averaging about \$1.05 a day. From 1860 to 1880, great variation existed, and the fluctuations were remarkable. The maximum was reached in 1869 when wages were \$18.18 a week and the minimum, in 1861 when \$6.48 was paid. The third period, from 1880 to 1900, presents greater uniformity than the previous one. Wages were adjusted in 1880, and since that date to last October, no reduction or advance was made in the Northern coal field, and the changes in the Middle and Southern fields were due to the sliding scale, which was in vogue there for thirty years, and abandoned last fall at the request of the men.

In 1839-1847, the following wages were paid by one of the mining companies in the Pottsville district:

Year.	Miner, per day.	Laborer, per day.	Year.	Miner, per day.	Laborer, per day.
1839	\$1.00	.82	1845	\$1.13	.80
1840	1.00	.80	1846	1.25	.83
1842	.875	.70	1847	1.25	.83
1844	1.10	.76	1848	1.25	.83

Senator Cameron, addressing the United States Senate in 1847, said that the mining laborers in 1840 got \$5.00 a week, while in 1846 they got from \$8.00 to \$10.00 a week. In 1849, men cut coal for 32 cents a ton, and made in six days \$8.00. During these years, operators were largely dependent on canal transportation. These artificial water-ways were frozen in the winter months and very little mining was done. Hence we find a difference between the winter and summer rate of wages paid for mining coal. In Tamaqua, the operators paid \$1.50 a day in summer, and \$1.25 in winter. In the fifties, coal was cut in Pittston and Scranton for 35 cents a ton, and men considered themselves fortunate if they made from \$25.00 to \$30.00 a month during the busy season.

During these years, the laborers loaded coal for 12½ cents a car, and earned 87½ cents a day by loading seven cars. The rate of wages paid the laborers varied also according to the condition of the trade.

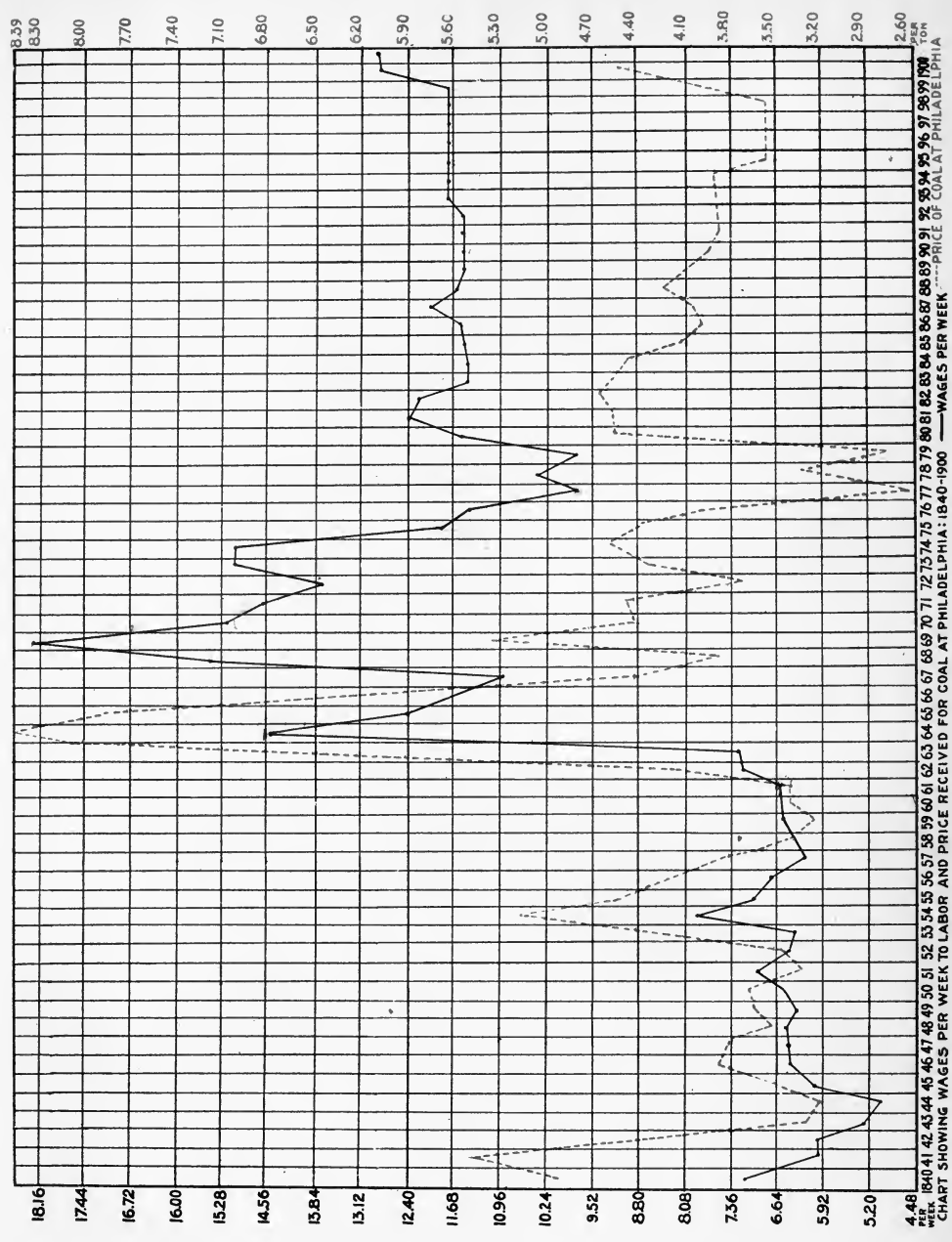
The Pottsville *Miners' Journal* states that in 1848, when the mines started after a suspension, men worked for \$3.50 a week, and took that out in orders. In the following year, wages fell to 60 cents a day. In 1850, the laborer got from 60 cents to 65 cents a day, and the miner from 80 cents to 90 cents. These were low wages, but they were actually lower than the amounts specified, for the men were not paid in money. They had to take their earnings out in goods which made a difference of from 15 to 20 per cent. against the wage earner.

Soon after the Civil War commenced, wages showed a strong tendency to rise. This was due to several reasons. One was a greater demand for coal consequent upon the increased activities due to the war. Another reason was the inflation of the currency due to the exigencies of the government and the action of the commercial world depreciating the paper money

put in circulation. Commodities rapidly advanced in prices and wages necessarily rose also to enable the workmen to live. The miners earned big money but they also paid big prices for mining supplies, food and clothing. But the chief reason was the scarcity of labor. Many of the miners left for the front, and during the years of strife, immigration into the coal fields from the British Isles fell off considerably. The wages of labor advanced from 100 to 300 per cent. In Ashland, Schuylkill county, a miner got \$4.00 a yard for cutting coal in 1860, and \$14.00 for the same work in 1869. In the Northern coal field coal that was cut for 70 cents a car advanced to \$2.00 a car. It was a common occurrence for miners to draw \$200 pay for a month's work, while some in narrow work made as high as \$400. In the fall of 1865, a reduction of 20 per cent. was made, and in 1867 another reduction of $7\frac{1}{2}$ per cent. At this time the Workingmen's Benevolent Association came to power, and during 1868-1870, wages advanced higher than they had ever been. The tidal wave was soon spent, and in the fall of 1870 a reduction of 30 per cent. was made; from that date to 1877, notwithstanding many strikes and suspensions, the employes were powerless to resist the reduction of wages. A general depression prevailed, wages reached a lower point in 1877 than they had for the past thirteen years. Coal was cut for 80 cents a car. In 1878, the operators voluntarily gave an advance in wages of 10 per cent., and in the following year they gave another advance of 15 per cent., thus giving the miners in the Northern coal field an average of \$1.00 a car for mining coal.

In the Southern and Middle fields, where the sliding scale prevailed, wages were adjusted by the following scale: when coal sold at tide-water for \$5.00 a ton, the miner got \$14.00 a week, the laborer \$12.00 and outside company hands \$11.00, and for each advance or decline in prices above or below \$5.00 the men were to be advanced or reduced 10 per cent. in their wages.

At these points wages remained between 1880 and 1900, as far as prices paid for mining coal are concerned. Changes were made, as we shall see, in allowances given the miner for inci-



1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900
 YEAR FOR WAGES PER WEEK TO LABOR AND PRICE RECEIVED FOR COAL AT PHILADELPHIA
 CHART SHOWING WAGES PER WEEK TO LABOR AND PRICE RECEIVED FOR COAL AT PHILADELPHIA : 1840-1900 ——— WAGES PER WEEK - - - - - PRICE OF COAL AT PHILADELPHIA



dental work, which reduced his wages. Last fall, an advance of 10 per cent. was conceded the miners after a strike of forty days.

PRESENT DAY WAGES.

The rate of wages paid before the recent advance is the following. There are variations in almost every locality. We give the rates in the Northern and Southern coal fields, which is a fair representation of the wages paid labor in the anthracite industry. Ten per cent. added to these rates will give the wages now paid in these regions.

INSIDE LABOR.

Classification.	Northern.	Southern.
Mine-foremen (per month).	from \$75 to \$100	from \$75 to \$110
Assistant-foremen "	" 60 to 75	" 60 to 75
Driver-boss (per week).	" 12 to 13.50	" 10.50 to 12.00
Barn-boss.	\$1.45 (per day).	\$40 (per month).
Miners (per day).	" 2.25 to 2.50	" \$1.93 to \$2.25
Miners' laborer (per day).	" 2.00 to 2.25	" 1.75 to 2.00
Masons, carpenters, etc. (per day).	" 1.90 to 2.25	" 1.70 to 2.00
Footmen (per day).	" 1.60 to 1.65	" 1.60 to 1.70
Pumpmen and inside engineer (per day).	" 1.60 to 1.98	" 1.33 to 1.66
Drivers and runners (per day).	" 1.05 to 1.37	" 1.15 to 1.71
Drivers' helpers "	" .75 to 1.00	" .90 to 1.00
Door and fan-boys "	" .73 to 1.00	" .75 to 1.00
General utility men "	" 1.69 to 1.98	" 1.70 to 1.86
Loaders and starters "	Not in Northern Field.	" 1.50 to 1.70

OUTSIDE LABOR.

Classification.	Northern.	Southern.
Outside foremen (per month).	\$75	\$75
Breaker boss "	50	from \$50 to \$60
Hoisting engineer (per day).	from \$2.00 to \$2.31	" \$1.83 to \$2.00
Firemen "	" 1.50 to 1.56	" 1.30 to 1.36
Blacksmith "	\$2.15	\$2.00
Carpenter "	2.03	2.00
Machinist "	2.15	from \$2.00 to \$2.10
Helpers "	from \$1.45 to \$1.75	" 1.00 to 1.50
Common laborers "	" 1.25 to 1.45	" 1.00 to 1.40
Drivers "	" .90 to 1.10	" .90 to 1.00
Headmen "	" 1.45 to 1.69	" 1.40 to 1.50
Culm-men "	" 1.30 to 1.45	" 1.30 to 1.50
Breaker boys "	" .50 to .75	" .50 to .75

Most of the above classes of labor are paid by the hour. The amount of their wages corresponds to the number of hours

worked by the breaker. The average number of days worked during the last 25 years was 189.08 days which, if we compute 300 days as a year's work, makes the real wage of these classes 36.97 per cent. less than the nominal. Foremen, assistant foremen, hoisting engineers, pump-men, barn bosses, and firemen receive regular monthly salaries which are paid them regardless of the time worked by the breaker. The miners work under the contract system, which varies in different localities. In the Northern field the men are paid so much per car of coal mined. The Delaware and Hudson Canal Company pays by the ton, giving the miners from 67 cents to 72½ cents for every ton of clean coal they mine. Some individual companies also pay by the ton. Most of the companies, however, pay by the car, paying from 87 cents to \$1.20 a car, according to the nature of the vein and the size of the car. Cars vary in size from a capacity of 70 cubic feet to 140 cubic feet.

The miners' laborers are paid by the miners. The scale of settlement in the Northern field is that the laborer gets one-third value of the gross earnings of the miner. It is generally computed, however, on the basis of \$2.00 a day for loading six cars. In addition to this the laborer gets one-third of the allowance paid the miner for rock-work and timbering.

All tools and supplies are to be furnished by the miner. His outlay for an outfit necessary for cutting coal would be approximately as follows :

MINER'S OUTFIT.

Drilling machine for coal from \$7.50	
to \$10 : average.....	\$8.25
Drilling machine for rock.....	8.25
Pick, 75c. Shovel, 50c.....	1.25
Drill from \$1.25 to \$1.50 : average.....	1.35
Needle, 25c. Scraper, 25c.....	.50
Axe, \$1.00. Saw, 75c.....	1.75
Total.....	\$21.35

If he works in a vein of coal which pitches at an angle of from 20 to 35 degrees, he must get a chain and pulley to hold the car in place, which will necessitate an extra outlay of from \$12 to \$15.

His incidental expenses per month, not counting the price paid for powder, would be :

INCIDENTAL EXPENSES PER MONTH.

One file to sharpen drill.....	.18
Cotton and oil.....	.65
Fuse13
Sharpening tools.....	.50
Wear and tear of tools.....	.63
Total.....	\$2.09

In computing the miner's wages, these items should be taken into consideration. The item of powder varies greatly, as we shall see below. Powder expense, however, is kept from the miner's wages in the office, and is not to be paid out of what he receives in cash from the operator. From a computation based on over 500 due-bills gathered from miners in different parts of the coal fields, we find the wages of miners varying from \$75.00 to \$30.00 a month, while the wages of laborers vary from \$45.00 to \$18.00 a month. Wages depend upon the number of days worked by the men. The miners under the Pennsylvania Coal Co. made on an average in August, 1900, after paying all expenses, \$2.60 a day, and the laborers \$1.67 a day. Miners under this company averaged from January first until August, 1900, \$2.55 a day, laborers, \$1.67 a day. The following is the average earnings of miners and laborers as computed from due-bills of wages paid them in the years 1898-1899 :

WAGES OF MINERS AND LABORERS.

Class.	Time.	Total Earnings.	Average per Month.
Miner.....	16 months.	\$392.35	\$24.51
Laborer	21 "	516.17	24.58
Miner.....	21 "	725.72	34.56
Miner.....	7 "	170.53	24.36
Laborer	7 "	149.70	21.40
Miner.....	25 "	839.00	33.56
Laborer	20 "	348.77	17.44
Miner.....	11 "	465.95	42.35
Miner.....	18 "	787.41	43.63
Miner.....	18 "	725.09	40.28
Laborer	18 "	540.90	30.05
Miner.....	13 "	383.97	29.53
Laborer	13 "	243.36	18.72

This gives us the average earnings of the miner per month as \$34.10, and that of the laborer as \$22.40, or an average of \$1.37 a day for the miner, and 90 cents for the laborer, counting twenty-five working days in the month.

Here, then, we have a discrepancy between the operator's statement and that based on the due-bills of the men: the one \$2.60, the other \$1.37 a day, for the miner; and \$1.67 and 90 cents for the laborer. This contradiction meets the investigator into the wages earned by mining employes throughout the anthracite coal fields. The operators say miners make \$2.50 a day; the miners say, we make \$1.50 a day. The explanation lies in the different points of view of the speakers. The operator computes the miner's earnings per day of ten hours or per six cars of coal mined which constitutes a shift; the miner computes his total earnings in the year, and proportions that for every day he goes into the mines, and says "The wages which I earn per day I go into the mines are \$1.50," but he does not say how many hours on an average he works per day. The miners who earn on an average throughout the year \$1.50 a day for 300 days only work five or six hours a day. It is true that they go into the mines every day, but the time they spend in the mines, computed by a shift of ten hours, amounts to only half a shift. Hence the operator is correct in his computation based on six cars of mined coal as a day's work; but there is reason also in the miner's statement, for he and his family must regulate their living according to the average rate of wages earned by him, namely, \$1.50 a day.

VARIATIONS IN WAGES.

The operators classify miners as good, medium and poor, and attribute all variations in wages to the differences in the capacity and skill of their employes. The miners classify chambers as "bully," "just so," and "rotten," and explain all variations in earnings by the differences in the veins of coal. Both parties state a truth, and both facts must enter into the explanation of the differences in the earnings of men.

In opening a new vein the following system is adopted to

fix prices. Two of the best workmen are chosen and set to work. They are paid \$2.50 each a day and supplied with all tools and powder by the company. They work for a month, at the close of which the foreman counts the expenses incurred, measures the progress made by the men, computes the amount of rock removed and the cars of coal produced, and adjusts prices per car and per yard of rock, so that a miner of the capacity of the chosen men can make \$2.50 a day. But all men are not equal, and the same vein differs in various sections so that the same man might be able to earn \$2.50 a day in one part of it but in another cannot make \$1.50.

The Clark vein operated by the Delaware, Lackawanna and Western in the Scranton district illustrates this variation. In one shaft the company pays \$1.05½ per car, in another shaft a mile away, 95½ cents and in a shaft two miles farther, 87 cents. Here the officials recognize the difference in working the same vein, and pay in one shaft 21.26 per cent. more per car for mining coal from it than in a neighboring colliery.

Men say that there are many inexplicable differences in prices under the same company as well as under different companies. The Delaware and Hudson pays 71.5 cents per ton for mining coal in the 14-foot vein, and 67 cents a ton for mining coal from a 5-foot vein. But in the latter yardage on rock is given. The Lehigh Valley pays 87 cents a car for coal from the Mammoth vein, about 30 feet thick, and 97 cents per car from the Wharton vein, about 10 feet thick. As respects the price paid per yard for driving cross-cuts, we have the following differences in rates: 75 cents, \$1.16, \$1.41, and \$2.12; and that for the very same work. The same is true of rock-work; in one place 50 cents a yard is paid, in another, 75 cents, and in another, \$1.00. This variation is explained by the difference in the nature of the rock, whether it is soft sandstone, shale, or fire-clay. Prices paid for standing timber show the same variation. The same man working in different places in the same vein and under the same company, can get 50 cents, \$1.00, and \$1.50 for standing a set of timber across the roadway. One company pays 68 cents a pair, another 75 cents and another \$1.70,

and the work, if done as safety demands it to be done, is the very same. When timber goes over a certain size, special prices are paid. Difference exists in the allowance given to miners for opening chambers. Under the Delaware and Hudson this allowance is \$9.03; under the Lackawanna Coal Co., \$3.50; under the Delaware, Lackawanna and Western, \$3.57; and under the Lehigh and Wilkes-Barre, nothing.

These are some of the differences in prices, which tell upon the aggregate wages of the men. They are the occasion of agitation, and when the United Mine Workers ask for a uniformity of prices, their plea is justified by the great inequalities which now exist in different sections of the anthracite coal fields.

There are variations which cannot be adjusted by fixed prices, but there is no reason why this could not be done on work which requires equal exertion and skill. Some of the above variations are explained by the different systems adopted by foremen and superintendents to fix prices. But as long as they exist they furnish employes plausible occasions of complaint.

CUTTING DOWN ALLOWANCES.

Operators say that prices have been uniform for the last 20 years. This is true as far as the price paid for the car of coal is concerned, but it is not true of the allowances given the miner for accessory work in mining; and when the tributaries are cut off, the stream perceptibly diminishes. The price per car was left intact, but foremen in almost every locality in the coal fields cut down prices for work the miner must do in order to carry on the work of mining. One man who brought upon himself the wrath of the workmen which well-nigh cost him his life, did the following: 75 cents a slab was paid for manway, he took it off; 50 cents a yard was paid for a stratum of slate which came down with the coal, he took that off; \$7.84 was paid for opening chambers, he told the men that they must open them for nothing; laborers who got \$2.00 a day were cut down to \$1.93; and this man did a very unusual thing, he cut the foremen's wages from \$100 a month to \$75. There was a strike last summer on the Hazleton mountain, because an allowance of \$2.64 paid the men for opening chutes was taken off.

Under another company \$1.50 was paid for standing a set of timber; this is reduced to 50 cents. In a shaft 75 cents was paid for standing props; now it is 50 cents, and double timber is reduced from \$2.50 to \$1.90. In another shaft the allowance for standing timber was reduced from \$1.50 to 60 cents. Companies were wont to grant allowances for water coming into the chamber; to-day, this is not given in many collieries. Allowance was given for sulphur streaks which appear in the coal, making it much harder to blast it and increasing the wear and tear of the tools; it is not given to-day. An allowance of 50 cents a yard was given to miners who had to use safety lamps; to-day, such a thing is not known.

This lopping off of incidental payments in order to keep down the cost of production, cuts into the wages of the men. Various reasons are advanced by the officials for these changes. Some of them are plausible, others are puerile and false. But whatever the reason may have been, the fact that this way of keeping down increased cost of production was eating into the wages of labor, stands forth as a stern reality. It aggravated the men and prepared the anthracite coal fields for the seed sown by the representatives of the United Mine Workers, and to-day one of the strongest and most compact labor organizations in the United States flourishes here. The wage grievance is one of the prime causes of the present discontent; this precipitated the conflict of last fall, and the settlement then effected was only a temporary patchwork; the root of the matter was not touched. The power which held together the representatives of 16 nationalities in the recent conflict was economic. It was wages, the hope of life of the people.

FACTORS AFFECTING THE NOMINAL WAGE.

There are three factors which directly affect the nominal wage of miners. They are powder, dockage and intermittent labor. ✓

Coal cannot be mined without the use of powder, but the quantity used in the different veins varies greatly. As the lower veins are developed more powder is consumed, for they are smaller and harder, and rock must be blasted to get the

necessary height for the car. The following table shows the difference which has come to pass in the amount of tons cut to the keg of powder in the last twenty-five years.

VARIATION IN THE AMOUNT OF POWDER USED.

Locality.	Year.	Average Tons per Keg of Powder of 25 lbs.
Upper Lehigh.....	1871	102.29
“ “	“	78.90
“ “	“	57.31
Carbon Co.	1875	62.75
Hazleton	1878	50.06
“	“	47.34
“	“	69.85
Schuylkill.....	“	52.00
Luzerne.....	1876	47.17
“	1882	58.3
Lackawanna.....	1889	31.5
“	1895	30.5

This shows the increase in the use of powder, and the more of it the miner uses, the less he gets in wages per ton of coal produced. In the Woodward shaft, where there was good mining, a miner blasted 75 tons of coal with one keg of powder, which, at the present price of powder, would mean only two cents a ton of powder expense. Another miner, an equally good workman but mining in one of the thin veins, could only cut nine tons, which was an outlay for powder of $16\frac{2}{3}$ cents per ton.

The Anglo-Saxons will not work the small veins if they can possibly avoid it. Into these the Sclavs enter. They are hardy and strong, and ambitious to become miners. They will work from eight to twelve hours a day and make good wages in these thin veins, whereas the English-speaking miners are in the habit of spending on an average from five to six hours in the mines.

Those who work these small veins, though they get nominally the same price for the car of coal as those who work the richer veins, will get less real wages, because of the amount of powder consumed. The yardage given for blasting rock is calculated to compensate them, but wages in the lower veins estimated in physical exertion are less than in the upper ones.

The system of dockage is not practised throughout the coal



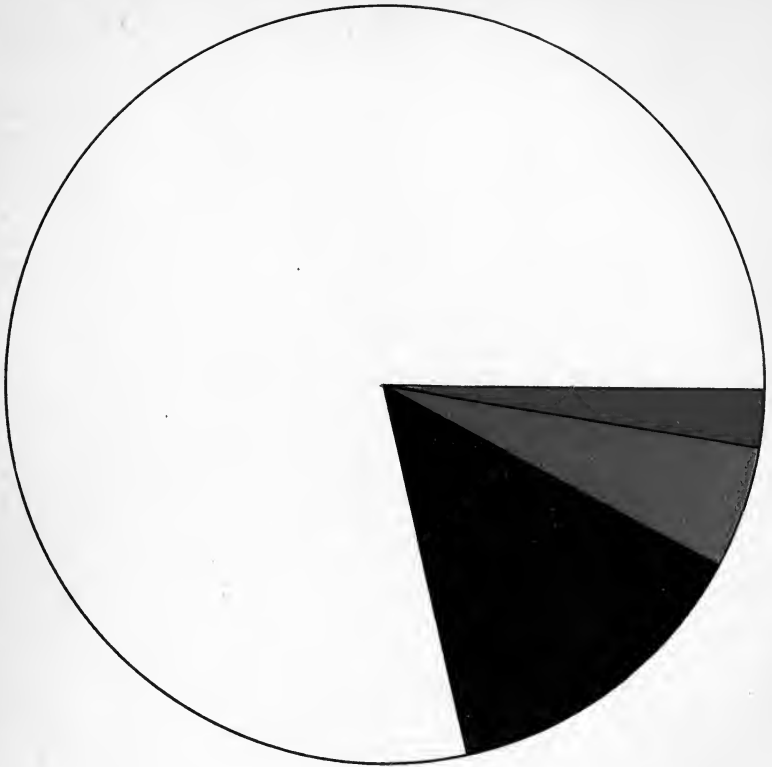


CHART REPRESENTING DOCKAGE.

—— = 2 % Dockage.

—— = 5 % Dockage.

—— = 13 % Dockage.

NOTE :—Twenty per cent. Dockage is represented by the above Colored Section of the Circle.

fields. In the Southern and Middle, most of the men mine coal in pitching veins, where they are paid by the yard, and the coal is loaded by company hands after the miner has driven the chamber to its usual length. Here then there is no docking. Even miners who cut coal by the car under the Reading Coal and Iron Co., as well as under some other companies, are not docked. This does not prove, however, that these companies pay more for cutting coal than the others who practise the system of dockage. In all the Northern and in parts of the Middle and Southern fields, docking is practised, because of impurities in the coal. Dockage then is a certain percentage deducted from the amount mined by the miner because of impurities.

In 1887 a law was passed to force the operators to accurately measure the amount of impurities in the cars, and pay the miner for the exact amount of clean coal sent out. To comply with this law, the operators introduced a system which has been nicknamed by the miners "the court house." A small platform was erected near the breaker, on which one or two cars a day are dumped, and two old miners are employed in assorting the pure from the impure coal.

The result of this examination then becomes the basis of the percentage of docking. "The court house" examines the contents of representative cars from the various veins, and dockage is fixed accordingly. Hence it follows that, the dirtier the vein, the heavier the dockage, and this is the reason why it has increased in recent years. Miners working in the same colliery are not docked uniformly, for some of them work in dirtier veins than others. But the variation in the percentage of dockage under the same company is not as great as that between different companies. The heavier dockage is practised by individual operators. They explain this by stating that they work smaller and dirtier veins than the larger companies; the miners explain it differently and call it "robbery." Under the Delaware, Lackawanna and Western, dockage amounts to between 2 and 3 per cent.; under four individual companies the average was 5, 8, 10 and 15 per cent. respectively; under the Delaware and Hudson, it is between 4 and 5 per cent.

The grossest case known to us was one in which a man was docked on an average 20 per cent. for three successive months. Representatives of the United Mine Workers say some miners are docked 25 per cent., but we never met with such an instance.

Besides the system of dockage, the companies who pay by the ton, such as the Delaware and Hudson and the Pennsylvania Coal Co., take from 2,800 to 3,000 pounds for the ton. In passing coal through the breaker, waste comes in, and the 500 or 700 pounds extra is to compensate the company for this waste.

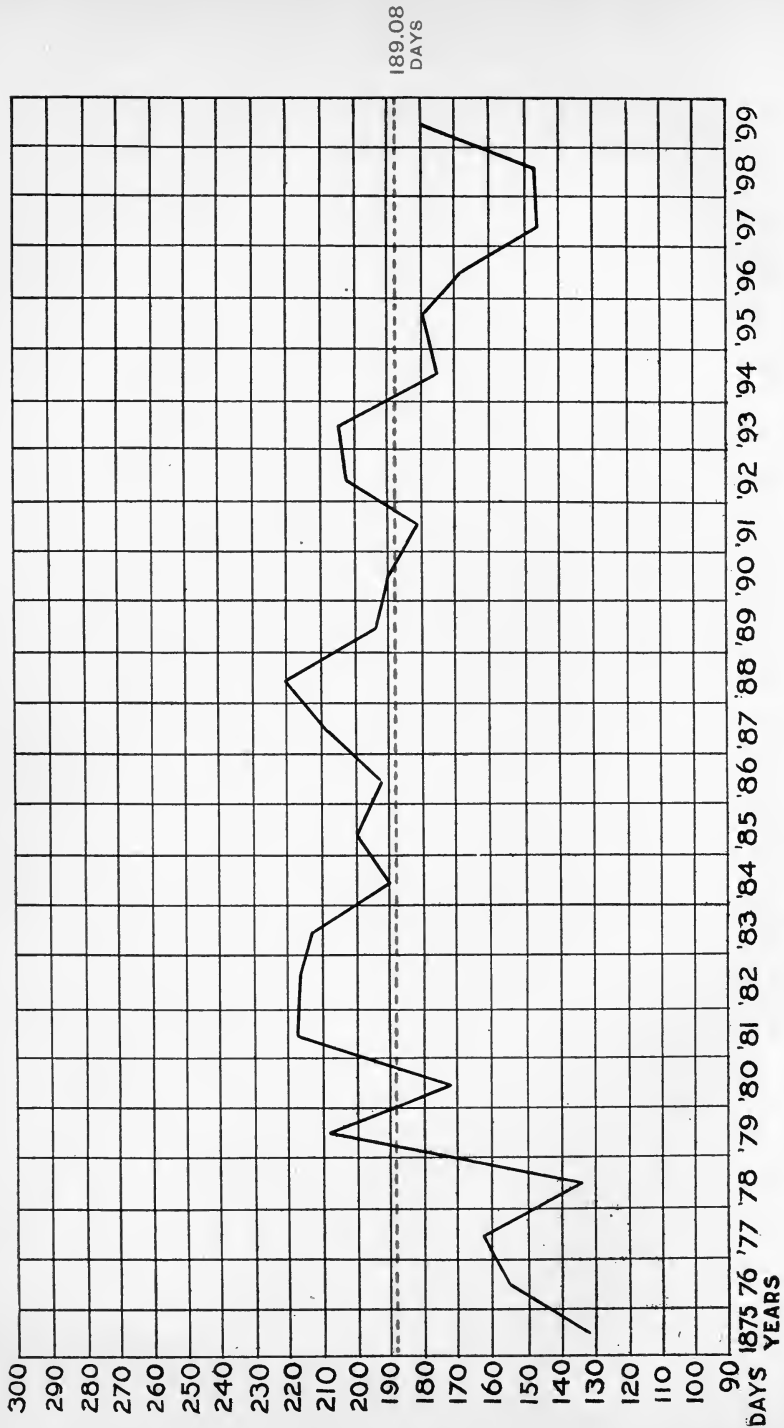
Hence we have three measurements for a ton in these coal fields. When a miner buys a ton of coal he gets 2,000 pounds; when the operator pays him for a ton of mined coal, it is 2,860 pounds; when the railroad buys the product of an independent colliery the ton is 2,240 pounds.

The number of days worked affects the wages greatly. This varies with the weather. A severe winter increases the demand and miners work more days. The Bureau of Industrial Statistics in 1885 gave the following estimate of the difference between the nominal and real wage of anthracite employes, due to intermittent labor. In the following table the nominal wage means the sum employes would have earned if they had worked sixty hours a week, while the real wage is the sum they received from the companies according to the time they were employed during the week :

DIFFERENCE IN NOMINAL AND REAL WAGE.

Class of work.	Theoretic or Nominal Wage per Week.	Actual or Real Wage per Week.	Percentage of Nominal Wage.
Miners on contract.....	\$16.28	\$8.84	54.30%
Miners on wages.....	12.00	7.00	58.33
Laborers inside.....	10.68	6.14	57.49
Laborers outside.....	8.40	4.91	58.45
Boys.....	3.90	2.07	53.07
Drivers and runners.....	8.58	5.32	62.00
Firemen.....	9.48	5.73	60.44
Engineers.....	11.28	8.84	78.36
Blacksmiths.....	11.46	7.16	62.48
Slate-pickers (men).....	9.30	5.60	60.21
Slate-pickers (boys).....	3.00	1.70	56.66





The following table, compiled from the inspectors' reports for the last twenty-five years, gives the number of days worked by the miners. The first column gives the average number of days worked by the breakers in the whole of the anthracite coal fields; the other four columns give the number of days worked, during the years specified, in four shafts located in Lackawanna county.

NUMBER OF DAYS WORKED IN THE YEAR.

Year.	General.	Special Collieries.			
	Days Worked.	Days Worked.	Days Worked.	Days Worked.	Days Worked.
1875	132				
1876	155	140	134		
1877	161	82	140		
1878	134	75	143		
1879	209	208	211		
1880	172	186	189		
1881	218	Idle	231	232	
1882	217	Idle	236	238	
1883	214	213	246	245	242
1884	190	206	206	204	196
1885	200	208	210	Idle	166
1886	194	198	186	Idle	201
1887	210	247	82	218	229
1888	221	250	252	250	252
1889	195	132	235	122	219
1890	191	127	210	42	205
1891	183	88	222	226	300
1892	205	222	224	222	277
1893	207	220	222	215	275
1894	179	181	188	168	230
1895	182	211	228	218	245
1896	171	199	220	205	232
1897	149	200	204	127	177
1898	148	175	186	92	169
1899	180	203.75	194.50	201.75	201.8

If we take 300 days as comprising a year's work, we get the following results from the above table. In 25 years the number of days lost in the general column was 2,873, an average loss of 110.92 days a year or 36.97 per cent. of the total working days in the year. In the special shafts, the lost time per year was on an average 128.77 days or 42.92 per cent.; 100.02 days or 33.34 per cent.; 110.23 days or 36.74 per cent.; and 75.53 days or 25.17 per cent., respectively. This means, when converted into nominal and real wages, that miners who could have earned, at \$2.50 a day, \$750 a year, only

really got an average of \$484.50; a laborer, who at \$1.45 a day, could have earned at full time \$435, only earned on an average \$285.65. This explains why the miners affirm that their earnings in the year do not exceed \$33.00 or \$37.00 per month, while inside and outside common laborers do not average \$25.00 per month.

SUGGESTIONS.

From a study of the wages of miners in the anthracite coal fields, one is impressed with the great inequalities which defy any attempt at distributive justice. It is often the case that those who work the hardest get the least pay. In some places, men actually do not work more than two or three hours a day, and draw \$55.00 or \$60.00 in wages for 21 or 22 days; others work from eight to ten hours a day and only draw \$35.00 or \$40.00 for 21 or 22 days. The latter work three times as hard and get one-third less pay. Ideal justice would apportion wages according to the time spent and strength consumed in labor, but in these cases the relation is reversed.

The root of the evil lies in a natural fact, namely, the formation of the coal seams in the geological era, and man cannot change it. In the last strike, there was a certain percentage of the miners favorable to the operators and ready to go back to work. They were the men who had the best places. As one expressed it, "The \$75.00 a month men are willing to go to work; the \$30.00 men are out to stay." All attempts to equalize this disparity must fail. Some argue that wages should be according to exertion measured in time units; that would be right, but it is impracticable. The question must be left to time. A gradual leveling down will take place. This will occur through the exhaustion of the better veins, and the necessity of extracting coal from the smaller ones. In the near future thin seams will be the only ones operated, and greater equality will prevail as to physical exertion spent in mining, and the amount of wages received by employes. But, if in the anthracite mining industry, the English-speaking miners expect to hold their own against the Slav, they must spend more time in the mines. This would refer particu-

larly to the Northern coal field. In the Southern and Middle, about 65 per cent. of the miners are paid by the yard, and they spend about eight hours a day in the mines; but the average English-speaking miner in the Northern field is in a hurry to get out and hardly spends five hours a day in the mines; while Slavs are known to spend from nine to ten hours at their work. The Inspector of the First District says in his last report: "It is strange but it is a fact nevertheless, that where the 'vein' is 'good' and 'blows' well, it is seldom that a miner, excepting when he has 'bad luck,' is found in his working place after ten o'clock in the morning, for very likely his 'home shot' has been fired long before this, and he is at home or somewhere else with his friends."

There is another natural fact which affects the wages of labor, namely, the weather. A hard winter increases production, a mild one diminishes it; no human power can change this, and the fluctuation in wages due to this cause cannot be avoided.

The above two causes due to natural forces will ever affect the wages of labor in the coal fields and are beyond human control; but there are other causes of variation which are due to human agencies and cause discontent among the employes; these can be remedied. There is no reason for different prices for the same work in the same and in different collieries. Timbering, rock-work, opening chambers, chutes and cross-cuts require a fairly uniform amount of labor throughout the coal fields, but the prices paid for these vary considerably. If uniform rates were established, the friction which now prevails in almost every section would be largely removed. Many miners think, also, that regular prices can be fixed for mining coal, based on the thickness of the seam; others say this is impracticable. Be that as it may, one thing is possible, namely, that the foreman should have no respect of person when paying prices for the same kind of work. When two or three rates are paid for the same work and by the same foreman, there is only one cause for it—favoritism, and there is only one result—strife. We are convinced that after all is done to adjust prices on the most equitable basis possible, a certain

element must be left to be adjusted between the miner and the foreman. If justice prevails between man and man, peace will result; if the foreman tries to outwit the ignorant miner, he is generally found out, and loss of confidence follows which breeds discontent and strife. There are foremen who have mercilessly ground the faces of their men and brought upon themselves such wrath as burst forth in frightful judgment.

There are two ways to cut down the cost of production: one by reducing wages; another by improvement in the art of mining and handling coal. The latter abridges labor and can generally be peaceably introduced, the former irritates laborers and precipitates labor conflicts. Men who have not skill enough to devise the one have resort to the other and friction follows.

An amicable adjustment of wages is the great desideratum to-day in the anthracite coal industry. It can be best and most easily done by collective bargaining between the operators and the employes. There is at present greater compactness of organization among the coöperating forces than ever before; capital is concentrated in a few hands; labor is also controlled by a few men.

The question of wages needs readjustment, and if the forces having antagonistic interests were to come together, an amicable settlement would be effected. This would involve the acknowledgment of the labor organization by the operators. The chief reason for not acknowledging it is prejudice and pride. Better councils will undoubtedly prevail among men of broad and intelligent views, for the United Mine Workers is a fact they have to account with in adjusting wages, however they may look upon the matter, and it would seem better to acknowledge the fact at once and meet it manfully.*

Another evil which can be largely eliminated is surplus labor. From the time when a profitable market was opened for anthra-

* The impression prevails among employes that the operators have conditionally promised to meet the representatives of the U. M. W. in convention before the first of January, 1902, to discuss wages, etc. This would be a recognition of the union, which is the chief desire of the miners at present.

cite coal down to the present day this evil has characterized the industry. If all the employes engaged in mining coal had worked full time in the year 1899, they would have produced over 90,000,000 tons of coal. They only worked, however, 180 days and 54,034,224 tons were produced, which shows that fully one-fourth too many men are engaged in the industry. If we allow for natural causes which introduce periodicity into the business according to the changing seasons of the year, it is safe to say that 30,000 employes now in the anthracite industry could be transferred to some other occupation, while the 110,000 remaining could produce the amount of coal needed to meet the market demand at remunerative prices.

This estimate is justified by a study of the time worked in representative collieries in the anthracite coal fields for the year 1899, which may be taken as one of average prosperity in the history of the industry. The following table compiled from the monthly returns of time worked per month in 138 breakers in the several districts throughout the coal fields, gives a fair idea of the number of days the employes were engaged in the respective months.

TABLE SHOWING NUMBER OF DAYS WORKED PER MONTH
IN 1899.

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
14.25	14.34	12.75	12.75	13.52	13.53	14.28	16.05	17.20	19.78	20.44	19.89
13.86	15.03	9.40	13.44	14.90	18.50	18.90	15.40	18.00	20.90	22.50	15.70
13.25	12.85	13.05	12.55	12.90	16.85	16.00	16.30	14.35	19.20	17.70	16.10
12.69	9.85	12.78	10.91	11.95	13.77	14.42	13.95	14.85	16.12	16.12	16.12
16.80	13.89	13.39	12.42	16.28	17.35	18.56	14.55	16.83	20.21	19.31	17.56
18.00	12.20	19.40	18.60	21.20	20.20	19.20	24.00	21.60	23.00	22.00	21.40
19.78	13.68	20.72	17.12	17.91	18.14	19.05	22.73	19.49	20.85	22.42	21.98
18.63	16.95	24.20	23.45	26.10	25.25	19.95	18.03	19.60	19.70	23.63	23.25
17.50	10.15	13.20	9.50	9.60	13.00	14.20	15.40	18.35	21.55	18.60	16.50
16.15	10.00	12.35	9.45	11.40	14.45	15.15	16.10	17.00	19.50	15.60	15.90
19.05	11.97	12.84	9.51	10.96	12.86	15.64	18.20	19.00	21.25	17.33	17.43
16.36	12.81	14.91	13.61	15.06	16.71	16.94	17.33	17.93	20.27	19.60	18.34

From the averages in the last horizontal line we see that February is the month in which the least number of days were worked, while October leads the list. The variation in the two extremes is 7.46 days. Or expressed in another form, the employes worked 36.75 per cent. more time in October



than in February to produce the amount of coal needed to meet the maximum monthly demand. But even in October the men could have worked 26 days, or 28.26 per cent. more time than they did, that is, 22.04 per cent. fewer men working full time could have produced the same amount of coal in October, 1899, the month in which the maximum tonnage was produced at the various collieries.

It is also reasonable to suppose that better administration could reduce the above variation between the maximum and the minimum number of days in the month the miners were employed during the year. The variation is partly due to the necessity of shutting down collieries for repairs, but far-sighted administration can so guard against this cause of intermittent labor that it would produce very little effect upon the employes. There is no insurmountable difficulty in the mining industry which would make it impossible to regulate the rate of production in periods of three months, so that during that time the monthly tonnage would be nearly equal. If we take the figures given above in the last horizontal line and estimate the average for each month in the quarter, we have :

From January to March.....	14.69 days.
“ April “ June.....	14.79 “
“ July “ September.....	17.40 “
“ October “ December.....	19.40 “

Here the variation between the maximum and the minimum number of days is only 4.71. In this view of the question, the men could have worked on an average 5.60 days per month more during the busiest quarter in the year, or 28.86 per cent. more time ; that is, 22.4 per cent. fewer men working full time during the season when the market demand is at its highest could have produced the same amount of coal that the 140,000 employes did working an average of 19.40 days a month. Hence, with no detrimental effect on the industry, 20 per cent. of the employes (28,000) could be dispensed with when the market demand is at its maximum and during the seasons of minimum production the remaining 112,000 laborers would not be employed at full time.

It is alleged—and there is reason to believe that it is true—that the surplus labor in the anthracite coal fields is largely due to a policy designedly pursued by the operators, whereby they might expect to keep laborers in due subjection. They acted on the idea that employes could be better controlled, their tendency to combination more effectually frustrated, and industrial friction more successfully stayed, if they were kept near the starvation point. Irregular wages and a miserable existence were their devices to quell all attempts of the mining employes to insist on their rights as men. They believed the workmen could not stand prosperity, and that the peaceful operation of the industry depended on having a surplus of cheap labor.

Business men are exceptionally keen in their insight into human nature, but the anthracite coal operators grossly miscalculated the effect of such a policy upon their employes. Privation and want in the ranks of workingmen are far more menacing to industrial peace than prosperity and plenty. The history of labor disputes in the anthracite coal fields shows how fallacious and superficial the idea is that laborers can be cowed to submission by surplus labor, intermittent work and starvation wages. Such a short-sighted policy invariably reacts upon the operators themselves, and the end is disruption, industrial conflict and distress. Economic peace has never rested securely on a foundation of privation and misery. Starvation-discipline by surplus labor will never make men submissive and meek. When mining employes are barely able to get the necessaries of life, discontent and dissatisfaction are engendered. It is only a question of time when these evils become so acute as to lead to protest and revolt. When men are hard pressed by economic conditions which intensify the struggle for existence, they resort to combination in order to overcome the antagonistic force. Men in distressing circumstances will cooperate in order to make the conditions of life easier. Surplus labor has been the cause of distress and want for many years in the anthracite coal fields, and the result is a formidable combination which demands better industrial and economic conditions for laborers.

*surplus labor
to defy
organization*

*leads to
distress
organization*

The tenet that miners cannot stand prosperity is utterly false. Human nature is the same in miners as in all other classes of laborers. Give them regular work and a fair wage, and the vast majority are intelligent enough to fully appreciate the favors. They will show their appreciation in steady co-operation with capitalists. In all industries a certain percentage of turbulent and ungrateful fellows are found, who ever have their list of grievances no matter how they are treated. That is true of mining employes, but the vast majority will respond to kindness and sympathy and feel thankful for regular work and good pay.

The Anthracite Syndicate can benefit the miners in this respect. It can do away with this surplus labor and bring about economic conditions which will insure contentment in hundreds of homes among the army of anthracite miners. These thousands of mine workers ask for one thing above all else, namely, an opportunity to earn an honest living for themselves and families. We have seen scores of strong men and patient women silently suffering under intermittent labor, and longing for work. They ask not for favors; they are too brave to complain; their manly independence raises them above charitable considerations; all they asked for is: "Give us work"; "Give us a chance to earn our bread;" and it is a great pity that they are deprived of the opportunity they seek. The Syndicate can do great good to this large body of thrifty workingmen in the coal fields. It can so manage the industry that every honest and industrious worker among them can get regular employment and be protected against the evils of surplus labor, which have filled so many hearts with bitterness and so many homes with misery.

CHAPTER VII.

INCIDENTAL PROFITS OF OPERATORS.

1. HOUSES RENTED.
 2. THE AMOUNT OF POWDER SOLD.
 3. THE KIND AND NUMBER OF COMPANY STORES.
 4. VOLUME OF BUSINESS AND PROFITS.
 5. THE GOOD AND BAD OF COMPANY STORES.
-

All the operators in the anthracite coal fields sell supplies to their employes. No miner is at liberty to buy powder where he chooses. Most of the mining companies also have houses for rent, and a great many company stores still exist.* Two of these items entered into the list of grievances of the United Mine Workers last fall. They wanted the price of powder reduced. They also demanded the abolition of the company store, because of exorbitant prices charged for commodities and compulsion to deal in them. Many and persistent attempts have been made to do away with this evil, all of which thus far have come short of their object. It was an issue in the Bates' strike of 1849. The Workingmen's Benevolent Association of 1868-75 attempted to remove it. It was one of the planks in the platform of the Knights of Labor who flourished in the Middle and Southern coal fields in 1886-1888. And the labor organization which now flourishes in the anthracite coal fields has undertaken to correct this evil. What the employes could not do by labor unions, their representatives have tried to do by legislative enactment. In June, 1881, a law was passed to enforce payment in lawful money of the United States or "any order or other paper whatsoever, redeemable for its face value in lawful money of the United States." This law was declared unconstitutional, in being an

*Some claim that all company stores have disappeared in the anthracite coal fields. Since the last strike many of them have been abandoned, but some still remain.

infringement on the privileges of men to sell their labor for what they think best, whether money or goods. In June, 1891, another act was passed, making it unlawful for "any mining or manufacturing corporation of this Commonwealth or the officers or stockholders of any such corporation—to engage in or carry on—any store known as company store." Another attempt was made at the recommendation of an investigating committee in 1897 to abolish this evil.* All these legislative acts have come short of their object. The company store still flourishes. Miners have taken up the question as a local issue in some of the shafts, but the company store still lives there. Their number is not as large as it once was; they are gradually dying out, but the institution dies hard.

This chapter treats of incidental profits derived by operators from supplies sold to their employes. We take the several items in the order of their importance in relation to public opinion.

HOUSES RENTED.

An item in the Pottsville *Miners' Journal* for January, 1850, states that there were 4,200 houses rented by the operators in the anthracite coal fields. From the earliest record of mining, operators have erected abodes for their employes, and the practise has been continued to very recent times among all the companies. In the early years of mining it was a necessity. Coal was then mined in barren places where men had not settled and shelter could not be procured. The employes could not build houses for themselves and families, for they had no capital to invest in land or building material. Mining companies met the need of the hour by building houses in which the employes could live.

* Another bill relative to the company stores was passed last June, to go into effect January 1, 1902. It provides:

1. That all operators who pay their employes in "orders, checks, dividers, coupons, pass-books or other paper representing wages or earnings of an employe not paid in cash," shall pay into the treasury of the Commonwealth a tax of 25 per cent. on the face value of all such amounts.

2. Failure to comply with this provision will result in an additional tax of 25 per cent. on the face value of all such amounts.

3. Mining supplies, coal, rent and assessments imposed by the Union which may be collected through the office, are exempted from this law.

It was an accommodation to the miner and a source of profit to the employer. Many of the companies at present conduct a large real estate business by selling land to their employes, on which they build themselves homes. The Reading Company will not sell the land, but it has a system of leasing lots for building purposes at a rent of a dollar a month. When the miner, who has improved the land, leaves he has the privilege of selling out to the best advantage. Some companies give their employes the privilege of building themselves homes on their land without any specified terms as to land rent. One company in Schuylkill county grants that privilege to miners in its colliery, but if any family takes in boarders, then a dollar a month per boarder must be paid to the company as rent. This is a wise provision against the evil of over-crowding a small house, which had been the custom among Sclavs during the first decade of their advent into the coal fields. An individual operator in Lackawanna county guards against this by prohibiting more than two boarders in the same house with the family. When the President of the Delaware, Lackawanna and Western was changed three years ago the company sold all the houses it rented. The Delaware and Hudson also has disposed of many but not all of its houses. The other companies rent houses to their employes. In some mining camps all the land and houses are owned by the company. On the Hazleton mountain, mining operators have sold land with the proviso that no saloon or any place for the sale of intoxicants should be erected upon it, and it has been an effective prohibitory measure. Many years ago instances were known of operators going to the other extreme. They erected saloons, and the vendor of intoxicants therein divided the profits with them. We have not seen an instance of that in our investigation. We only met one case of a foreman in charge of a striping, who was the proprietor of a saloon. Regulations restricting the use of intoxicants in and around the mines were not as strict years ago as they are to-day. There is ten times more capital invested in the colliery now than was the case then, and many costly experiences have taught operators that drink and safety are not compatible.

As the population of the coal fields has increased, many towns have sprung up where formerly only company houses existed. Hence we find in many communities company houses and those possessed by private individuals side by side. No compulsion, as far as we have learned, is exercised on the employes to live in company houses. They are generally rented at lower rates than private ones, and so are eagerly sought for by the men. They are not as well built, as a rule, as houses erected by private individuals, but the low rent is an advantage the miners appreciate more than convenience. Most companies provide homes for their foremen, but this custom, in mines proximate to towns and cities, has been discontinued. One company takes monthly rent from its foremen for the houses put at their disposal, and at the end of the year refunds to the tenants the total sum of the rent it has collected.

The character of company houses differs very much ; some of them are commodious and comfortable, others are rude shanties, rickety, dirty and small. Hundreds of houses can be seen in the Southern coal field consisting of a frame, to which hemlock boards are attached in a perpendicular manner, and strips nailed over the crevices to keep out the wind. On the inside again hemlock boards constitute the sides of the building, which, where the tenant is not neat and clean, show the accumulation of dirt and filth on their unpolished surface, and in the crevices a vigorous struggle for existence goes on. Company houses built in recent years are better in every respect than the older ones. The contrast is striking at the Lytle's colliery ; in one place the old dilapidated houses now tenanted by the Sclavs may be seen ; on another plot are seen new homes recently erected, containing six comfortable rooms, and tenanted by English-speaking miners.

The rule adopted by many companies in fixing rent is to adjust it so as to cover insurance and water tax and pay about 12 per cent. on the investment. On this basis the employes get houses for about \$1.00 a room per month. The Lehigh Valley charges more than this, but it sells eight tons of coal in the year to its tenants for \$1.00 a ton.* At Natalie, in Schuyl-

* Last fall the Lehigh Valley discontinued this custom of selling coal at reduced rates to its tenants and readjusted its rent rates.

kill county, four-roomed houses rent for \$5 a month ; six-roomed houses for \$7.00. At Buck Mountain Colliery, about 130 houses are rented: 28 for \$8.00 a month ; 30 for \$6.00, and 72 for \$4.00. The Lytle Company rents 120 houses : 40 for \$3.00 a month ; 40 for \$4.00, and 40 for \$6.00. Nowhere did we hear complaints of exorbitant rents charged by operators for their houses.

Mining companies also sell coal to their employes at lower rates than they charge the public, and keep teams to haul it to their homes. Thirty years ago operators gave their employes coal at nominal rates, but the kindness was abused by some men. What they got from the company at a nominal rate they sold for drink or groceries at market prices. So to-day the rates charged the employes are only from 7 to 10 per cent. below those charged the public.

THE AMOUNT OF POWDER SOLD.

All the mining companies sell powder to their miners. The men are compelled to buy it of them : if they buy it elsewhere, they must go elsewhere to burn it. Operators advance many reasons for this rule : they claim that they are able thus to regulate the kind of powder used, so that it will contaminate the air as little as possible in the mines. It is certainly a convenience to the men to have the powder at the head of the shaft. The high price charged for powder before the last strike was defended on the ground that miners would use it more economically than if it were a cheaper commodity. All these reasons are superficial: the truth of the matter lies in the profits made by the operators. The powder question was one of the vital issues in the last strike. It was settled as far as prices are concerned. All through the anthracite fields, a keg of 25 lbs. is now sold for \$1.50, whereas formerly \$2.75 was charged for it by most of the mining companies. The reduction made in the price of powder was computed in the advance of 10 per cent. given the miners, so that the actual advance in wages received by those who formerly paid \$2.75 for powder was only between 3 and 4 per cent. The discussion of this question in the press was spirited during the conflict; the operators claimed

that the price paid for powder had no bearing upon the rate of wages, for in fixing them, the amount paid for powder entered into the computation.* The miners claimed they had a real grievance and demanded a settlement of the question. The truth lies midway between the assertions of the contending parties.

If in the seventies one keg blasted 50 tons of coal, which in the nineties required two kegs, the powder cost in these periods would be as 1 : 2. If the price of powder was fixed in adjusting wages back in the seventies, surely it made a difference in wages, when the same agreement was perpetuated in the nineties. No sophistry can hide the fact that the increase in the amount of powder used in mining the lower seams reduced the miner's wages and justified his appeal for a reduction in its price. On the other hand, the powder expense did come into consideration in adjusting wages. It was in the agreement made in the seventies. Changed conditions in the last decade made that agreement a source of injustice to the men of to-day and the companies on grounds of equity ought to have changed the price of powder to suit the changed conditions. This most of the mining companies failed to do and so left in the hands of the agitator a weapon which he never failed to use with great effect. The question has been settled, however, as to price; the miners may yet demand the right to buy powder where they choose, for the operators still insist on a monopoly in the sale of it.

ice of powder

The conflict which has been waged over this question has historical interest, inasmuch as it illustrates the tenacious grip of self-interest. For the last 20 years miners have tried to get the price of powder reduced. The Reading Company yielded to the demands of their employes in the year 1888 by reducing the price to \$1.50 a keg. Several individual companies which follow the lead of the Reading did the same. In the Northern and Middle coal fields the operators in 1893 reduced the price from \$3.00 to \$2.75 a keg.

During the last 10 or 15 years, as miners felt the powder

*The Delaware, Lackawanna and Western Coal Company, in the latter sixties, made an agreement with its employes "that \$3.00 per keg was to be the established price of powder, irrespective of whatever changes that may occur in the price of the car of coal."

expense increasing, many appeals were made to the companies to reduce its price, but all efforts were in vain until the strike of last October.

The following table gives the amount of powder consumed during the last 19 years.

AMOUNT OF POWDER CONSUMED.

Year.	Number of Kegs.	
1881	551,164	
1882	555,493	
1883	564,057	
1884	663,157	
1885	889,177	
1886	931,958	
1887	1,023,529	
1888	1,112,160	6,290,695
1889	904,140	
1890	1,030,000	
1891	1,198,788	
1892	1,242,140	
1893	1,269,051	5,644,119
1894	1,230,128	
1895	1,310,671	
1896	1,284,866	
1897	1,272,198	
1898	1,226,804	
1899	1,372,691	7,697,358
Total.	19,632,172	

Up to 1888, \$3.00 a keg was charged throughout the coal fields for powder. That year, the Reading and some individual companies reduced it to \$1.50. The amount sold for \$1.50 a keg by these companies may be put down at 16 per cent. of the total consumption of powder. In 1893, the other companies reduced the price to \$2.75.

The cost to the companies is acknowledged to be on an average, one dollar a keg. Upon this calculation, we get the following result :

AMOUNT OF POWDER SOLD AND ESTIMATED PROFITS.

Years.	Total Amount Consumed.	Amount Sold by Reading, etc., for \$1.50.	Total Sold for \$3.00 a Keg.	Total Sold for \$2.75 a Keg.	Estimated Profits.
1881-1888	6,290,695		6,290,695.00		\$12,581,390.00
1889-1893	5,644,119	846,617.85	4,797,501.15		10,018,311.22
1893-1899	7,697,358	1,154,603.70		6,542,754.30	12,027,121.87
Total.	19,632,172	2,001,221.55	11,088,196.15	6,542,754.30	\$34,626,823.09

In the year 1881, an average of 54.81 tons of coal were produced for every keg of powder used. In 1899, the average was 39.36 tons per keg. The accompanying chart shows the actual amount of powder used, and the amount of powder that would have been used in producing the coal mined, if the proportion of tons mined per keg of powder in 1881 had continued throughout the years. The increased consumption of powder affected employers and employes very differently: to the miner, it meant more expense; to the operator, more profits. Of course, the operator may answer that the item of dead-work increased, and that he had to pay more in 1899 for rock-work than in 1881; that is true, but he could well afford to do it, from the increased profits derived from the larger quantity of powder sold. From the study of this question one can hardly avoid the conviction that the introduction of the price of powder into the question of fixing the rate of wages in the seventies was a shrewd move, which illustrates the superiority of brain over brawn in concluding a bargain. Powder in this instance played the same part exactly as appreciation of gold does in the case of a debtor who is obliged to pay his debt in the appreciated metal.

THE KIND AND NUMBER OF COMPANY STORES.

There are two kinds of company stores. The company store proper is that conducted by the same party as runs the colliery. This was the kind which prevailed in the early years of mining. Another kind, however, came in during the years of consolidation. When an individual operator sold out to a large corporation, he reserved the privilege of continuing the company store, with the understanding that the operators would deduct each month from the wages of the men the amount due him for goods sold the employes during the month. The store proprietor paid from 3 to 5 per cent. to the company for collecting. This latter kind of store is more odious to the employes than the former, and is technically called "pluck-me store." The manager works through the foreman, whom he sometimes takes in as a stockholder, or perchance he enlists his

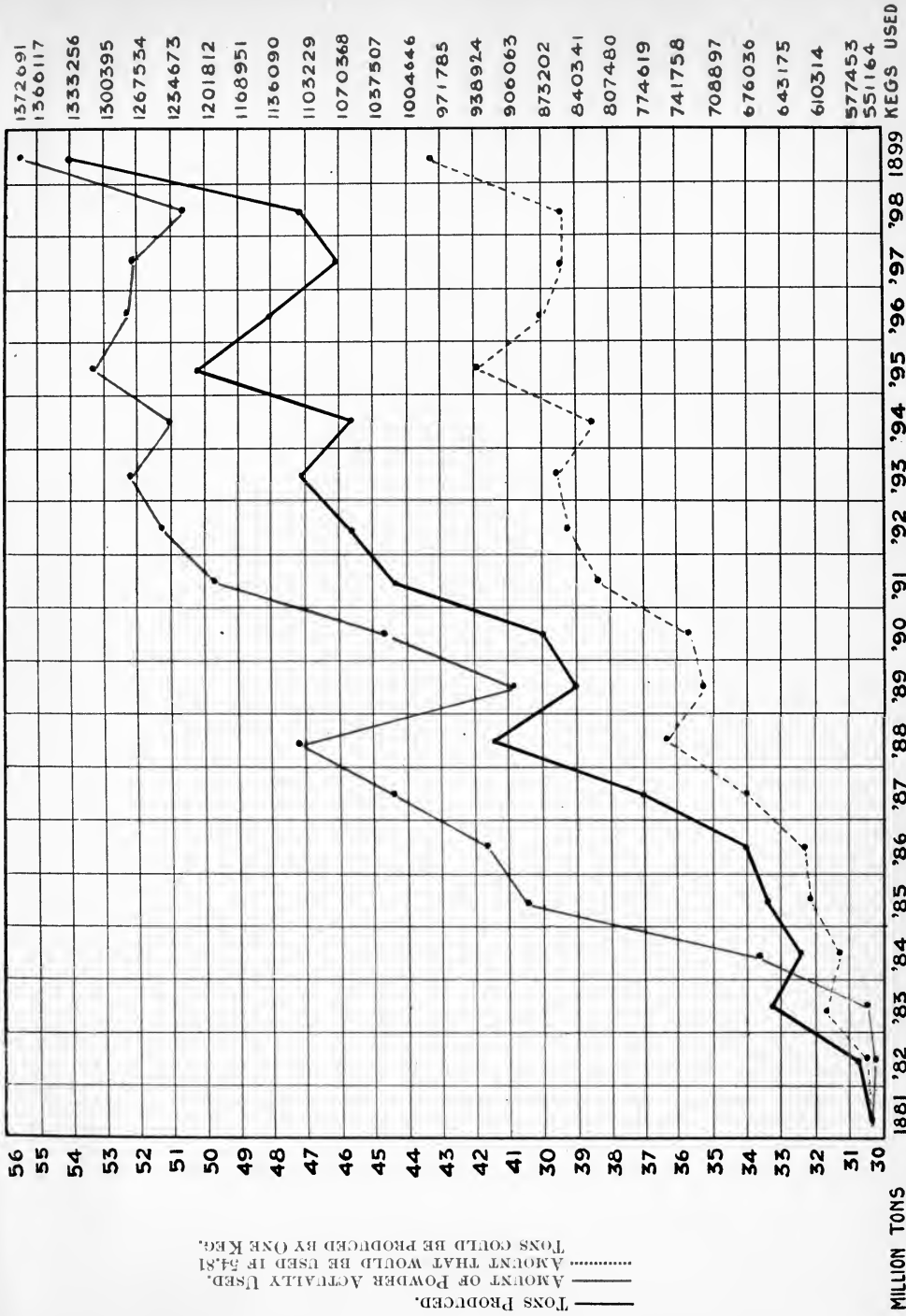


CHART SHOWING VARIATION IN THE CONSUMPTION OF POWDER FROM 1881-1899.

1372691
 1366117
 1333256
 1300395
 1267534
 1234673
 1201812
 1168951
 1136090
 1103229
 1070368
 1037507
 1004646
 971785
 938924
 906063
 873202
 840341
 807480
 774619
 741758
 708897
 676036
 643175
 610314
 577453
 551164
 KEGS USED

56
 55
 54
 53
 52
 51
 50
 49
 48
 47
 46
 45
 44
 43
 42
 41
 40
 39
 38
 37
 36
 35
 34
 33
 32
 31
 30
 MILLION TONS



coöperation by presents or special favors, so that he may bring his power to bear upon the men under his charge. There are other kinds of stores which affect the men in the very same manner as a truck store. Some foremen in years past thought they could make an honest penny by running a store. Many of them holding positions under the large companies opened stores and did a thriving business as long as they held the position of foremen. In other instances a son or a son-in-law, or a brother-in-law went into business, and invariably the patronage came from the men working under the relative in the mines. The foremen showed favor to men who patronized their store, and the men curried favor by dealing there. This latter kind of store as well as the former were removed either by the employes complaining to the head management of discrimination, or by a detective of the company ferretting out the evils incident to it. Then the foreman, directly or indirectly interested, was removed to a shaft so far from the store that he would not be influenced in the discharge of his duties. ✓

co store

The number of company stores is gradually diminishing. This is due chiefly to the action of corporations buying out individual operators and discontinuing the stores. That was the case with the Temple Iron and Coal Company, which last October closed five company stores in the Northern coal field. The Delaware and Hudson last February purchased four collieries of individual operators, to which company stores were attached ; these are discontinued. In the Southern and Middle coal fields some of the large companies have tolerated the company store after they had control of the colliery, but the friction caused by the truck system among their employes has moved some of them to do away with it.

That has been the case with some of the largest company stores in the Pottsville district. The operators served notice on the managers of the stores they would not collect their bills through the office after a certain date specified by them. This is not the invariable rule, however. The New York, Ontario and Western purchased the interests of the Scranton Coal Company last fall, but the company stores are continued ;

the policy of this corporation seems to be to run the stores on a large scale, and compete with any of the merchants in the county.

It is difficult to learn the exact number of stores now connected with collieries.* The connection between stores and collieries varies, and one does not know exactly where the dividing line comes in. We found many instances where the officials emphatically denied any connection between the store and the colliery, but the employes just as positively said there was a relation between them. As far as we have been able to count, the following would be an approximate estimate of the number of employes connected with collieries which have company stores of one kind or another attached to them :

NUMBER OF COMPANY STORES.

District.	Number Connected with Collieries with Company Stores.	Percentage of the Total Employes in the District.
First.....	4,913	22.82%
Second.....	5,909	38.25
Third.....	6,397	37.30
Fourth.....	9,604	66.13
Fifth.....	9,468	66.24
Sixth.....	3,144	15.80
Seventh	7,557	37.19
Eighth.....	4,609	36.34
Total.....	51,601	37.43

An approximate estimate of the number of men affected by this grievance in the anthracite coal fields would be about 37 per cent. of the total number of employes. The remaining 63 per cent. are paid in cash and can trade where they have a mind to. It will be seen from the percentages in the several districts that some of them are far more afflicted by this evil than others. The above figures are not to be taken as exact in every detail. They are given as an approximate estimate and are as near as one can get to a question on which great sensitiveness is felt on the side of operators and great acrimony among employes.

*The following computation was made before the strike of last fall, and hence before the antagonism against company stores reached so acute a form as to drive some of them under cover and to reform gross abuses in others. The effect of the bill passed last June is watched with interest. Some companies are instituting changes so as to conform to the provisions of that act.

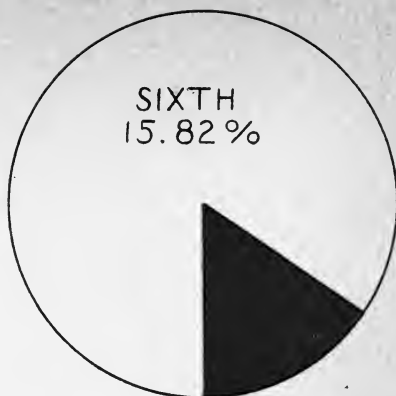
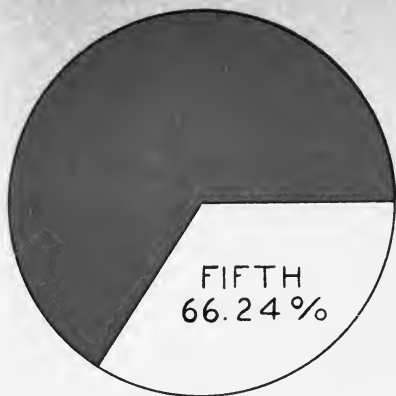


CHART SHOWING DISTRICTS HAVING THE LARGEST AND SMALLEST PERCENTAGE OF EMPLOYEES, WHO WORK IN COLLIERIES WHICH HAVE COMPANY STORES.



CHART SHOWING PERCENTAGE OF EMPLOYEES THROUGHOUT THE WHOLE ANTHRACITE COAL FIELD, WHO ARE IN COLLIERIES WHICH HAVE COMPANY STORES.



THE VOLUME OF BUSINESS AND PROFITS.

The volume of business done by many of these stores is large. Three of them under one management in Lackawanna county did a business in 1899 of \$275,000, an average for each store of \$7,639 a month. Another store in the same county did an average business of \$8,000 a month. One in Schuylkill county, which was patronized by three collieries, had a business of \$20,000 a month; when the operators discontinued collecting for this store its business fell off 50 per cent. Two of the smallest stores we found were in the Mahanoy Valley, which did a monthly business of \$2,910 and \$3,100, respectively. Two of the stores recently discontinued did a business every month of between \$9,000 and \$11,000. Some of the largest we met with were in the Hazleton District. One of these stores did a business of \$229,870.17 in one year, or an average of \$19,155.84 a month. The average monthly purchase by each employe, estimated according to the above figures, would be about \$14.00. Computed on this basis, the volume of business done per month by the company stores throughout the anthracite coal fields would be \$736,722.

The profits of the company store depends on the volume of business, the prices charged, and the nature of the patrons. The volume varies according to the number of employes, the prices depend largely upon the man in charge of the store, and the patrons may be either English-speaking workmen or Slav.

The objection most commonly heard against company stores is that they charge more for their goods than men can buy them for in other stores.

The agitators last summer said that prices were from 25 to 35 per cent. higher than in stores in neighboring towns. A committee of the legislature of Pennsylvania, which investigated the question in 1896, stated that prices were about 20 per cent. higher. A merchant in Schuylkill county, who appeared before that committee, testified under oath that they were from 10 to 15 per cent. higher. But here again no general rule can be laid down. Company stores in isolated places, as a rule,

charge higher for their goods than business men in town, but some company stores located in populous towns compete in prices with any store in the community. Managers of truck stores differ greatly. Some insist on high prices, while others fix them at popular rates, so as to secure a large volume of business. Human nature in the management of company stores is the very same as elsewhere. We have met managers who were upright, frank and keen business men, and ran the company store so as to compete with any store in the neighborhood; others there are who are arrogant, unscrupulous and tyrannical; they charge exorbitant prices, treat their patrons with contempt and stoop to the most contemptible schemes to tyrannize over men who dare to question their authority. To make a sweeping generalization as to exorbitant prices in company stores is therefore unjust.

In comparing prices three things should be taken into consideration. Regular and not special prices are to be taken, the quality of the goods must be considered and the kind of articles sold. Store-keepers make leaders of certain articles and put the prices of these at or even below actual cost. To compare these prices with the prices of the same articles in the company store is not just. Sugar, muslin, calico, hams may under these circumstances be from 20 to 25 per cent. below truck store prices. The comparison, however, is unfair; the regular prices charged for these articles should be taken. It is an acknowledged fact that the quality of goods handled by the company stores is a grade higher than that usually handled by general stores. If prices are to be compared, the same grade of commodities should be taken. A certain brand of tomatoes can be sold three cans for a quarter; another brand, two cans for a quarter; the one is $4\frac{1}{8}$ cents dearer per can than the other, but the reason is in the brand. Two miners' wives last summer instanced the exorbitant prices of company stores by the above prices of tomatoes, but they did not mention the brand purchased. It may be true that the miner and his family could get along just as well with the cheaper grade of goods; nevertheless the quality of the article sold must be taken into con-

sideration as well as its price. The profits realized on all articles sold in a company store are not uniform. On miners' tools, some realize 100 per cent.; on gingham, 75 per cent.; on dry goods, generally from 50 to 100 per cent. Groceries, however, are ordinarily sold by the company stores at the same price as by the credit stores. Shoes, rubbers, clothing, hardware and furniture are sold at current prices in truck stores near cities; in isolated places, however, they are from 15 per cent. to 25 per cent. higher. It is a fact that in houses dealing in general merchandise, profits vary greatly, according to the articles sold. On commodities of prime necessity, the general merchant is satisfied with 10 per cent. profits above expenses, but profits on spices, molasses, etc., are about 100 per cent. Profits on dry goods, hardware and furniture, are higher than those on flour, sugar, butter, etc. This same rule applies to company stores and the reason lies in the nature of the commodity. On prime necessities which are daily consumed, profits are small; on articles that are occasionally purchased, profits are higher.

The following table (on next page) may serve as an example of the difference in prices in three stores, where we found the difference such as deserved notice. It will be seen that the difference in the prices of articles of prime necessity is less than that of articles of luxury. The average percentage of excess in each case varies, and it shows how unjust a general statement of exorbitant charges can be, when applied to all stores. Nos. 1 and 2 are in Schuylkill county; No. 3, in Lackawanna; Nos. 1 and 3 are in isolated localities; No. 2 is near a town.

A woman dealing in No. 3, whose average monthly bill was \$28, said she could save every month from \$4.00 to \$5.00 if she got the wages in money. Another dealing in No. 1 and buying provisions for a family of six, said she could save every month from \$7.00 to \$9.00 if she got the money. Other women buying in company stores said they could do as well there as elsewhere.

Some of the managers want large profits. A company in Luzerne county expected 25 per cent. after clearing all ex-

COMPARISON OF PRICES OF COMMODITIES.

Name of Article.	No. 1.			No. 2.			No. 3.		
	Price in Co. Store.	Price in Town.	Percentage Difference.	Price in Co. Store.	Price in Town.	Percentage Difference.	Price in Co. Store.	Price in Town.	Percentage Difference.
Flour (bbl.)	\$5.50	\$5.00	10	\$5.30	\$5.00	6	\$5.50	\$5.50	
Butter (lb.)	.36	.30	20	.34	.28	21.42	.28	.24	16.66
Sugar (lbs. \$1)	18 lbs.	20 lbs.	11.11	16 lbs.	16 lbs.		14 lbs.	16.5 lbs.	17.85
Soap (bars \$1)	16 bars	20 bars	25	16 lbs.	16 lbs.		6 bars	7 bars	16.66
Tobacco (c. \$1)	10 cakes	15 cakes	50	10 cans	10 cans		45c. lb.	42c. lb.	7.15
Tomatoes (c. \$1)	8 cans	10 cans	25	10 cans	10 cans		10 cans	10 cans	
Raisins (lb.)	.10	.08	25	.10	.10		.10	.08	25
Currants "	.10	.08	25	.10	.10		.10	.08	25
Lard "	.13	.10	30	.10	.10		.10	.09	11.11
Crackers "	.12	.10	20	.10	.10		.10	.09	11.11
Cheese "	.18	.14	28.57	.16	.14	15.71	.16	.13	23.07
Eggs (doz.)	.25	.20	25	.07	.05	40	.07	.05	40
Calico (yd.)	.08	.05	60	.08	.06	33.33	.07	.05	40
Muslin "	.08	.05	60	.07	.06	33.33	.07	.05	40
Potatoes (bu.)	.70	.60	16.66	.70	.60	16.66	.60	.50	20
Bacon (lb.)	.12	.10	20	.12	.10	20	.60	.50	20
Coffee "	.15	.15		.15	.14	7.14	.12‡	.10	25
Rice "							.10	.08‡	20
Beans (qt.)				.15	.12	25	.10	.08‡	20
Dinner can.				\$1.00	.80	25	.10	.08‡	20
Washing bd.				3.50	\$3.25	7.14	.60	.50	20
R. Boots (Candee)				3.00	2.75	9.09	.60	.50	25
Boots (oil grain)									
Corn (bushel)	.60	.40	50	3.00	2.75	9.09	.60	.50	25

penses. A stockholder in store No. 1 received an annual dividend of from 80 to 100 per cent on the stock he held. An ex-bookkeeper of one of the Hazleton companies said "the store was as profitable as a breaker." These profits realized from company stores is the reason they have continued in existence, notwithstanding the persistent effort of the men to abolish them. To small operators they have been a substantial aid in making a poor colliery pay.

The best customers are the English-speaking families. Their bills generally amount to double those of the Slav per member of the family. The following bills contracted in July, 1900, show the difference. They have been taken from the books of one of the stores.

COMPANY STORE PATRONS.

Date.	Slav Patrons.	Anglo-Saxon Patrons.
July, 1900.	\$8.01	\$63.45
" "	7.70	41.97
" "	7.32	43.33
" "	4.03	35.79
" "	7.70	72.95
" "	7.50	18.38
" "	10.97	33.42
" "	7.20	21.98
" "	3.47	20.65
" "	2.41	48.08

Are the men compelled to deal in these stores? It depends wholly on the operators. Some never speak to their employes on the subject; others use very effectual means to secure their trade. There is a certain class of workers who need no stimulus. They hold the best positions, and from considerations of prudence, they patronize the truck store. Another class is employed in such distasteful work that, though they buy not a dollar's worth, they are left unmolested. In one colliery a never-failing way to get a good place was to run a heavy bill in the store. Few are the operators to-day who use direct means to compel the men to trade with them. The manager may speak to the employes, and, if they persist in withholding their patronage, they are transferred to a place where they cannot earn a living wage and so they quit. The employes of a colliery in

Schuylkill county organized a Granger society; the operators soon came to know it, and forced the foreman to use means to break it up. A sure way of keeping one's job is to be in debt in the store. Indirect compulsion is used in many places.

In one colliery it is an unwritten law, somehow impressed on the employes, that a married man is expected to deal monthly in the store to the amount of \$10.00, and a single man to the amount of \$2.50. In this colliery, a man did not obey this precept; he drew all his wages in money and it was his last pay there. A foreman, desiring to retain in his service a man who did not deal in the store, was told by the operator, "He does not patronize us, why should we patronize him?" He had to go. These are individual cases; but they show how operators, who are men of like passions as all others, are influenced by a store to do that which industrial ethics condemns, but which they, blinded by self-interest, justify on business principles.

Company stores have little or no competition; they spend nothing on advertising, and no time or money is wasted on decoration. The expense of management is from 6 to 7 per cent. of the sales, and the stock they carry is about two or three times the amount of their monthly trade. When three or four stores are under one management, they have a great advantage in buying goods in large quantities, and get bottom prices. The credit of the stores is of the highest; a large wholesale house doing much business with these stores said it had never lost a dollar through them. Company stores sometimes lose by giving credit. When an employe is injured, they see that he is furnished with the necessaries of life on credit. Some of these, when they get well, reward the kindness by leaving town and never paying the bill. Hungarians of the "smart" kind sometimes steal a march on the store manager. It is hard to distinguish Huns, and their names are the torment of Anglo-Saxon tongues. Thus one of them occasionally comes for a pair of boots, gives a name, which the manager finds on the book, and a record of wages due him, and so he gives the boots. When pay-day comes, the manager finds that the

fellow used the name of another and has left town. The losses of company stores are small, amounting on the average to the fraction of one per cent. on the sales. The manager has to exercise his authority, however, to hold some patrons in check. One of great experience said that 80 per cent. of his trade would pass beyond their income unless they were watched. Hence they use means to hold this class in check. Signs are generally relied upon. If C. M. stands opposite a name on the day book, the clerk must send the party to the manager. If G. O., he must only give the party the prime necessities of life, and cut down all luxuries. Another sign means that the party is to be watched. Then some names go on the "dead list," when the manager must be seen. All this is possible because the account of every man's earnings goes to the office at the close of every day, and the store manager has access to the books.

THE GOOD AND BAD OF COMPANY STORES.

There is nothing wholly good or wholly bad in human affairs. There is honor among thieves and sin among saints. The company store has its good as well as its bad features.

1. It offers the employe a store on which he can draw, from the first day he works, to the full extent of his earnings. This is no small advantage to men who come to a mining town for the first time where they are unknown. They cannot make purchases at a cash store, for they have no cash, nor at a credit store, for this requires a guarantee from some known inhabitant before the proprietor will trust a stranger. This guarantee they cannot furnish. When one has worked a day in a colliery having a company store attached, he can enter the store and draw to the amount of his earnings for that day, and indeed it frequently happens that he can get more than he has earned.

2. It gives the drunkard's wife the privilege of securing the necessary monthly supply for the family before the husband gets his wages, a large percentage of which he would spend on drink.

We have known cases where wives were very thankful when

their husbands worked in collieries having company stores attached. They could better secure food and clothing than when their husbands drew the pay, spending half of it possibly in drink before getting home. Weak men, who cannot resist the temptation of the cup, live a more sober life when working under the truck store system than any other. Where the curse of intemperance is as great as it is in mining towns, the company store may prove a blessing to many homes. If the system could be used as a means of discipline, by forcing drunkards to work under operators running company stores, it would be a very effective means in temperance reform, and devoted mothers and innocent children would find their misery greatly mitigated.

3. Company stores are one of the most efficient means of raising the standard of life of the Slav population in mining communities. The standard of living of these people is very low, and they have a tendency to perpetuate it. Stores conducted by their own people follow this standard, and there they generally deal.

Company stores follow the higher standard prevailing among Anglo-Saxons, and carry a high grade of goods. They do not fall to the Slav standard, though a large number of their patrons are of that nationality. The result is that the Slav gradually approximates more closely to the higher standard of living, and purchases articles of luxury which he would do without if he did not weekly and monthly come in contact with a store which carries them and with people who buy them. When we consider the great influence exerted on the character and condition of labor by the standard of living held, any means which tends to raise that standard serves a good purpose. The truck store has had that influence.

4. The company stores, largely removed from competition, and sure of their money for the articles they sell, are able to carry a higher grade of goods, to secure a higher standard of credit, and to offer better conditions to their employes, than might otherwise be possible.

The stress of competition drives general storekeepers to lower

the standard of the goods they sell, in order to meet the demand for low prices. Wholesale merchants have considerable trouble in this regard. Goods are frequently returned to them from retailers, who ordered them because of the low figures at which they were offered, but which could not be sold. This is hardly ever the case with company stores, and the reason is, that they are not driven by competition to clutch at low prices and reduce the quality of the goods they carry. The credit of the company store is good. It is very seldom any one of them goes into bankruptcy. When several of them are under one management, they can buy in large quantities and pay cash for the commodities. There is no reason why these stores could not compare in prices with any store whatsoever. We know of several in the Northern and Southern coal fields which do so. Employes generally prefer to be engaged in company stores rather than in private ones. The wages are on the average higher, the hours shorter, and they are not subject to the stress of competition in the regular run of business. The clerk of the company store hardly ever goes out to solicit business, which is the rule in other stores, and is disagreeable work. Truck stores always close at six o'clock in the evening, general stores seldom close so early. The advantages workingmen seek in unionism from the disastrous effect of unrestrained competition in labor, are enjoyed by the employes of company stores, which fact renders these positions attractive to clerks everywhere.

There is another side to the question: there are bad features inseparably connected with company stores.

1. Nothing is more encouraging to the workingman than to have his share of the production turned over to him periodically in the currency of the realm. This is not possible in the company store. Indeed, it is often the case that men draw what is known as a "bob-tail check." Men are known to work for months in succession, and on pay-day draw a slip of paper stating that nothing is coming to them. What is more discouraging to a man, after working all the month, than to receive such a due-bill as the following, which was actually paid an employe:

*Luminate
Co. - The*

Coal mined, 49 tons at 71½ cents = ...		\$35.03
Supplies	\$8.25	
Blacksmith.....	.30	
Fixing two drills30	
Rent	6.00	
Groceries, etc.....	20.18	
Total	<u>\$35.03</u>	
Net Balance.....		\$00.00

A system under which such a contingency as a "bob-tail check" is possible is demoralizing to the social and industrial instincts of workmen. Men take pride in their earnings. They want to see them, to handle them, to feel the magic touch of the product of their labor in the concrete form of dollars and cents. Operators during the campaign of 1896 appealed to this sentiment. They paid their men in gold and silver, and the ring of that coin was invigorating and exhilarating, and a clinching argument to the practical miner against any scheme to debase the currency. Payment of wages in currency has always a beneficial effect upon labor. Men have a sense of independence in the enjoyment of their month's wages, which they can never get by taking it out piecemeal during the month.

It may be said, that it amounts to the same thing after all. True, but the ordinary mine employe is not a philosopher, and the just pride in possession which we all feel only comes into the life of most of these men in the wages they earn, and no system should be tolerated which closes the door through which this power comes, which builds up manhood. The effect of a "bob-tail check" is seen in its most lamentable form in the case of young boys. Who will not pity these little lads, when they burst into a flood of tears as they bring home such a wage after the month's work? The child is father of the man here, and every miner who has drawn a "bob-tail check" knows how the boy feels.

2. Company stores encourage improvidence. Humanity in the lower stages has no economic foresight. When tribes and hordes begin to look ahead, they are on the way out of savagery. It has taken civilized nations many centuries to develop such economic foresight as is seen in the highest races to-day. It is

not astonishing then, if among groups of men even in civilized society, we still find this high attainment in a very undeveloped condition. That is the case in hundreds of families in the anthracite coal fields. Storekeepers who watch the habits of men know how true this is. When one of the managers of a company store said that 80 per cent. of the families in the coal fields were liable to purchase goods in excess of what the wages warranted, he simply affirmed that the majority of people lack economic foresight. Few house-wives can see the pay-day four or six weeks ahead, and regulate their purchases so that the aggregate amount of the orders will not exceed the husband's wages. They only think of the present need, and the store-book is the talisman which opens the cornu-copia. They imagine that the goods cost nothing, and are only reminded of it by the manager checking them in their extravagance. There are model house-wives found in anthracite mining communities, whose economic foresight is perfect, but these are the most bitter enemies of the company store. They know well how much they could save if all the earnings of the family were turned over to them in cash. Hence the company store is a source of evil to both classes of house-wives. To the thriftless woman it is the means of confirming her in her thriftlessness; to the thrifty it is a source of constant irritation and checks her laudable ambition to save and lay by in store for the hour of need.

3. The company store is humiliating in depriving families of ready cash in the hour of emergency. When the young man pays the clergyman for marrying him by an order on the store, when the charitably disposed woman gives help by a pound of coffee or tea from the store, and the father goes to beg for a dollar or two to get medicine for his sick child, there is roused a strong and deep sense of injustice, and a discontent which disturbs the peace of the home and the harmony of society. The dissipated also use the company store in ways that testify to what depths men can fall, drawn down by vitiated appetites.

Thus men have been known to secure at the company store

a ham worth \$1.60 and exchange it over the bar for 50 cents' worth of drink ; or a pair of boots worth \$2.50 and sell them for \$1.00 for the same purpose. Women are not free from this habit ; for example, one used to buy an excessive amount of sugar, which, when investigated, was found to have gone to the saloon for drink.

Tea and coffee are got and traded in the same way. Of course the company store is not responsible for the depraved appetites of these people, and managers do their best to guard against such practices ; but no class of people know better than they how prevalent these practices are, and our point is that payment in merchandise through the stores deprives men of ready cash, which the provident would wisely use and have at hand in the hour of need, and the improvident, if they spent all, could not gratify their appetite by ingenious devices for trading goods got at the store for drink.

4. In many collieries this system results in favoritism. Coal operators would not carry on a company store if they did not expect their employes to trade there. And as long as human nature remains what it is, there will always be a tendency to favor those who spend most of their earnings in the store. Managers of collieries watch the turn books of their employes, and the best work is regulated according to the store patronage. Seniority, capacity and intelligence count for very little in these cases. The store book decides who gets the best work ; it regulates the favors to be distributed ; it settles what wages the man may expect. The system places a premium on improvidence and incapacity. The thrifty and industrious miner who is blessed with a wife who studies the best interests of the home and keeps down the store account is discriminated against. Truck stores are always open to this abuse. Those managed by men who resist it are in the hands of parties having much restraining grace. Favoritism, however, generally creeps in where the truck store system prevails. Its fountain head is the temptation inalienably associated with the company store, and this is one of the prime causes which set intelligent and conscientious men against the institution.

5. It is contrary to the laws of the State. Operators know this, for many of them have contract forms which the miner must sign when he begins to work for them, waiving any right under the laws of the State to the money kept for goods sold to him or his family at the office. There is only one reason for the persistence of mining companies in violating the law ; it is their greed. It is asked has not the operator a right to run a store? Yes he has, but he has no right to sweat the wages of his employes through the company store, and as long as it is connected with the mines the door is open for such abuse. We know men who despise any such thought, but these very men know how some of their neighbors practice the sweating system under the form of the company store. And as long as men are liable to fall into this abuse, the system which affords them the opportunity should be removed. This has been the object of legislation on the subject, but intelligent and patriotic men have defied the law, and given an example of lawlessness to men who need, above all else, a lesson in deep and abiding reverence for the majesty of the State.

6. The company store is un-American ; it is totally contrary to the character and principles of the institutions of the country. This is why the agitators find, in the company store, a weapon they wield with such marvellous power.

We all like to imagine that we are free, and delight in having others flatter us by saying that we are free. The spirit of opposition to tyranny and oppression which has been in the air for centuries has become a constituent part of our blood. When the agitator addresses an audience of free Americans, and points to the company stores as an infringement of their liberty, he never fails to rouse his audience to a high pitch of anger. It would seem that prudence on the part of operators should lead them to take out of the hand of the agitator this cudgel, by abolishing the institution.

CHAPTER VIII.

ACCIDENTS.

1. PSYCHICAL EFFECTS OF ACCIDENTS. 2. CLASSIFICATION OF ACCIDENTS.
 3. NUMBER OF WIDOWS AND ORPHANS. 4. THE INJURED CLASSIFIED IN AGE GROUPS. 5. ECONOMIC LOSS.
-

Those who, unfamiliar with mining communities, visit them for the first time, generally observe the large number of maimed among the inhabitants. Persons having lost an arm or a leg, or bearing on their face and hands blue scars, or with impaired eye-sight or total blindness, are familiar scenes in mining regions. Over 28,000 persons have been injured in the anthracite coal fields during the last three-quarters of a century, while the number of those killed during that period must be not far from 12,000. No one can tell what this means in sorrow and suffering. Every family which derives its subsistence from the mining industry has its record of dark days; while in the history of every community there stands forth some great calamity which serves as a landmark to the people, when the voice of mourning was heard in the streets thereof. A husband, or son, or father, leaves home in the morning in perfect health, and in a few hours is brought home a corpse. The covered spring wagon—ambulance—passing through town, carrying some unfortunate home, is so familiar a scene in mining communities that it excites no comment. It is regarded as a necessary accompaniment to the industry, and long acquaintance with disaster and death among miners, verifies the adage “familiarity breeds contempt.”

No department of human activity has recorded braver deeds or greater self-sacrifice than that of mining. The soldier on the battlefield, amid the blare of trumpets and a wave of patriotic enthusiasm, has wrought deeds which have been immortal-

ized in song and poetry : but miners have exhibited equal bravery and self-abnegation without the sound of trumpets or the excitement of patriotic ardor ; they acted from motives of pure humanity, and most of their deeds are buried with their bones. The incident of the late war which has gone the round of the press of an entire company of soldiers volunteering to undertake a dangerous expedition, finds its parallel in the Wyoming Valley. When a party of men were hemmed in by a fall, and the foreman asked for volunteers to go in search of them, all the force of miners present offered their services. Some five years ago two men, heads of families, discovered in one of the collieries of Lackawanna county, the underground engine house on fire. Fourteen men were working far in the mines, and the air current carried the smoke toward them. Instantly the men gave the alarm to the authorities, and without a moment's hesitation started for the interior to warn the men of their danger. As they were hurrying back, the smoke grew thicker. They were forced to return. The instinct of self-preservation led them to build a brattice, so as to cut off the air current, and risk their lives on the amount of air which was around them. Behind that barricade the sixteen men remained in hope and fear, knowing not what their fate would be. The fire was extinguished and they were rescued after an imprisonment of from eight to ten hours. The two men who risked their lives to save the fourteen got no reward save that which every brave man gets from having done his duty. Thousands of such deeds have been wrought in the mining industry, which have never been recorded.

PSYCHOLOGICAL EFFECTS OF ACCIDENTS.

One of the beneficent effects of this element of common danger which ever surrounds the miner is to make him the possessor of a large heart. The elements of sympathy, tender feeling and kindness are found among no class of workingmen to a greater degree than among miners. They may be coarse in language and manners, for they are not accustomed to the polished ways of life ; they do not frequent the salons of the

refined ; they cut black coal, and often work where there are thick mire and water ; they are not clothed in soft raiment ; many of them curse and swear like veritable troopers ; and yet behind this coarse exterior beats a heart as large as ever is found among men. In case of need no body of men will respond more readily ; from their meagre earnings they willingly contribute to the aid of a brother in distress, or to an appeal from a distant mining community which has suffered a calamity. Miners as a rule are generous even to a fault.

Another psychological effect of accidents is to make the miners careless in their work. They are so inured to danger that they take risks, trusting to chance that they will escape, and neglect to take the necessary precautions to secure themselves against accidents. Men of very wide experience in mining affirm that 50 per cent. of the accidents are due to the carelessness of the men. Inspectors of mines constantly speak of this subject.

In the year 1898, the chief of the Bureau of Mines says : " A large number of accidents which have been reported during the year have been due to the carelessness of the injured, and records show that many of them could have been avoided if those in authority had exercised the proper care and discipline in and about the mines." In that year, the report attributes 41 per cent. of the fatalities and 43 per cent. of the non-fatal accidents to carelessness. One of the inspectors, in the same report, refers to the braggadocio of a miner, who when warned about carrying his lamp in his cap when handling powder, replied : " You're right, but I guess a man may as well pass in his checks that way as any other." In another part of the report one of the inspectors says : " Restrictive measures must be applied upon the miners to stop their own suicidal attempts."

The same comment from inspectors runs throughout the thirty volumes published by the State. In 1875, one of them says : " I am sorry to have to report that a majority of the accidents that occur in the coal mines are the result of recklessness of the workmen themselves." In 1876, another says that one-third of the accidents in his district are due to the lamp and

the pipe used by the miners. He concludes his report by saying: "But until our miners exercise more care in the prosecution of their dangerous avocation, and legislative enactments are more specific in their character, accidents will continue to happen." Since the year he wrote laws have been passed in great abundance, and still the accidents continue about the same. The foreman is supposed to watch over the safety of the men, but how can he possibly do so when he has from 300 to 400 men in his charge, and is expected by the operators to see that all details of the colliery are accurately reported and everything kept in good working order?

Men do not even obey the commands of the foremen. They neglect to stand the necessary props when they are told to do so, although a sufficient supply of timber is on hand and is delivered at the man's chamber when ordered. The miner is supposed to put his place in such condition that the life of his laborer will not be imperilled. A miner of the careless kind was reminded by his laborer that he heard the top "working," which is always a sign of danger, when he got the reply, "Shovel away and you won't hear it."

The same carelessness is common in relation to gases. Miners passing through doors neglect to close them, and so change the course of the air, until gas accumulates in one section of the mines and the result is an explosion.

It would be a mistake, however, to imagine that all miners are careless. No colliery would last long if that were the case. There is a large body of men as careful of the life of their laborers as a father is of his son. They watch over the safety of others and guard the property of the operators as if it were their own. They are coöperators with the foremen in enforcing discipline, and without this class of men the history of mining would be more replete with calamities than it is. There are collieries where hundreds of thousands of dollars have been invested, and one careless act may start a fire which will necessitate the drowning of the shaft in order to extinguish it. To maintain the proper discipline in such collieries is only possible by the coöperation of many faithful

and experienced men, and everywhere throughout the coal fields they are found.

Men act under the excitement of an accident very differently. Some are paralyzed with fear and are not able to move; others are so excited that they know not what they do; others again concentrate their minds on the future world and fervently prepare themselves for a smooth passage to eternity. Few are the men who keep their wits and know exactly what has occurred, estimate the extent of the danger, and set to work to devise ways of escape. An old foreman in the Hazleton regions tells his experience in a recent explosion. When the gas ignited and hurled him several yards along the gangway, his last thought before he lost consciousness was, "You're done for this time." When he gained consciousness, his first thought was, "No, you're not." He got up, and although seriously injured, made his way out to seek help. Profanity is a practise too common among miners, but there are instances when its magical effect has saved life. A serious explosion had occurred in one of the Scranton mines, and the lives of all not killed were threatened with after damp. Six men were so frightened that all they could do was to cling to each other and fervently pray, for they had abandoned all hope. At the time a burly fellow came along, escaping for life. He saw the men at their devotions, and with a roar he leaped upon them and shouted, "You damned fools, what the hell are you at? Come out of there." The six men were saved. Another foreman in a similar explosion had his arm and two of his ribs broken, and a big gash cut on his head. In this condition he made his way out, when, within a hundred yards of the door, on the other side of which there was perfect safety, he saw two men devoutly praying. They were not in the least injured. He told them it was not time for prayer but for action; a hundred yards farther there was perfect safety. They could not be moved. He hurried out, and sent two men in to carry them out; they were barely saved from suffocation.

Some very trying experiences come to these men. There are moments when they have to choose between two evils and that

promptly. A man's foot is caught under a fall. Help comes, but it is found to be impossible to liberate the member. The particles of refuse coming from the roof assure them that the fall is only partially down. One of two things must be instantly done—either leave the injured to his fate, or take the ax, sever the limb and take the man with them. They who have had such experiences say, that without exception, the prayer of the injured man under the fall is to lop off the member and take him with them.

CLASSIFICATION OF ACCIDENTS.

Accidents show a wide range of variety. Their number partly depends on the thickness of the vein of coal worked. Accidents are far more frequent in thick veins than in thin ones. In the former, one life is lost for every 83,000 tons of coal mined; in the latter, one for every 130,000 tons. The character of the colliery also has much to do with the number of accidents. In the southern portion of the Northern coal field, we have the most gaseous mines found in the United States. In the northern section of the same coal field, from Olyphant to Forest City, there are no explosive gases in the veins which have been hitherto worked. Hence the number of accidents in these two sections differs greatly.

The four most fruitful cases of accidents are falls of rock or coal, cars, powder and gas. Adding to these the accidents due to machinery, falling down shaft and miscellaneous, we have the following classification on page 158 for 1870–1899.

These figures have been compiled from the reports published by the State from 1870–1899. For the last decade the reports have been full and well arranged; but from 1888 back to 1870, some of the inspectors gave admirable reports while others are very imperfect. In the first two volumes, whole districts are left out, and in the succeeding volumes up to the year 1878, the data concerning fatal and non-fatal accidents are not full. Because of this imperfection in the reports, the figures given for the first eight years are not reliable as to the number of accidents which occurred in the anthracite coal fields. From the

CLASSIFICATION OF ACCIDENTS ACCORDING TO CAUSES.

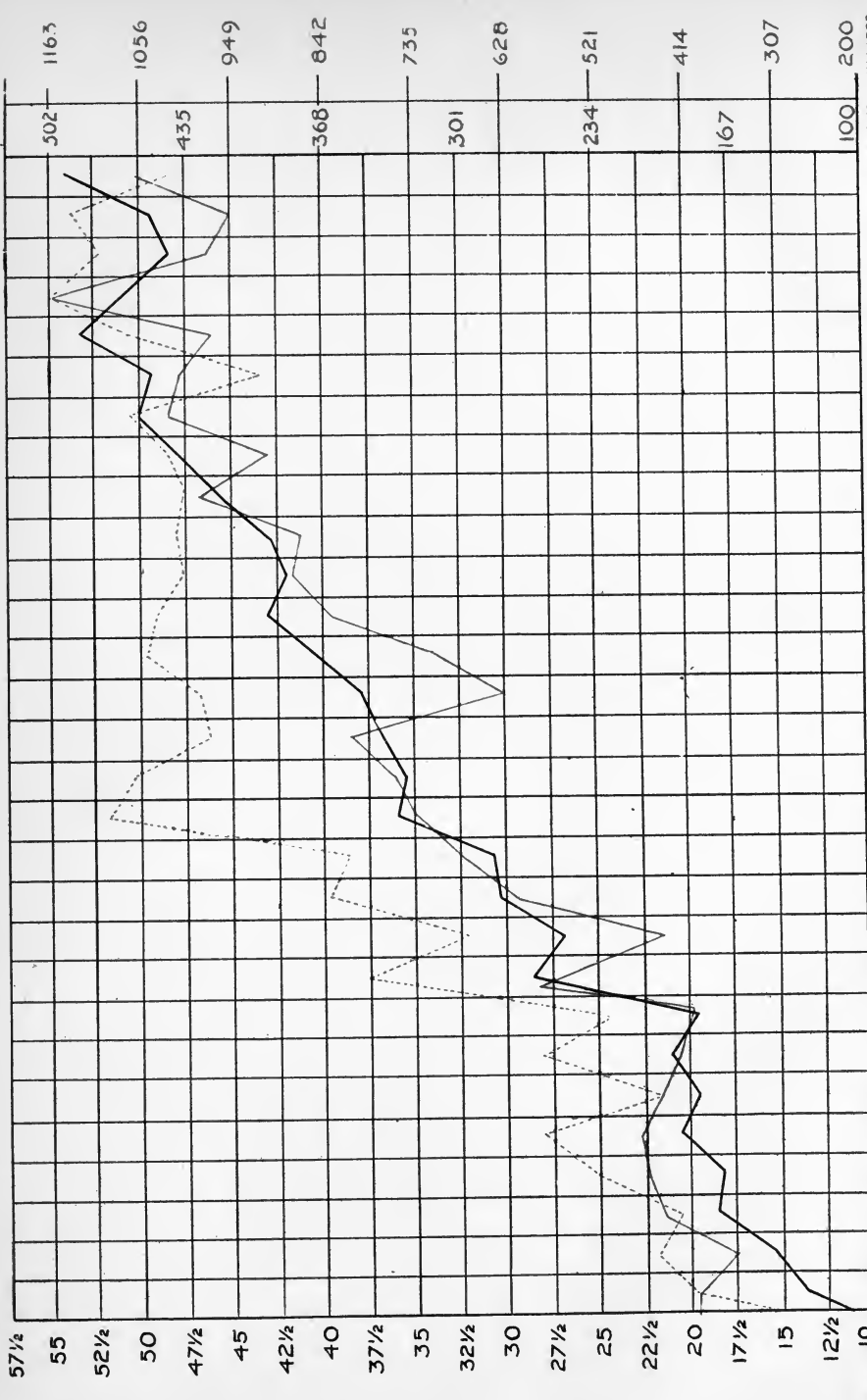
(F = fatal. N. F. = non-fatal.)

Year.	Gas.		Falls.		Cars.		Powder.		Ma- chinery		Falling Down Shaft and Slope		Miscel- laneous.		Total.	
	F.	N. F.	F.	N. F.	F.	N. F.	F.	N. F.	F.	N. F.	F.	N. F.	F.	N. F.	F.	N. F.
1870	6	86	45	49	9	18	7	31	6	5	26	3	30	106	129	298
1871	26	120	41	96	12	49	11	21	8	27	0	13	31	71	129	397
1872	22	115	70	141	22	76	11	50	6	11	17	8	10	47	158	448
1873	40	91	105	164	22	87	14	14	3	7	0	0	40	16	224	379
1874	34	109	97	173	41	90	13	50	3	13	8	17	32	73	228	525
1875	28	95	104	275	25	102	31	45	13	22	7	13	30	35	238	587
1876	32	96	100	181	30	81	27	36	3	4	8	1	28	54	228	453
1877	18	105	116	220	15	100	13	88	4	30	3	2	25	45	194	590
1878	33	36	74	221	23	115	11	29	5	5	4	1	37	98	187	505
1879	30	131	133	246	44	155	14	82	4	9	3	7	34	166	262	796
1880	21	81	99	235	41	138	9	53	1	0	6	3	25	161	202	671
1881	27	122	117	286	53	216	16	61	17	10	6	1	37	138	273	834
1882	25	100	130	264	59	196	19	50	13	20	17	8	30	178	293	816
1883	28	95	118	390	70	339	43	94	9	5	16	0	39	172	323	1095
1884	19	140	134	346	74	256	33	91	12	4	13	7	47	221	332	1065
1885	31	146	141	281	42	224	25	91	10	11	14	4	93	221	356	978
1886	24	145	125	323	42	222	24	108	4	31	10	8	50	154	279	991
1887	25	186	147	326	60	197	20	122	6	18	9	9	49	190	316	1048
1888	17	149	177	358	69	240	31	120	7	14	11	1	52	155	364	1037
1889	25	200	174	298	67	183	27	95	10	24	5	21	76	176	384	997
1890	65	164	132	353	69	228	20	93	15	24	21	2	56	143	378	1007
1891	44	139	167	338	67	236	43	107	2	12	16	10	88	155	427	997
1892	56	151	181	335	67	231	32	78	8	15	9	3	43	210	396	1023
1893	44	160	188	329	85	251	40	126	11	12	9	33	68	158	445	1069
1894	35	109	194	297	70	239	43	110	10	19	15	6	72	139	439	919
1895	32	134	193	336	73	223	52	212	0	0	15	6	57	164	422	1075
1896	46	192	246	403	76	255	43	109	0	0	18	4	73	202	502	1165
1897	36	146	205	392	65	238	49	135	7	0	8	7	54	188	424	1106
1898	37	200	191	377	65	263	33	121	0	0	16	3	69	170	411	1134
1899	32	127	226	384	87	233	33	115	0	0	21	13	62	158	461	1030
Grand Totals.	938	3870	4170	8417	1524	5481	787	2537	207	352	331	214	1437	4164	9394	25035

nature of the case the columns giving the fatalities are more accurate than those giving the non-fatal accidents. In non-fatal injuries, the inspectors try to draw the line between a serious and a non-serious accident. It must be arbitrarily done, and depends largely on the opinion of the inspector. An accident which one inspector might consider worth reporting, another might not think so. In case of death within twenty-four hours, however, we have a positive fact which gives accuracy to the compiled statistics.

From the preceding table we have the following percentages due to the several causes mentioned.





MILLION TONS
 57 1/2
 55
 52 1/2
 50
 47 1/2
 45
 42 1/2
 40
 37 1/2
 35
 32 1/2
 30
 27 1/2
 25
 22 1/2
 20
 17 1/2
 15
 12 1/2
 10

1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899

502 — 1163
 1056
 435
 949
 368 — 842
 735
 301
 628
 234 — 521
 414
 167
 307
 100 200

CHART SHOWING TONS PRODUCED AND THE NUMBER KILLED AND INJURED FROM 1870-1899.
 — TONS PRODUCED.
 — KILLED.
 INJURED.

PERCENTAGES OF ACCIDENTS.

Cause.	Fatal.	Non-fatal.
Gas.....	9.99%	15.46%
Falls.....	44.39	33.62
Cars and machinery.....	18.42	22.30
Powder.....	8.38	10.13
Falling down shaft.....	3.52	.86
Miscellaneous.....	15.30	16.63

The following table partially taken from the mine inspectors' report for 1899 gives the number killed per 1,000 employed and the number of tons produced per person killed.

TABLE GIVING PER THOUSAND KILLED, ETC.

Year.	Total Fatal Accidents.	No. Accidents per 1,000 emp.	Total Tons Mined per Fatal Accid.	Tot. No. Days worked each Year.	No. Accid. per 1,000 emp. per 100 ds. worked.
1870	211	5.929	59,970		
1871	210	5.601	66,038		
1872	166	3.709	83,735		
1873	224	4.647	83,711		
1874	231	4.325	77,034		
1875	238	3.401	87,795	132	2.450
1876	228	3.235	86,013	155	2.087
1877	194	2.902	113,803	161	1.802
1878	187	2.923	99,794	134	2.181
1879	262	3.805	105,708	209	1.818
1880	202	2.753	122,987	172	1.600
1881	273	3.591	110,659	218	1.646
1882	293	3.520	105,349	217	1.622
1883	323	3.533	104,336	214	1.650
1884	332	3.284	98,076	190	1.728
1885	356	3.541	94,160	200	1.770
1886	279	2.707	122,095	194	1.395
1887	316	2.965	117,522	210	1.413
1888	364	3.103	114,391	221	1.404
1889	384	3.226	101,604	195	1.654
1890	378	3.463	106,033	191	1.713
1891	427	3.463	103,796	183	1.886
1892	396	3.051	115,500	205	1.488
1893	445	3.224	106,021	207	1.557
1894	439	3.144	103,659	179	1.756
1895	422	2.939	121,344	182	1.614
1896	502	3.354	95,766	171	1.961
1897	424	2.836	110,725	149	1.903
1898	411	2.886	114,708	148	1.943
1899	461	3.271	117,211	180	1.817

The fatalities in the above table for 1870, 1871, 1872 and 1874 differ from those given in the classification of accidents. We have taken these figures from the Report of the Bureau of Mines for 1899; in the former table we have followed the figures given in the inspectors' reports for those years.

We should naturally expect that the number of days worked in the year would have some influence upon the number of accidents, so for comparison we add two columns to those taken from the report of the Bureau of Mines, giving the number of days worked each year, and the number of accidents per thousand employed working one hundred days. The significant fact about this column is, that in the years the miners work the least number of days we have the highest averages. For years of 200 working days or over, the average is from 1.404 to 1.818 per thousand employed one hundred days ; but for years of 175 working days or less the average is 1.802 to 2.450 per thousand employed one hundred days. There are two reasons for this. Collieries which work regularly are safer than those under a system of intermittent labor. When coal is produced every day, all the workings are kept in fairly good condition ; when coal is produced three days in the week and the mines are idle the remaining days, the workings do not get the same attention and the result is a higher average of accidents. Another reason is that miners employed every day fall into a regular manner of working which promotes personal safety ; but if they are idle three days in the week, when work is resumed their surplus energy expends itself in intenser activity to produce coal, and they are less cautious for their personal safety. Men used to daily toil take pleasure in the handling of tools which set in motion the developed muscles of the body, and the miner, after a few days' suspension, is eager to ply the drill and cut coal, often careless of the conditions under which he works.

We said that accidents are more numerous in thick veins than in thin ones, and since the thick veins have, during the last decade, been gradually exhausted, and the thin ones are being operated, we should expect a decrease in the percentages of accidents. The table shows, however, an increase in the last decade. From 1880 to 1890, the average per thousand employed one hundred days is 1.599 ; from 1890 to 1899, it is 1.769. One explanation of this is, that notwithstanding the smaller veins are safer, so far as falls are concerned, yet they are buried deeper in the earth and are harder to mine, and

hence contain more explosive gases and require the handling of more powder. The accidents from gas and powder show an increase during the last decade. Another change has been introduced in the last ten years which is calculated to promote safety of life and limb. In the early years of mining the gangways were driven from nine to ten feet wide; this hardly afforded room enough between the car and the pillar for the driver and his mule to pass, and many accidents resulted. A change was introduced. The gangways are now driven from twelve to fourteen feet wide, and the number of accidents from cars is diminished.

Legislation calculated to protect the employes has particularly sought to reduce the number of accidents due to falls, gas, powder and cars.

These have been and still are fruitful causes of accidents, and offer the legislator a tangible fact with which he can deal. We give below a table of the percentages of the total accidents due to these causes for the years 1878-1899.

PERCENTAGES OF ACCIDENTS.

Year.	Percentage due to Gas.		Percentage due to Falls.		Percentage due to Cars.		Percentage due to Powder.	
	Fatal.	Non-fat.	Fatal.	Non-fat.	Fatal.	Non-fat.	Fatal.	Non-fat.
1878	17.64%	7.10%	42%	40%	12.30%	22.77%	5.88%	5.74%
1879	11.06	16.45	50	31	16.79	19.47	5.34	10.30
1880	10.39	12.07	50	34	20.30	20.57	4.46	7.90
1881	9.89	14.62	42.85	34.29	19.41	25.90	5.86	7.31
1882	8.53	12.00	44.36	32.35	20.13	24.02	6.48	6.13
1883	8.66	8.67	36.53	35.62	21.67	30.96	13.31	8.58
1884	5.72	13.14	40.36	32.49	22.29	24.04	9.94	8.54
1885	8.70	14.90	39.61	28.73	11.80	22.90	7.02	9.30
1886	8.60	14.63	44.80	32.59	15.05	22.40	8.60	10.90
1887	7.91	11.06	46.52	26.33	18.99	15.93	6.33	8.78
1888	4.67	14.36	48.63	34.52	18.96	23.14	8.52	11.57
1889	6.51	13.03	47.92	24.87	17.45	15.35	7.03	6.52
1890	17.16	16.28	34.92	35.05	18.25	22.64	5.29	9.23
1891	10.30	13.94	39.11	33.90	15.69	23.67	10.07	10.73
1892	14.14	14.76	45.71	32.75	16.92	22.58	8.08	7.62
1893	9.88	14.96	42.25	30.78	19.10	23.48	8.99	11.79
1894	7.97	11.86	44.19	32.32	15.95	26.01	9.79	11.97
1895	7.58	12.46	45.73	31.26	17.30	20.74	12.32	19.72
1896	9.16	16.46	49.00	34.59	15.14	21.03	8.57	9.36
1897	8.53	13.20	48.35	35.44	15.33	21.52	11.56	12.21
1898	9.00	17.64	46.47	33.24	15.81	23.19	8.03	10.67
1899	6.94	12.33	49.02	37.28	18.87	22.62	7.15	11.16

Years.	Average Percent. due to Gas.		Average Percent. due to Fall.		Average Percent. due to Cars.		Average Percent. due to Powder.	
	Fatal.	Non-fat.	Fatal.	Non-fat.	Fatal.	Non-fat.	Fatal.	Non-fat.
1880-89	7.958	12.848	44.158	31.579	18.605	22.521	7.755	8.553
1890-99	10.066	14.389	44.475	33.661	16.836	22.748	8.456	10.523

This table confirms our statement. Accidents due to gas have increased about 2 per cent. in the fatal, and 1.5 per cent. in the non-fatal column. Those due to falls remain about the same, only increasing in the fatality list about .2 per cent. and in the non-fatal about 2 per cent. Total fatal accidents due to cars have diminished about 2 per cent., while non-fatal injuries due to the same cause have slightly increased. Accidents due to powder show an increase of .7 per cent. and 2 per cent. respectively. It seems to be in the nature of the mining industry that diminution of accidents in one direction is offset by an increase in another, so that the total fatal and the non-fatal injuries show a remarkable regularity in the last 25 years. The gaseous nature of the mines in Luzerne and Schuylkill counties may be judged from the following number of accidents due to that cause in these localities. Gas was the occasion of the following percentages of mining fatalities in these regions from 1892 to 1898.

Years.	Luzerne.	Schuylkill.	Years.	Luzerne.	Schuylkill.
1892	44.64%	39.28%	1896	34.77%	41.30%
1893	70.45	20.45	1897	38.88	27.77
1894	22.85	34.28	1898	56.75	37.84
1895	43.75	18.75			

Self-preservation is the first law of nature, but if we judge from some remarks made by inspectors, this does not seem to be the predominating passion in the lives of miners. One of them speaks as follows: "I have not the least doubt but that if miners were paid for timbering, there would be more timber stood, and I think many accidents avoided; as it is now, in many places no compensation is given and no more timber is put in place than can be avoided, as it is considered by workmen labor for nothing, unless they cannot work without such timbering."

The importance of properly timbering a chamber or gangway

is apparent, when we remember that over 44 per cent. of the total fatalities are due to falls. The roof in some veins requires the greatest care. This is the case with a kind of black rock which is next to the coal in some seams. It is a carbonaceous shale, which is perfectly hard and firm when first exposed, but which soon swells and softens from exposure to the atmosphere and breaks off in large masses. The miners call it the "man-killer," and it has killed more men in the Wyoming Valley than any other kind of rock.

The following table shows the number of non-fatal injuries from 1870 to 1899, the number per thousand employed, and the number of tons mined per person injured.

TABLE OF NON-FATAL INJURIES.

Year.	Total Non-Fatal Accidents.	Non-Fatal Accidents per 1,000 Employed.	Tons Mined per Non-Fatal Accident.
1870	298	8.37	42,462
1871	397	10.59	34,932
1872	448	10.01	31,027
1873	379	7.86	49,476
1874	525	9.83	33,895
1875	587	8.39	35,597
1876	453	6.42	43,291
1877	590	8.83	37,420
1878	505	7.89	36,953
1879	797	11.57	34,769
1880	671	9.14	37,024
1881	834	10.97	36,223
1882	816	9.80	37,827
1883	1,095	11.98	30,320
1884	1,065	10.53	30,574
1885	978	9.73	34,275
1886	991	9.62	34,374
1887	1,048	9.83	35,436
1888	1,037	8.84	40,153
1889	997	8.38	30,106
1890	1,000	9.16	40,080
1891	997	8.08	44,454
1892	1,023	7.88	44,710
1893	1,069	7.75	44,134
1894	919	6.58	49,517
1895	1,075	7.48	47,634
1896	1,165	7.78	41,265
1897	1,106	7.39	42,448
1898	1,134	7.96	41,574
1899	1,030	7.35	52,427

We do not find in this table the same regularity as in the fatality one, and the reason is as above mentioned that the line of

demarcation between reported injuries and those not reported varies with the discretion of the inspector.

During the years covered by the reports, from 1870-1899, we have a total of 9,394 deaths and a total of 25,035 persons injured.*

NUMBER OF WIDOWS AND ORPHANS.

Death often comes to the head of a family and the wife and children must carry on the struggle for existence without his aid.

Complete data as to the number of wives and children affected by fatal accidents are not given previous to the year 1884.

The table on page 165 gives the number from 1884 to 1899, together with the percentage of husbands killed and the average number of orphans left per widow.

The average number of husbands killed during these sixteen years is nearly 48 per cent. of the total number of fatalities. The variation is from 41.03 per cent. in 1896 to 55.23 per cent. in 1898. The number of orphans left per widow shows great regularity, the variation being less than one; the average number of orphans left per widow during the sixteen years is 2.94. The total number of widows is 3,032, and that of orphans 8,902.

An estimate of the number of widows and orphans left from the year 1820, when the regular shipment of coal to market began, must be guess-work, for official data are wanting. We can get some idea, however, from the averages secured from the

* A bill for the care of injured miners was passed last June to go into effect January 1, 1902. It provides that :

1. Operators must erect a commodious room in each colliery specially designed for the treatment of injured employes.
2. In this room a sufficient quantity of linseed or olive oil, bandages, linen splints, woolen and water-proof blankets are to be kept.
3. The duty of "treating with oils or other remedies" the burned, and applying bandages, splints, and linen to injuries involving loss of blood devolves upon the foreman and his assistants. To neglect these duties or to violate the provisions of the act is a misdemeanor to be punished by a fine not exceeding five hundred dollars, or imprisonment for six months, or both.
4. Any injury resulting to an employe because of failure of operators to comply with the provisions of this act will give the injured party a right of action against the operator.

foregoing tables. Before 1870, there were 190,928,364 tons of coal sent to market, to this we can add 10 per cent. as representing consumption at the collieries and local sales; this gives us a total tonnage produced previous to 1870 of 210,021,200 tons. If we take 100,000 tons as the average produced per life lost, we have as an estimate of fatalities from 1820 to 1870, 2,100. From 1870 to 1899 we have 9,394, making a total of 11,494 killed during 80 years. According to the accompanying table,

TABLE OF WIDOWS AND ORPHANS.

Year.	Total Number of Married Men Killed.	Per Cent. of Total Fatal Accidents in which a Widow was Left.	Number of Orphans.	Average Number of Orphans for each Widow.
1884	148	44.55%	408	2.75
1885	167	46.91	509	3.04
1886	144	51.61	452	3.13
1887	160	50.63	529	3.30
1888	178	48.90	525	2.95
1889	188	48.69	507	2.69
1890	185	48.94	608	3.28
1891	186	43.56	592	3.18
1892	175	44.19	536	3.06
1893	202	45.39	593	2.93
1894	210	47.83	659	3.13
1895	189	44.78	505	2.67
1896	206	41.03	542	2.63
1897	218	51.41	632	2.89
1898	227	55.23	696	3.06
1899	249	54.01	609	2.44
Total and Av.	3,032	47.99	8,902	2.94

47.99 per cent. of the total deaths were those of married men, which will give us an estimated total of 5,515 women made widows by fatal accidents in the anthracite mines from 1820 to 1899. If we multiply this by the average number of orphans for each widow, given in the above table, we have an estimate of the aggregate number of orphans from 1820 to 1899 as 16,214.

This estimate of the number of widows and orphans in the last eighty years is below the actual number, for the reason that in the early years of anthracite mining less care was exercised by the men, the conditions of the mines were not as good as at present, and the veins of coal were thicker.

CLASSIFICATION OF FATAL ACCIDENTS ACCORDING TO
AGE-GROUPS.

The work of driving in the mines is almost wholly done by boys from the age of fourteen to twenty years, so that the accidents due to cars almost wholly fall upon that class of employes. Of course there are many men also killed and injured by cars.

The law has for many years prohibited men from riding on wagons up and down slopes, nevertheless miners persist in doing so, and last year a foreman in Lackawanna county brought on a strike because he enforced this law in the slope under his charge.

In mining, as in all other industries, there is a scale of promotion along which every youth who grows up in the industry passes. Generally, the boy begins in the breaker at the age of 12; when he is 14 he goes underground as a door-boy; from watching the door, he goes to driving. After that he becomes a laborer, from which position he hopes to get a chamber of his own and enter the class of miners.

Since driving is almost wholly in the hands of boys, the accidents due to this cause may be said to be the tribute paid by youth in flesh and blood in the mining industry. It is about 16 per cent. of the total accidents. If we consider the grades of the roads underground, the narrow places in which boys work and the meagre light with which they have to perform their labor, the wonder is that the percentage is not higher.

The following classification gives an idea of the ages of those who have been killed in anthracite mines in the last ten years.

FATALITIES ACCORDING TO AGE.

Year.	13-20 years.	21-25 years.	26-30 years.	31-35 years.	36-40 years.	41-45 years.	46-50 years.	51-55 years.	56-60 years.	61-65 yrs.	66-70 yrs.	Tot. Acc.	Aver. Age.
1890	72	70	67	50	33	31	22	15	9	3	6	378	31.89
1891	74	75	88	57	43	40	29	13	6	1	1	427	31.74
1892	68	75	77	58	49	25	15	15	9	5	0	396	31.15
1893	78	73	79	83	50	33	20	12	13	3	1	445	31.21
1894	73	69	79	63	56	34	28	21	10	4	2	439	31.15
1895	68	76	73	67	44	32	33	15	11	2	1	422	32.69
1896	77	76	107	89	63	33	27	16	8	2	4	502	32.36
1897	47	64	79	74	53	38	29	21	14	1	4	424	34.33
1898	59	55	78	61	61	38	25	19	10	4	1	411	32.16
1899	80	63	82	70	67	35	24	10	17	7	6	461	32.66
Total.	696	696	809	672	519	339	252	157	107	32	26	4305	32.13

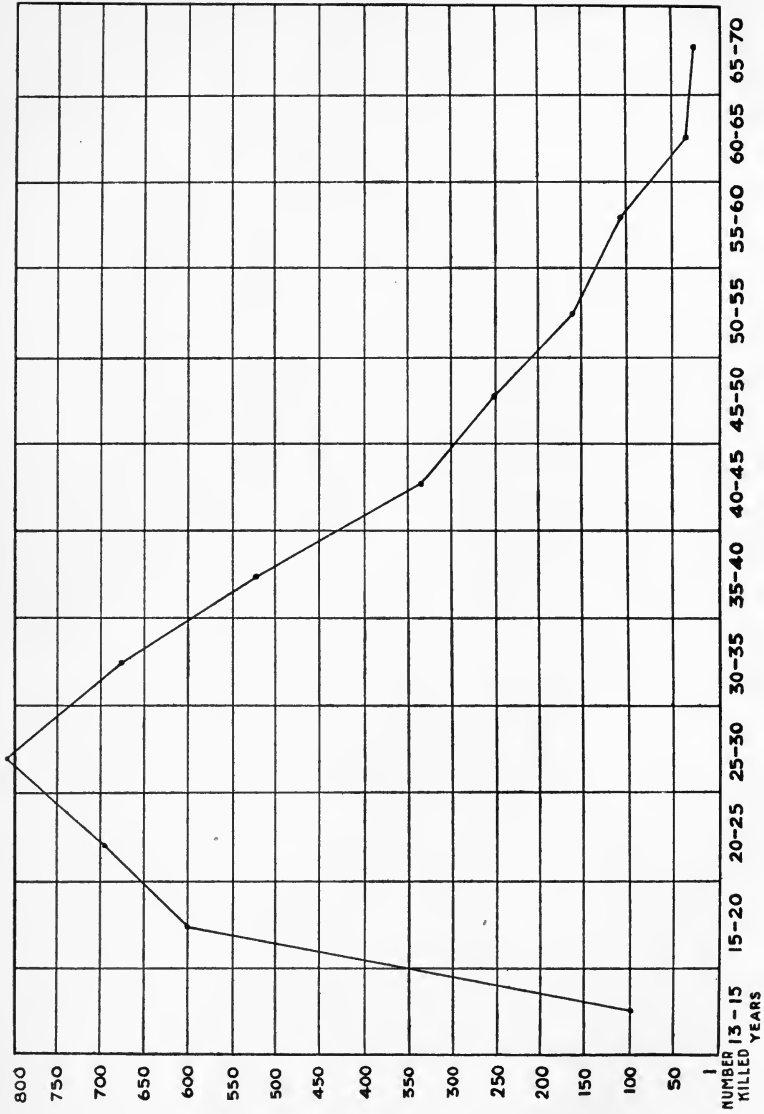


CHART SHOWING FATALITIES ACCORDING TO AGE.

In the table the highest number of the killed among the men is of the age of 26 to 30 years. Of the total number of fatalities in this decade 696 boys were killed, or 16.15 per cent. After the age of thirty the number killed gradually diminishes till forty, and after that age the decrease is more rapid. Beyond the age of sixty few men are miners. Those of that age who are still in the mines are engaged in company-work, which is not as dangerous as mining. The number of old men in the mines is very small. The average age of the killed is 32.13 years. This low average is probably accounted for by the fact of the large number of Slav immigrants in the coal fields, who come here in the dawn of manhood, from the age of 20 to 30 years. The report of the Bureau of Mines for 1899 gives us, for the first time, complete statistics of the nationality of the killed and injured :

NATIONALITY OF THE KILLED AND INJURED.

Nationality.	Fatal.	Non-fat.	Nationality.	Fatal.	Non-fat.
Poles	152	259	Americans.....	90	227
Austrians.....	11	15	Irish.....	67	176
Hungarians.....	27	65	English.....	27	50
Russians.....	4	5	Welsh.....	30	103
Slovaks.....	6	22	Scotch.....	7	9
Greeks.....	1	0	German.....	15	49
Italians.....	13	32	French.....	0	5
Bohemians.....	1	0	Swiss.....	5	4
Lithuanians.....	5	11	Spanish.....	0	1
Total.....	220	409	Total.....	241	624

The nationalities which are generally classified as cheap labor contribute 47.72 per cent. of the total fatalities, and 39.59 per cent. of the non-fatally injured.

THE KILLED PER MONTH.

Yr.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1890	21	29	38	22	61	24	26	18	44	34	25	36
1891	32	55	32	32	26	20	37	32	37	43	48	23
1892	29	35	23	34	25	25	53	37	29	31	41	34
1893	35	40	36	49	40	40	36	33	32	32	37	35
1894	22	45	30	24	50	41	54	26	26	51	47	23
1895	34	30	40	27	34	35	36	21	20	52	44	49
1896	48	24	32	32	25	97	29	47	46	51	39	32
1897	47	30	35	22	22	19	41	31	42	63	34	38
1898	28	22	25	24	37	36	25	33	38	46	46	51
1899	51	31	30	22	38	41	52	42	34	42	39	39
Tot.	347	341	321	288	358	378	389	320	348	445	400	370

The preceding table is a classification of the fatal accidents during the last decade according to the months in which they occurred.

In the table there is no regularity observed. No two figures in the same month in successive years are the same. In the totals, the month of October leads. If we divide the year into four quarters, the aggregates are as follows :

January to March.....	1,009
April to June.....	1,024
July to September.....	1,057
October to December.....	1,215

The last quarter leads the other three by about one-fifth. This we would naturally expect, when we remember that these are the months when the season of the year demands greatest production and the mines are kept the busiest.

During the year 1899 one out of every 304.73 employes was killed and one out of every 136.09 was injured. One out of every 94 persons employed was either killed or injured. On the railroads of Pennsylvania during the same period, one out of every 434 was killed, one out of every 21 employes was injured, and one out of every 20 employes was either killed or injured. Deaths from accidents are more frequent in the mines than on the railroads in proportion to the number employed, but it is otherwise with injuries.

ECONOMIC LOSS.

The economic loss to mining communities due to the frequency of accidents is great. Not only is society deprived of the productive power of the killed, but it frequently happens that a wife and children are left, who become dependent on the community. To this must also be added incidental expenses. In the case of the injured the income of families is cut down because of the suspension of the productive power of their members for a season, and extra expense is incurred for necessary medical attendance and medicine.

The table classifying fatalities in age-groups shows the vast majority of the killed to be less than 45 years of age. That

is, the employes are cut down in the ages when their expectation of life is high and their productive power is greatest. If we measure the expectation of life of these groups during the decade 1890-1899, in accordance with Dr. Ogle's Life Table, we have the following results :

EXPECTATION OF LIFE OF THE KILLED.

Age.	Total Number of Years of Expectation of Life.	Age.	Total Number of Years of Expectation of Life.
13-20	28,814.40	Br't Forward.	125,392.84
21-25	26,127.84	46-50	5,166.00
26-30	27,417.01	51-55	2,738.08
31-35	21,008.64	56-60	1,555.78
36-40	13,997.43	61-65	378.88
41-45	8,027.52	66-70	244.66
Total.	125,392.84	Grand Total.	135,476.24

The aggregate number of years of the expectation of life of the killed during the decade 1890-1899 is, by this calculation, 135,476.24.

If we estimate the average earnings at \$400 a year, the aggregate loss to society would be \$54,190,496. The numbers of orphans and widows during the decade were 2,047 and 5,972 respectively. If these depend on society to an extent equal to the aggregate of three years' wages of the deceased, the sum would be \$818,800. The estimated loss to society by these deaths is as follows :

Loss from expectation of life.....	\$54,190,496
Sustenance of widows and orphans	818,800
Total.....	\$55,009,296

This is a sum about equal to half the amount of capital used in the anthracite coal industry to produce the 54,000,000 tons of coal mined in 1899.

It is more difficult to give an estimate of the loss incurred from injuries. By a computation of the payments made by the Delaware and Hudson Relief Fund, the average loss of work per employe due to accidents is nearly 1.25 days per annum. For the 140,583 employes, this would equal a loss of 175,728.75 days in the year. If we estimate the average wage per day at

\$1.10, the loss in wages would be \$193,301.62. We may add a dollar a day for medical attendance and medicine, and a dollar a day as an average contribution to the sick from friendly societies and relief funds. Hence we have a sum equal to \$351,457.50.

The estimated total loss then from non-fatal accidents per year in the industry is as follows :

Loss in wages.....	\$193,301.62
“ “ medical attendance, etc.....	175,728.75
“ “ benefits from societies, etc.....	175,728.75
Total.....	<u>\$544,759.12</u>

Upon this basis, the total loss for the decade 1890-1899, with an average of 136,580 employes, was \$5,221,341.80. Thus we get the estimated total loss to the anthracite mining communities from fatal and non-fatal accidents for the years 1890-1899 of \$60,230,637.80, or a sum equal to half the capital necessary in the anthracite coal fields for the production of 60,000,000 tons of coal.

Each adult male is estimated to have cost \$1,000 to rear. Looked upon from the economic standpoint only, this loss to society is a great drain upon the resources of the anthracite communities. When we add to this the amount of suffering endured and the affliction of the bereaved, the loss passes beyond computation. The sum total of human happiness is constantly diminished by this source of economic loss, physical suffering and mental sorrow. From the study of accidents, one feels how impotent legislation is to prevent them, and notwithstanding the mournful experiences which come to men year after year, the number of accidents remains about the same annually, as if there were an implacable demon ruling the industry, which each cycle demands so much sacrifice of life and blood to appease him. It is hardly credible that men will risk their lives and the happiness of their families in a willful manner, and yet the gross carelessness of miners as depicted by the inspectors seems to imply this.

CHAPTER IX.

STRIKES.

1. HISTORY OF STRIKES.
 2. THE STRIKE OF LAST FALL.
 3. ESTIMATED COST OF STRIKES.
 4. THE EFFECTS OF STRIKES.
-

A complete history of the strikes which have occurred in the anthracite coal fields from the inception of the mining industry would involve every colliery which has been or is operated, for none of them has been exempt from labor troubles. In the Report of the Bureau of Mines for 1897, 54 strikes are mentioned, in which 7,614 persons were implicated, and \$668,646 was lost in wages. If the annual record of the coal fields of Pennsylvania were written, industrial warfare between the coöperating forces engaged in mining would occupy a prominent place. In June and July of last year six local strikes occurred in Lackawanna county, one of which continued for 13 weeks. ~~These local disputes were frequent throughout the anthracite coal fields.~~ They were mutterings of the coming storm which burst over the entire area on September 17th, when over 100,000 employes ceased work, and at the end of two weeks about 120,000 out of 140,000 anthracite workmen were on strike. It was practically a complete tie-up of the anthracite coal industry and was a great surprise to thousands directly connected with mines and mining. Prophets had predicted that it would be impossible to bring the fourteen or sixteen nationalities into line to effect a strike of any importance. It was done, and it stands to-day as one of the most marvellous achievements of organized labor in the whole world. It was the anthracite coal operators who first brought the Slavs to the coal fields, to break the power of Anglo-Saxon labor, but these foreigners have proved capable of forming labor organizations which are more

compact and united than any which ever existed among the various English-speaking nationalities, who first constituted these communities. It is conceded by men intimate with the situation throughout the coal fields during the last strike, that its universality was more due to the Slav than to any other nationality. There would have been, in all probability, a break in the ranks in Schuylkill county had it not been for the firm and uncompromising attitude of the Slavs in favor of the strike. They have been trained to obedience, and when they organize they move with an unanimity that is very seldom seen among nations who pride themselves on personal liberty and free discussion.

Our purpose in this chapter is to give a brief sketch of the leading strikes which have occurred in the history of anthracite mining.

HISTORY OF STRIKES.

The first organized strike in the anthracite coal fields of which any record has been kept dates back to the spring of 1849, when the Bates Union flourished in Schuylkill county. This labor organization was formed in the previous year and continued in existence until the fall of 1850, when the president absconded and took with him a part of the funds. The year of its greatest activity was 1849.

In May of that year, its greatest strike was precipitated, which lasted for several weeks, and had for its object an advance in wages. The miners held two public meetings, one on May second, in Minersville, and the other on the following day in Norwegian township, when resolutions were passed, declaring "That we have learned from Divine Providence that the laborer is worthy of his hire," and "That if any man was stopped because of his participation in the union, they would all strike." A general committee existed which was to settle all disputes, but questions of local interest were to be discussed in the local unions. The strike was accompanied by violence. Miners, armed with cudgels, formed themselves into bands and marched down the Black Valley to collieries which were working, and by intimidation compelled the men to join

their ranks. The union then, as to-day, asked the companies to meet its representatives and amicably adjust the difficulties, which the operators absolutely refused to do. Among the grievances of the men was the order system which prevailed in most collieries. After a struggle of some weeks, a compromise was agreed to. A central committee was formed, the issues between employer and employe submitted to it, and a settlement effected by mutual concessions.

At this early date over-production was a recognized evil, and the Bates Union attempted to correct it. On July 4, 1849, the organization held a picnic at Deer Park Farm. A grand parade was organized by the members of the union in the Pottsville district, and to the number of about 3,000 men, they marched through Pottsville to the place of rendezvous. John Bates, of St. Clair, was the president of the organization, and the Pottsville *Miners' Journal* states that from 4,000 to 5,000 men were that day assembled at Deer Park Farm. Among the resolutions passed was the following: "That all work be suspended till Monday, the ninth day of July, believing such a suspension is required for our own good, for the good of our employers and for the interests of the coal region generally." Mr. Bates, the head of this organization, did not escape criticism and suspicion. He was employed by the union as its field agent at \$12 a week, together with a horse and its feed. He could not have fared very sumptuously on that income. Accusations, however, were brought against him of having secret connections with the operators, of betraying the interests of the workingmen, of having connections with the politicians of the day, and of cherishing political aspirations of his own. Lack of confidence and meagre pecuniary support destroyed the organization. Division and dissension invaded its ranks, and the first labor union in the anthracite coal fields dissolved with the absconding of its president.

It is interesting to notice that in this first recorded conflict between capital and labor in the anthracite coal industry, all the principal issues involved in the last strike are present, and the conduct of the parties to the industrial conflict is very similar

to that displayed in the strike of last fall. The attempt of the Bates Union to regulate production by suspension finds also a parallel in the discussions of the United Mine Workers in their recent conventions held in Pottsville and Hazelton.

The next period of conflict begins after the close of the Civil War and continues for ten years. To understand the struggles which were waged in the first half of this period we must remember that there was no community of interests between the operators of the Northern and Southern coal fields previous to the early seventies. Intense rivalries and jealousies existed between the operators of Schuylkill county and their brethren of the Wyoming Valley, and not until six railroads secured control of the major part of the anthracite coal trade was there a general attempt made to regulate prices and production. The relation of the coal carriers to the trade is summed up by the editor of the *Nation* in the issue of March, 1871, in the following words: "The country needs to-day about 15,000,000 tons of anthracite coal per annum. Half a dozen companies own mines enough and railroad facilities enough to bring 25,000,000 tons to market."

During the Civil War, the price of coal almost quadrupled. In May, 1862, it was sold in Philadelphia for \$2.78 a ton; in August, 1864, it commanded \$10.75 a ton. Wages necessarily rose, for labor was scarce and the increased cost of the essentials of life demanded higher wages. Soon after the close of the war the coal market became sluggish; labor, attracted by high wages, had flowed into the coal fields, so that a diminished demand for coal and surplus labor brought down wages in 1865 and 1866. The miners tried to resist the reduction, and during these years several local strikes occurred in the Northern and Southern fields.

There were at this time several local unions among the miners, the strongest of which was at Locust Gap known as the Miners' Benevolent Association. This, however, only comprised a small section of the coal fields, and its influence was local in defending the rights of labor. The miners felt the need of a general organization and united action to maintain prices and

resist undue encroachments on the rights of employes throughout the anthracite coal fields. In the fall of 1867 the leaders of the local unions came together, and on July 23, 1868, the Workingmen's Benevolent Association was chartered, with John Siney as its President. This organization is generally referred to by the miners as the old W. B. A.

The most serious evil with which both employer and employe had to wrestle was over-production, and the W. B. A. soon attempted to regulate it by a scheme similar to that of the old Bates Union, namely, suspension of work for a season, that prices might advance so as to reward the investment of capital in the industry and give labor a "fair wage for a fair day's work." The year 1868 is described as a "succession of strikes, suspensions, agreements, resumption and again suspension."

By the year 1868 the W. B. A. was strong in the Southern and Middle coal fields, but had not extended as yet to the Wyoming Valley. On July 7, 1868, a strike was declared by the miners of Locust Gap and Mt. Carmel. They marched to the Mahanoy Valley and stopped the collieries there, then they advanced to the Schuylkill Valley and did the same. Thus most of the Southern and Middle collieries were closed. They resolved then to continue their march to the Wyoming Valley and persuade the miners there to join their ranks. The employes of the Wilkes-Barre District joined them. Along the line of march, they compelled all classes of workmen to throw down their tools and fall into line. The mechanics of Wilkes-Barre were forced to quit work and join the strikers; the same was done with the force working on the Wilkes-Barre jail at that time. The sheriff of Luzerne county addressed them and asked them to disperse, but to no purpose. As they advanced, however, along the Wyoming Valley, the miners of the Northern coal field did not respond as the paraders had anticipated. The strikers came as far as Pittston, where their enthusiasm was so dampened by the indifference of the miners then working that they abandoned their march and returned home.

The chief demand of the strikers at this time was, that eight hours should comprise a day's work, while the wages

should remain the same. This, if granted, would be equal to an advance of 20 per cent. The strike lasted in Schuylkill till August 28th. The eight-hour movement was lost, but the men gained 10 per cent. advance. The collieries in the Pottsville region produced 173,812 tons of coal less than in the previous year.

The jealousies existing between the operators of the Northern and Southern coal fields were reflected also in the employes. The Northern miners refused to join their brethren from Schuylkill in 1868, as the latter had refused to aid the Wyoming Valley men in 1865. That year the employes of the Delaware and Hudson, of the Delaware, Lackawanna and Western and of the Pennsylvania Coal Co. had a three months' strike. The miners of Schuylkill county during this time supplied the market demand and their brethren in Luzerne, after three months' conflict, were glad to return to work on the old terms.

The need of coöperation and united action was more than ever felt by the miners, and in the fall of 1868, organizers of the W. B. A. were sent into the Wyoming Valley, so that by the autumn of the following year, the organization was said to have 30,000 members out of about 35,000 anthracite mining employes.

In December of the same year, the Schuylkill operators announced a reduction of 25 per cent. The miners resisted and declared a strike. They offered to take 10 per cent. reduction on the wages paid the previous October, but after a strike of five weeks, they began work on January 20th, at the old rates. The miners in the Northern coal field did not participate in this strike.

The W. B. A. had by this time acquired great power. On January 23, 1869, the executive committee of the Coal Association of Schuylkill county issued circulars, stating that the men had stopped deadwork, that the union governed prices, and all they needed to perfect their work was to dictate prices at tide-water. They declared that they could not compete with the Northern operators, because the wages they paid were 30

per cent. higher than those paid the men in the Scranton district. In the following month, the Schuylkill district of the W. B. A. agreed to accept the rate of wages paid in the Northern coal field, that their operators might compete with their rivals in the Wyoming Valley.

On March 17, 1869, the W. B. A. delegates met in Hazleton and drafted a list of grievances, among which were company stores, a "5 per cent. shave" of the wages paid in cash, the company doctor, the keeping of wages due miners at pay day, and the increased capacity of mining wagons, which were now said to hold three tons. They were prepared also to demand the eight-hour day, and issued a circular letter to the operators requesting them to meet the representatives of the labor organization in joint convention on April third following "to discuss and adjust grievances."

The demand was now made for the adjustment of wages according to the price of coal at certain points. The Pottsville *Miners' Journal* suggested: "If a scale of prices for labor based on the scale of the prices of the average sizes of coal could be adopted and adhered to—rising when coal rises, and falling when coal falls—it would remove many of the difficulties." On May 10, 1869, the union ordered a general suspension to secure the sliding scale. All sections ceased work save the employes of the Delaware, Lackawanna and Western and of the Pennsylvania Coal Co. The employes of these companies however joined the ranks of the strikers on June 10. The operators were willing to meet the employes, but they objected to being "dictated" to by them. A sliding scale was adopted. When coal sold at \$3.00 a ton at Port Carbon, outside labor was to get \$11.00 a week; inside labor \$12.00; platform men \$11.50, and miners \$14.00 clear of all expenses. Prices of coal were to be taken from five operators, each producing more than 30,000 tons a year, and to be selected every month by representatives of the union. The sizes to be taken into consideration were 75 per cent. large coal, 12½ per cent. chestnut, and 12½ per cent. peanut coal. For every advance of 25 cents over the \$3.00 a ton, 50 cents was to be added to the weekly wage and

5 cents on the price paid per wagon for mining. The price of coal was not to fall below \$3.00 a ton.

In the Lehigh region, the basis was \$5.00 a ton at Elizabethport, New Jersey. Work was resumed under this system on June 16th in the Southern coal field; and on July 1st in the Lehigh region; but the Delaware, Lackawanna and Western, the Pennsylvania Coal Co. and the Delaware and Hudson Canal Co. absolutely refused to adopt the sliding scale, and their employes were out until September 1st, when work was resumed on liberal terms offered by the operators who would not grant other terms than so much per car for mining coal.

The sliding scale agreement drafted by the men themselves was expected to work smoothly. It did not, however. In August, the union asked for a 20-per-cent. advance, which was 10 per cent. above the rates coming to them on the basis laid down the previous June. It was a gross violation of the contract voluntarily entered into by the miners. The rates to be paid each month were secured by an operator and the president of the W. B. A. going to Philadelphia to get figures from the books of the selected operators. In October, the committee reported that the price of coal was below \$3.00 a ton at Port Carbon. The cry was immediately raised that the committee was bought by the companies, and some collieries went on strike.

In January, 1870, the Anthracite Board of Trade of Schuylkill county served notice on its employes that the \$3.00 basis was too high. They proposed a \$2.00 one, which would reduce the wages of miners from \$14.00 to \$10.00 a week and that of all other classes of labor proportionately. The Schuylkill men struck. The union now ordered a general suspension, asking for eight hours a day and the old basis. The order was not generally observed. The Shamokin and Lehigh regions, and the Northern collieries continued to work. In March the operators offered a compromise by figuring the basis at \$2.50.

The W. B. A. considered the proposal in convention at Summit Hill and rejected it. In July following, the miners met at Pottsville and offered to go below the \$3.00 basis as well as above it. Franklin B. Gowan was now president of the Read-

ing Railroad, having been elected to that office in April of the previous year. He came to Pottsville, entered into communication with the miners and effected an agreement on what has been known since as the "Gowan compromise." The basis was to be \$2.50, but the following wages were to be paid: Outside labor, \$9.13 a week; inside labor, \$9.96, and miners, \$11.90. On this compromise work was resumed in August.

The power of the union was now supreme. Its leaders dictated terms and prices to operators, to which they must comply if they wished to stay in the business. The unreasonable and arbitrary demands of the men crushed scores of individual operators, while it added to the strength of corporations by bringing more collieries under their control. Affairs had assumed such a condition in many localities that the operators could not say their property was their own. Everything pointed to a gigantic struggle which was to decide whether capital or labor was to govern the anthracite coal industry. A warning of the pending struggle was given by President Dickson, of the Delaware and Hudson Canal Co., to a committee of the W. B. A. who waited on him. He said: "The only question involved in the issue is whether the property shall be controlled and the policy of the company determined by the owners, or whether it shall be committed to the care and direction of an irresponsible organization, and in determining this question the managers are strong in the belief that the stockholders can have but one opinion."

The operators chose the hour of conflict. The canals were generally closed for a few months in winter. About the close of November, 1870, the three leading companies of the Northern coal fields gave notice of a reduction of 30 per cent. The men responded by a strike on December 6th. The Northern men were now anxious that the Middle and Southern miners should join them. Delegates of the W. B. A. convened at Tamaqua on January 10, 1871, and passed an order for a general strike. All collieries throughout the anthracite coal fields were shut down with the exception of a few in Northumberland county. The strike lasted until May 1st in the Wyoming and Lacka-

wanna valleys. Then a few shafts were started by the Delaware, Lackawanna and Western Company. Riots ensued. The military power of the State was called out and in a conflict between it and the strikers, two of the miners were shot and several wounded. The fire of conflict was quenched in human blood. Collieries resumed work after nearly six months' idleness. Labor was utterly defeated in the contest. The men went to work on the terms of the employers.

In Schuylkill, the question of the basis was submitted to arbitration. Judge Elwell, of Northumberland county, was chosen arbitrator, who decided to fix the basis at \$2.75, which gave the miner \$13.00 a week clear of expenses; inside laborer, \$11.00; outside laborer, \$10.00; 10 per cent. reduction on contract work, and 1 per cent. advance or reduction for every 3-cent change in the price of coal, but the price was not to fall lower than \$2.25 at Port Carbon. The collieries resumed work May 13th. The Lehigh region began work on June 1st on the terms offered by the employers. Labor was crushed. The Workmen's Benevolent Association was utterly demoralized. An attempt was made to perpetuate the organization by changing its name to that of Miners and Laborers Benevolent Association, but its prestige was gone. National antipathies had been engendered by the strike and no longer was united action possible among men who had suffered and bled for a cause which resulted only in misery and strife.

The labor organization was now charged with being a political machine. The great strike brought prominently before the people of the State the consolidation of the large railroad corporations, among which the Reading Co. was a most conspicuous example. A committee from the Legislature of Pennsylvania was appointed in the fall of 1871 to investigate into the rates charged by the Reading Coal and Iron Company. The leaders of the labor organization were summoned before the committee to make good the charges they had so freely vented in their public addresses. They failed to establish them. Franklin B. Gowan defended the Reading Company and won a complete triumph by proving on constitutional grounds that the

railroad could charge whatever rates it chose. He also showed that consolidation was a necessity, and delineated the tyranny and lawlessness practised by combinations of laborers.

After 1871, practically there was no workingmen's organization in the Northern coal field. In the Middle region, the dissolution of the W. B. A. was not so complete; there, some enthusiastic members still tried to stem the receding tide. In the Southern coal field the organization was still strong, and now acting under the name of the Miners and Laborers Benevolent Association chartered by a special act of the Legislature.

No strike of any importance took place for the next three years. In January, 1875, the Schuylkill operators announced a reduction of 10 per cent. The miners threw down their tools, and then followed what is still known in Schuylkill county as the "long strike." It was over five months' duration. This shattered the last remnant of the old W. B. A. The miners of the Northern coal field worked during this long suspension in the Southern coal field, and the strikers bitterly complained of their lot by saying that they held the cow and the Wyoming Valley men milked it.

In June the Schuylkill miners began work at a 20-per-cent. reduction. The labor organization was completely broken. Dissension came into the ranks of the workingmen. The miners refused to contribute to the expenses of the representatives who were to determine the scale of wages, and from that day till the abandonment of the sliding scale last fall, the rates paid labor according to the prices of coal, were wholly left in the hands of the operators. Before the long strike of Schuylkill ended, a reign of terror prevailed in many communities, which resulted in much litigation.

In 1877, the great railroad strike made it impossible to operate the mines and a general suspension was the result. The air was full of assertions concerning the rights of labor and the tyranny of capital. The miners of the Delaware, Lackawanna and Western and of the Delaware and Hudson joined in the chorus, rehearsed their grievances and demanded 25 per cent. advance in wages. Their demands were refused

and a three months' strike ensued. During this strike the Schuylkill miners milked the cow and the men of the Lackawanna Valley held it. Labor riots were the order of the day and the anthracite coal fields were not exempted. Riots are subject to the law of imitation, and the contagion spread among the miners. Feelings ran high. The tension in the city of Scranton was higher than in any other section of the coal fields. A city guard was organized there to preserve law and order. Frequent meetings were held by the miners, and into one of these mass meetings held in August, some vicious wretch flung a torch which precipitated a deadly conflict.

A letter was handed to the chairman of the meeting, which purported to come from one of the operators. The men shouted "Read it," and there was no alternative but to do so. It was a statement saying that the operator would force his employes to work for a dollar a day. The storm burst in all its fury. The passions of men passed beyond all restraint. They marched through the principal street of the city in defiance of all authority. The City Guard was called out and a conflict ensued, in which four men were killed and over a score wounded. Again the flame of conflict was quenched in human blood, and soon after the collieries were started.

The next strike of any magnitude was that of 1887-88, which extended through the Lehigh and Schuylkill regions. The miners of the Lehigh region affirmed that they were not paid the regular rate of wages according to the basis laid down in 1870; that the cars had grown since the prices were fixed, but that the prices had remained the same; and that it was unjust to require the men to buy a chain and block to hold the car in place on pitching veins. In 1884 the Miners and Laborers Amalgamated Association was organized at Mt. Carmel; by 1887 it numbered about 30,000 members in Luzerne, Carbon and Schuylkill counties. About the same time the Knights of Labor were actively engaged in organizing the anthracite coal miners. Many of the employes in the Middle and Southern districts were members of the Amalgamated Association and of the Knights of Labor, and in the summer of 1887 the majority of

the members of the former organization voted to unite their forces with the latter, which was then in the heyday of its triumphs. The Knights of Labor championed the cause of the Lehigh miners, and endorsed a strike in November, 1887.

Attempts were made to bring out the miners of Schuylkill, but this was overruled in the district convention by a motion to continue work and pay a monthly sum toward the strikers. The Reading Co. also advanced the wages of their employes and reduced the price of powder in order to induce the miners to continue at work. As the Reading men aided the striking miners, so did the Reading Railroad aid the Lehigh Valley Company. Against this the miners protested. The friction increased, so that by January 6, 1888, the Schuylkill men were also out in sympathy with the Lehigh region. An attempt was made at arbitration, but the operators said that the President of the Knights of Labor knew nothing of anthracite mining, and was not qualified to judge of the dispute. The strike lasted from November, 1887, in the Lehigh region, and from January, 1888, in the Schuylkill region, till March, 1888. The strike was fatal to the cause of the Knights of Labor, whose strength was utterly broken, as far as the anthracite coal fields were concerned.

THE STRIKE OF LAST FALL. (1900)

No strike of any extent occurred among the anthracite miners after 1888 till last fall, when one of the most successful strikes in the history of the anthracite coal industry occurred. In 1897 the United Mine Workers of America of the bituminous coal fields sent organizers into the anthracite mining towns. The organization rapidly took root in the Northern coal field, but was of slower growth in the Middle and Southern. By 1900 it had gained sufficient strength to call a convention at Hazleton to discuss the grievances of the anthracite miners. The convention met on August 15th, and a list of twelve grievances was drafted, among which were :

1. Excessive dockage, topping and too many pounds in the ton taken by the companies.
2. Discrimination as to prices and distribution of cars.

3. Cutting regular prices and dockage of time when the breaker was idle during the working day.
4. Demand pay every two weeks.
5. Excessive price demanded for powder.
6. Exorbitant prices and compulsion to deal in company stores.

Circular letters were issued to the operators inviting them to meet the representatives of the miners in joint convention on August 27th, "to discuss amicably and adjust the various grievances." The employers paid no attention to the circular. The miners held their convention on the above date and passed a resolution asking the national executive board of the United Mine Workers of America to endorse a proposition for a strike. After a careful examination of the appeal, the national executive board unanimously endorsed the proposition, and on September 12th, President John Mitchell issued an order that all miners and mine workers in the anthracite coal fields should cease work on Monday, September 17th. In the Northern coal field, the order was literally obeyed. From Forest City to Wanamie, not a colliery worked Monday, September 17th. In the Middle and Southern fields, some 20,000 employes did not obey; some of the collieries of the Lehigh Navigation Coal Company, those of Markle & Co., and mines in the Lykens and Panther Creek Valleys continued to work. In two weeks' time, the number of mining employes still working was reduced to about 5,000; so that, practically, the whole of the 366 collieries in the anthracite coal fields were tied up.

Early in October, the Reading Company posted notices at its collieries that it would give 10-per-cent. advance on the wages paid in September. The other companies soon followed suit. A convention was then called by the miners to meet in Scranton on October 12th to consider the proposition of the employers. They voted to accept the 10-per-cent. advance, but made the demand that the sliding scale which had been in vogue in the Middle and Southern fields since 1870 be discontinued, that the price of powder be reduced to \$1.50 a keg, and that the advance agreed upon be continued till April 1, 1901. These de-

mands were agreed to by the companies, and an order was issued to resume work on October 29th, after a suspension of 40 days or the loss of six weeks' labor.

The successful issue of the strike was a great triumph for labor in general, and for the United Mine Workers of America in particular. Much of the success was undoubtedly due to the fact that the strike was ordered at an opportune time. It came on when the Presidential campaign was rising to fever heat, and the issues of the political parties were presented to the people by the leading orators of the day. The Democratic candidate at once used the anthracite coal strike to confirm some of his statements and to illustrate the inexorable greed of trusts and combinations. It was a weapon any demagogue could use with terrific power. If the strike were allowed to develop into distress and riot, no one could predict what the effect would be on the neighboring States which held the balance of power in deciding the Presidential election. This was clearly seen by the leaders in the campaign, and pressure was brought to bear upon the operators to settle the dispute. The *Financial Chronicle* of October 27th says: "Had the strike been allowed to develop into an excited contest, attended by riots and bloodshed, with a large portion of the 140,000 men and their families in absolute want for daily bread, as was the promise, it might have so far absorbed attention as to almost hide from view the great issues at stake in the election. The banker who foresaw all that and forced settlement before the threatening irritation had assumed the more dangerous stage, acted with the discernment and long-sightedness which have many times marked his distinguished career."

The same periodical predicted, when the strike was ordered, that it must necessarily fail, "Because the railroads and mining companies that increased their expenses, under present circumstances and prospects, would be doing an extremely heedless thing."

The acceptance of the miners' terms by the operators, the *Chronicle* explains by saying, "That if there ever was a case where the consent to terms of settlement was secured by



duress the coal strike settlement is such an occurrence." Others, however, believe that the profits realized by the coal operators were high, and that the concession of 10-per-cent. advance was due the men and should have been granted without precipitating a conflict.

The strike was conducted in a peaceful manner for the greater part. A riot occurred in Shenandoah, in which two men were killed and about thirty wounded. In many other sections feelings were high strung, and ominous signs indicated that if the contest had lasted longer and an attempt made to operate the collieries, there would have been serious riots and bloodshed.

ESTIMATED COST OF STRIKES.

A strike is war, and war is costly. During the strike of 1887-1888 the stocks of the Lehigh Coal and Navigation Company and of the Reading Company depreciated. In the month of January, 1888, the Lehigh Valley Company lost in tonnage 111,597 tons. During the strike, the shipment over the Reading railroad fell off to the amount of 380,156 tons. The loss in wages during the five months' strike amounted to millions of dollars. During the Lattimer riots of 1896, the soldiery sent to the scene of conflict cost the state \$30,000 a week. But we can best get an idea of the cost of a strike in the coal fields by an estimate of the loss incurred in the one of last fall. No exact account can be given of the loss incurred in industrial warfare. The following account is only approximate.

1. Loss to labor. There were from 120,000 to 130,000 mining employes involved in the last strike. We will take the first number. These 120,000 hands were idle from September 17th to October 29th, which represented six weeks' work. Trade is usually brisk at this time of the year, so that we can take \$1.50 as an average daily wage of the employes. This rate for 36 days for 120,000 employes would aggregate \$6,480,000, which was lost in wages throughout the coal fields during the strike. If we take the average earnings of mine employes at \$30.00 a month, it will take the 140,000 anthra-

cite mine workmen over a year to make up through the ten-per-cent. advance what was lost during the strike.

2. Loss to capital. The loss to the capitalist was incurred in two ways. During the strike, it was necessary to keep a force at the mines to see that the water was kept down, the mules fed, and the avenues of transportation underground kept open : these items of fixed charges went on every day. Then came the direct loss from a suspension in the production of coal.

At least from ten to twelve men would be necessary at each of the 366 mines to keep them in order. Their wages would aggregate \$25.00 a day, which for all the collieries would amount to \$292,800. The 14,348 mules must be fed, which, at \$2.00 a head per week, would amount to \$172,176. Incidental expenses would amount to about \$10.00 a day, which would aggregate \$146,400. Thus the expense of keeping the collieries open for the 40 days amounted to \$611,376.

In September, 1899, 4,502,880 tons were produced at the mines ; in the same month last year, 2,959,550 tons ; which was a loss of 1,553,330 tons. In October, 1899, 4,899,303 tons were produced ; in October 1900, 813,531 tons ; which was a loss of 4,085,772 tons. Hence the total loss of tonnage during the strike amounted to 5,639,102 tons. If we put the returns to capital at 50 cents a ton, the total loss would be \$2,819,551. Thus the total loss to mining companies from the above two sources amounted to \$3,430,927.

3. Loss to the railroads. *The Financial Chronicle* in its issue of December 1, 1900, computes the loss in gross earnings of seven railroads for the month of October at \$6,812,368, and a loss in net earnings of \$2,899,412. The loss of the Erie, the Delaware and Hudson, and the Delaware, Lackawanna and Western is not included in this sum. In its issue of January 19, 1901, it states that the loss from the strike in revenues to the Lehigh Valley was no less than \$1,200,000. The percentage of the total production of the Lehigh Valley for the year 1900 was 15.32 per cent. It is reasonable to suppose that the other lines lost amounts varying directly as their per-

centages of the total production. Estimated in this way, the total loss of the railroads from the strike was \$7,835,511.

5. During the month of October the price of anthracite advanced to the consumer from \$2.00 to \$3.00 a ton. If we take an average advance of \$2.00 a ton on the 813,303 tons sent to market in that month as the tribute paid by consumers to the war in the anthracite coal fields we have a sum of \$1,626,606. Bringing together these four sources of loss due to the strike we have :

Loss of Wages to Employes.....	\$6,480,000
Loss to Mining Companies.....	3,430,927
Loss to Railroads.....	7,835,511
Loss to Consumers.....	1,626,606
Total.....	<u>\$19,373,044</u>

Thus the total cost of the last strike to society, estimated from the economic standpoint only, was not far from twenty millions of dollars. On this computation, the strike cost an average of \$484,323.60 every day it lasted, or nearly half a million of dollars. The expense attached to the calling out of the soldiery to quell the riots in the Mahanoy Valley, as well as the expense incurred by companies in hiring special detectives and purchasing supplies to safeguard collieries against contingencies which might arise from disturbances, are not included in the above computation. The figure attained, however, is enough to convince all of the enormous expense to society of industrial warfare.

THE EFFECTS OF THE STRIKE.

The effects of the strike were far-reaching. The Delaware, Lackawanna and Western ships coal to the West and loads its cars eastward with grain and produce; the strike cut off that source of revenue. The employes of railroads were laid off. Railroad rolling stock for the transportation of coal was almost wholly idle. The number of cars used by the Reading railroad for the shipment of coal to market is 55,468, while the number used by all the anthracite carrying companies is about 277,350. During the strike these empty cars for many miles

lined the passenger train tracks of the prominent railroads in the coal fields and at the terminals, which was a glaring testimony to the ruinous effect of the suspension of operations among the anthracite miners. Coal agents at the terminals, coal heavers at the wharves, coal retailers at the cities and towns of the Eastern and Middle States, felt the effect of the strike.

The wheels of a great industry cannot be stopped without disturbing the commercial equilibrium of the whole country. The enlightened conscience of the twentieth century condemns war as barbarous; strikes fall into the same category, and should also be condemned as barbarous. Surely, the ingenuity of man which has successfully wrestled with great and intricate problems, ought to devise means whereby industrial convulsions of this nature could be avoided.

The effects of the strike are more apparent in the anthracite coal fields than elsewhere, for there, thousands of workmen were directly concerned in the dispute. The victory won by labor was greeted with unbounded enthusiasm; it has had an intoxicating effect in many regions, and the gravest danger now arises from the pride of victory. Human nature under the stimulus of conquest seldom knows where to stop. Consciousness of power in labor rarely consults either prudence or justice. Extremists come to the front and take the reins. There is danger that the judgment and discretion of competent leadership will not be able to control the force it has called into existence, so that, passing beyond restraint, the fruits of a past victory will be lost.

What the future relation between employer and employe will be in the anthracite coal fields remains to be seen, but the air is full of elements which threaten a storm, before which any conflict that has occurred in the past history of the anthracite coal industry will pale into insignificance.

The strike injured the status of hundreds of families. They had no margin before the strike, and 40 days' suspension of income has thrown them into debt from which it will take them long to be released. Many struggled bravely to build homes, but

the strike has brought them into arrears, from which every nerve must be strained to recover. Some during the strike suffered the want of the necessaries of life, but their needs were supplied by their fellow-workmen, who stood ready to divide the portion they had with those who suffered in a common cause.

Strikes, above all else, promote the sense of the solidarity of labor. During the progress of the strike in the anthracite coal fields labor leaders from nearly every State in the Union visited the scene of conflict and addressed the strikers. The miners were conscious that they were but a part of the great army of workers which form the brawn and sinew of the Republic. In the contest they waged against capitalists and corporations they were but martyrs in a common cause, which involved all labor. Sentiments of this nature were expressed by the visitors, and the gulf between capital and labor was widened by their harangues. It deepened and intensified class antagonism, and made of the two coöperative forces irreconcilable foes.

One of the necessary results of an industrial conflict is that attention is concentrated on the materialistic side of life. For weeks the one dominating subject which swayed the hearts of these thousands was the strike. The labor agitator was the man of the hour. All other interests were swept away as by an on-rushing flood, and the whole life of the mine employes was taken up by mass meetings, union meetings, parades and processions. On the street, in the home, at work and in the saloons, there was but one topic of conversation—the conflict between capital and labor. Any attempt to lead their minds in another channel was useless. The heart and mind of the anthracite mining communities revolved around this one topic—their material welfare. It necessarily followed that religious or ethical influences lost their grip on the life of the people. For weeks and months, the thousands of employes constituting the anthracite mining communities lived in an atmosphere charged with class antagonism and the sense of accumulated wrongs. This must necessarily influence the entire life of the people. The moral tone of the communities is weakened; the power of religion over the life of the family is diminished.

To this we must add the passions which stirred the hearts of men against their fellows. In every community there is a class of men on the side of the employers, against whom the workingmen cherish sentiments of jealousy and suspicion, if not of positive hatred. Few open conflicts occurred in the late strike, but everywhere angry passions raged, and the flame of hatred then kindled will continue to burn for many a day. Men bear in their bodies the marks of that conflict, while others were stigmatized with vile epithets which they will carry to their graves. This burning rancor will exercise an abiding influence on the religious, political, industrial and social life of the communities. Resentment makes the men uncompromising enemies, and they ever watch their opportunity to "do" their opponents. This mars the peace of towns, creates friction, destroys business and frustrates reforms.

The pecuniary loss from strikes is great, but that is limited and can be made good; the loss in moral sympathy and social harmony perpetuates itself and its miasmatic effect lingers on for a generation.

CHAPTER X.

UNIONISM.

1. THE UNITED MINE WORKERS' ORGANIZATION. 2. THE ORGANIZER.
 3. THE EFFECTS OF UNIONISM. 4. THE LIMITS OF UNIONISM.
-

In the preceding chapter, we mentioned various attempts made to organize the mine workmen of the anthracite coal fields. Every strike of any importance in the history of the anthracite coal industry is associated with a labor organization. The only exception is the strike of 1877. That, however, cannot be properly called a strike; it was more a contagion and limited to a section of the Northern coal field. The miners were forced to idleness because of the great railroad strike. They then ventilated their grievances and demanded certain rights, because that was the order of the day. They failed in every particular, for there was no organization among the men to enforce their claims.

The prominent labor organizations in the anthracite regions for the last fifty years have been :

1. The Bates Union of 1848-1850, which as far as we have been able to learn, contained about 5,000 members.

2. The Workingmen's Benevolent Association chartered in 1868 and dissolved in a piecemeal fashion from the year 1871 to 1875. In the days of its glory its membership was 30,000, or about 85 per cent. of the total number of employes.

3. The Miners and Laborers Amalgamated Association and the Knights of Labor from the year 1884 to 1888. Both organizations combined in 1887 and comprised a membership of about 40,000. The sphere of operation of the combined societies was largely the Middle and Southern coal fields.

4. The present United Mine Workers of America, which began organizing the anthracite coal employes in 1897, and which to-day includes in its membership from 90 to 95 per cent. of the mine workers of northeastern Pennsylvania.

Other organizations have been introduced, but they did not take root. In 1874, the Miners' National Organization of Ohio sought to secure a foothold in the Wyoming Valley, but did not succeed in enlisting the support of the miners. In 1864, there was a miners' union of considerable local influence at Locust Gap, but it does not seem to have extended its power beyond that territory. From 1860 to 1876 the Mollie Maguires were active, but they cannot be said to have been a labor organization; they were rather a coterie of lawless intimidators who sought political power and prestige by terrorism.

In the Northern coal field, all attempts at unionism failed after the great struggle of 1871, until this present effort. The United Mine Workers' organizers found greater readiness to receive them in the Northern field than in the Middle and Southern. Since the labor trials of 1871 and 1877 a new generation of mine workmen had grown up in the Wyoming and Lackawanna Valleys, who, together with the Slavs, formed the rank and file of the present organization before the strike of last fall. The successful issue of that conflict increased the prestige of the union greatly, and swept away all opposition. It is now supreme everywhere in the anthracite collieries, and the spirit of unionism dominates everywhere among the 140,000 employes in the anthracite coal industry. The object of the present chapter is to describe this labor organization as to its nature, its mode of propagation, its effect upon the mine workers, and the possible scope of its activity.

THE UNITED MINE WORKERS' ORGANIZATION.

It has long been observed that human history moves in cycles. The experience of one generation is repeated by a subsequent one. When we remember that the average life of a generation in mining communities, under such conditions as have prevailed in the anthracite coal fields for the last fifty

years, does not exceed fifteen years, we see that every labor organization which has succeeded in gaining a foothold in this territory has been planted in new soil. That was preëminently the case with the United Mine Workers' organization. In 1896 attempts were made in the neighborhood of Pottsville by a member of the U. M. W., to organize the miners, but after a year's effort not 5 per cent. of the Schuylkill men were in the union. In February, 1897, a local union was organized in Hazleton, but here it did not meet with the success the organizer anticipated. The memories of 1887 and 1888 were fresh in the minds of men, and labor organization was synonymous with labor disputes, strikes and suspensions. In March, 1899, an organizer was sent into the Wyoming Valley and within a few months 50 per cent. of the employes had been enrolled. The men who knew nothing of the trials of the seventies flocked into the organization. They had heard their fathers speak of past efforts, but they believed they could do better and soon the United Mine Workers was a power which made itself felt in the discussion of labor disputes in the Northern coal field. By the summer of 1900, 65 per cent. of the Wyoming, 15 per cent. of the Hazleton and 25 per cent. of the Schuylkill mine employes were members of the union. During and after the strike, the work of organization was vigorously prosecuted, so that by the beginning of the current year about 85 per cent. of the employes in and around the mines were members of the anthracite branch of the United Mine Workers of America. The organization comprises not only the mine workmen, but also the majority of engineers, firemen, blacksmiths and machinists connected with the mines. This combination is deemed expedient for the reason that any dispute between these classes of workmen and the employers may precipitate a strike, when the miners would have no grievance. To avoid any such conflict of interests, all the employes in and around the mines are in one organization.

The organization is modelled on democratic principles. It is an organism formed of a series of concentric circles culminating in the National Executive Board, whose chairman is the

president of the national organization. The president receives \$1,500 a year salary and travelling expenses; the secretary and treasurer \$1,300 and expenses; the other members of the board get \$3.00 a day and expenses. The national organization has from 25 to 30 men in the field, each of whom gets \$70 a month and expenses.

Each local union is a perfect organism and has complete autonomy in affairs pertaining to its members. It has its own constitution and by-laws, can regulate its own entrance fees and dues, elect its own officers and discipline its members.

The local unions are affiliated into districts. Each district has its own constitution and by-laws and the regular staff of officers. The president of each district receives \$75.00 a month and expenses. The district secretary receives \$70.00 a month and expenses. The districts put agents in the field, whose duty it is to organize new local unions and keep the existing members in line. These get \$3.00 a day and expenses. They, with the officers of the district, form the executive board, before which any matter that cannot be settled by the executive committee of the local union is brought; and if the district executive committee cannot settle it, then it goes before the executive board of the national organization.

The local union is organized by one of the field agents. Those who sign the application for a charter become charter members and pay an initiation fee of 25 cents. The charter and certain supplies necessary for the workings of the local union are supplied from headquarters for \$15.00. After the enrollment of the members, they are all solemnly sworn to abide by the principles of the order, to implicitly follow its instructions, and never divulge its secrets. Then officers are elected and the password and sign given to each member. Anyone wishing to join after the local union is organized, must sign a blank form and be recommended by one of the members of that union. The entrance fee is from \$1.00 to \$3.00, according to the decision of the members. The monthly dues are 25 cents, which is divided as follows: 10 cents to the national organization, 5 cents to the district association, and 10 cents for local

purposes. The secretary and treasurer of the local union get from 50 cents to \$1.00 a night, according to the amount of work they have to perform. Members appointed on committees or delegated to conventions get from \$2.50 to \$3.00 a day and expenses. Each local union has its executive committee and grievance committee. Provision is made to place on each member an assessment of 25 cents a month in case of a strike in any part of the territory covered by the national organization, provided the strikers are in need of help.

No strike can be declared in any colliery unless endorsed by the executive board of both the district and the national organization. If it is otherwise declared, the union will not recognize it, however just the cause may be.

This, in brief outline, is the organization which now takes in all the anthracite coal fields, and affords to the various nationalities excellent practice in self-government and discipline. All classes of men seem to be eligible as members of the organization save those who sell or manufacture intoxicating drinks, lawyers, bankers, gamblers and stock-brokers. Foremen are also barred out. It is generally the rule that those working in the same shaft form one local union. This, however, has not always been the case. In the early days of the organization a local union might comprise all the mine workers in a village, though they worked in different collieries. In some localities the Slavs were granted the privilege of having a distinct organization from that of the English-speaking employes. When this was the case the separate locals invariably had conferences and acted conjointly in any important movement. The rule now is, however, that each colliery has a local union of its own with a grievance committee which confers with the foreman in case of a grievance presented by any of the men in the colliery.

John Graham Brooks, when he studied the Lattimer riots of 1896, found on the Hazleton Mountain over a dozen nationalities. He expressed the conviction that it was a hopeless task to attempt to form these into a labor organization. Paul de Rosiers, in his essay on "Les Tentatives de Monopolisation de L'An-

thracite," expressed a similar opinion. He compared the present personnel of anthracite employes, "largely composed of Polanders, Hungarians and Lithuanians, who are turbulent and incapable of being advantageously formed into an association," with the Americans, Germans and English of 1868, who so successfully organized the Workingmen's Benevolent Association, and believed they could not be successfully organized into a labor organization. Both eminent men have proved to be false prophets. The staunchest members of the union are the Sclavs, and the organizers of the United Mine Workers of America have successfully overcome racial differences, national antipathies and industrial prejudices, and formed into one body the fifteen or sixteen nationalities now constituting the anthracite mining communities. It was possible because gross abuses needed correction and low wages needed an advance. These were the powers which made of all nationalities one common brotherhood, pledged to correct the one and raise the other.

THE ORGANIZER.

The men who have accomplished this marvelous feat are from the ranks of miners. All of them handled the pick and shovel before they were delegated by their fellow-workmen to the work of organizing local unions throughout the coal fields. They are not educated and have never been trained in the art of oratory; and yet many of them are orators, if we judge them by the effect of their addresses. Their style has force but no elegance; they know the way to the hearts of their audience but could not analyze the process; they know their subject and present it in a form which every miner understands. When they speak, conventionalities are laid aside, they have one goal to reach, and for that they make with all the powers at their command, and invariably they reach the mark before they are through. They are earnest men in the common walks of life, speaking of a subject they know from practical experience, and addressing men whom they know—for they are of their kith and kin. They are genial, frank, and flippant, and are boon companions when they fall in with good cheer and

jovial fellowship. They know the power of a social glass and are not above an occasional quarrel and tussel over it. They have strong social qualities and can make friends and keep them. In the work of organizing the Slavs, men of that nationality are assigned to the work. The English-speaking organizers also attend the meetings of Huns, Poles, etc., when interpreters are used to convey their thoughts to the audience. These are the men who organized the anthracite coal employes in the years 1897-1901 and still preserve the organization in its integrity.

In the discharge of their duties as organizers their one aim is to get an audience. Time and place are secondary considerations. The weather has very little effect upon these men. Give them an audience and they will stand the pelting rain or the broiling sun to convey to wage earners the message they have to give. They address men early in the morning or late at night. They stand to deliver their message on the vacant lot, or the open field, or the public square, or the street corner, or the head of the shaft, when the miners come home in their squalid garments. Anywhere, only give them the men to hear. Last summer when the thermometer was in the nineties, we heard one of them talking for an hour in a public hall, crowded to the door. There the speaker stood on the platform without coat or vest, without collar or tie, with his shirt sleeves open which he occasionally tucked up, but which again fell because of the vehemence of his gestures, and again they were rolled up. The audience was sweltering; the speaker was in a bath of perspiration, but he clung to his theme and interested his audience. Occasionally he received a responsive confirmation from some one of the miners, and at times was greeted with rounds of applause. Many prevailing wrongs and economic conditions which pressed hard upon the lives of men gave the agitator his opportunity, and well did he use it to bring into existence the organization which precipitated the strike of last fall.

All the organizers are not on a par. Some of them are extravagant and unreasonable, and in their addresses pass beyond

all bounds. That class has little influence with the miners. No class of men are better judges of practical common sense than these people, and the men who wield greatest power over them are those who abide by the facts and reason along the line of economic justice. We heard some describing their opponents as "robbers, scoundrels, blood-suckers and villains, who ought to be behind prison bars," but their words fell flat. Others said that labor produced all the capital which existed, and that the miners actually owned the United States and had the power to paralyze all industries. There was no response in the audience to such statements, for the miners did not believe them. No organization can be built up on wind, much less on exaggeration and falsehood. It is important to know what is the teaching of these men, which they infuse into the minds of the 140,000 mine employes of northeastern Pennsylvania. They also influence a mining population of nearly half a million in the United States, and their teachings reflect the thoughts and ideas of the working classes, which, if erroneous, deserve attention that they may be corrected; or if true, that they may be incorporated into the framework of society. To give an idea of their teaching, we subjoin the substance of the best address we heard in the summer of 1900, delivered by one of the most successful organizers in the anthracite coal fields.

The organizer spoke in the open air and argued his case for an hour. As he became heated to his subject, he threw off his coat, took off his collar and cuffs and tucked up his sleeves. None of the audience left until he was through, though the weather was hot. The substance of his address was :

"The employes of the anthracite coal fields are in a deplorable condition. We are not here, however, to curse the employers. They take every dollar they can get and we do the very same. What we want is the share that rightly belongs to us, and if we do not get it then we ourselves are to be blamed. Wages could be advanced and conditions improved at the present prices of coal, but the employers won't do it unless they are compelled. All they ask is how many dollars they can get out of it. They do not concern themselves about your wives and chil-

dren. You must look after your own interests. The anthracite coal operators form a combination, and they have tried to teach you to combine. Many condemn trusts, etc.; we should not. We should organize in order that combined labor may do business with combined capital. The 140,000 employes in the anthracite coal fields have done business with the corporation as individuals, and they are crushed. If combination is good for capital it is good for labor. Ask concessions now and they are refused, for the reason that you have no organization to enforce your claims. Organize, and they will be compelled to hand over the dollars that belong to you.

“Men will shout for freedom in the next campaign, but here there is tyranny worse than ever existed in Europe. Anthracite coal miners don't know what is freedom. They are dictated to by bosses and are not conscious of the freedom they might enjoy in this country. Carry your freedom into labor organizations, for it is your right to organize.

“The conditions of the men of to-day determine those of the rising generation. Your children are in the breakers and mills because you do not get your rights. These little ones will curse their parents. You cannot give the protection to your wife that she deserves. Organize and your right will be respected.

“Miners say the operators whipped us in the past. Yes, and it was due to lack of confidence in each other on the part of the workingmen. Because you have no organization, evils have piled up high in the last fifteen years, and it will take time to remedy them. The old W. B. A. failed because it did not do business in a business-like manner. The miners did not come out together. In 1887 the Knights of Labor precipitated a conflict to their sorrow. Men struck in the Lehigh region and came to the Wyoming Valley to work for less wages. Our organization must embrace all miners.

“Miners have a right to put a price on their labor for it is their capital. The selling price of coal should not govern wages, but wages should govern the selling price of coal. Our only hope to remedy prevailing abuses is by organization, then we will get our rights and see that the mining laws of the State are enforced.”

Four points were prominent in the address. The speaker made correct and effective use of the history of unionism in the coal fields. The rocks upon which the unions were wrecked were lack of confidence and united action. He was also right in affirming that labor had a right to combine and enter into collective bargaining with capital. Joseph S. Harris, in 1896 (*Forum*, Vol. 13), said: "Business operations should rest on organization, coöperation and reasonable consideration for the property of others. In other words, it is beginning to be recognized that industrial warfare is no better regulator of business than private warfare is of social intercourse . . . this failing has led to the organization of labor on the one hand and to the organization of capital on the other . . . both will be right when they learn that they are forces which must work in harmony to carry out the ancient command to subdue and replenish the earth." It is interesting to notice also that the editor of the *Nation* in 1871 said of the anthracite coal operators: "They never once raised the wages of their own accord. In every instance they compelled the men to strike or to threaten a strike before they yielded the advance. . . . The fact is that no advance was yielded by them except upon compulsion." Dr. Virtue, in his article on the Anthracite Coal Workers in the Bulletin of the Department of Labor for 1897, suggests the same idea. During the twenty years, from 1880 to 1900, no labor organization existed in the Wyoming coal field, and no advance in wages occurred. All this seems to confirm the speaker's statement that the operators will only raise the wages of employes under compulsion. And yet it would be the gravest fallacy to imagine that labor organization can raise wages without limit. Production is limited, and there is a point beyond which the demands of labor cannot go; if laborers can discern that point and come as near it as is safe, they will be able to get the share due them. The proposition that wages ought to govern prices is open to grave question. Those who sell anthracite know that they cannot raise prices as they will, for the man at the other end of the bargain has something to say in the matter. William Jaspar Nicolls, in his work on

"American Coals," says, "Anthracite coal is no more a necessity of life than is young hickory wood, and its price for domestic use can be raised just to the point where people won't use it and no higher. . . . When we read of the strenuous exertions made by the use of every inducement, including bribery, to force the use of anthracite coal upon the public, it does not seem a formidable undertaking for the public to return again to the use of bituminous coal as they did in former years" (p. 290).

The operators are uncompromisingly hostile to the formations of unions; they have their agents busily sowing tares among the wheat. In each local there are spies who report to the foremen all the business transacted. Some companies are more hostile than others to unionism. A brave attempt was made by the officials of the Delaware, Lackawanna and Western last summer to organize their men into a separate union, and thus divide the ranks of labor. The effort miserably failed. Fire-bosses, driver-bosses, loader-bosses, etc., were members of the union, but in July last orders were issued by operators that they must quit work or quit the union, for they could not serve two masters. The Reading Co. has given very liberal concessions to its workmen. It was the first to offer 10 per cent. advance to its employes on the September wages, which were 6 per cent. above the basis; and so actually giving an advance of 16 per cent. It also restored the old prices paid for timbering. These concessions have been interpreted by the leaders of the union as efforts to induce their employes to forsake the organization. Efforts have been made to frustrate the progress of the United Mine Workers on lines of political bias and religious antipathy, which took very ludicrous forms. The secrecy imposed on all the members, as well as the ceremony of initiation in the order, were solemnly believed by some to be a cunning device to restore the temporal power of the Papacy. The efforts of the operators and their partisans were in vain. Onward marched unionism as a mighty army, so that every colliery is under its control, and well-nigh every mining employe whom the union wishes to bring under its power must fall in line.

THE EFFECTS OF UNIONISM.

The Reading reduced the price of powder in 1888 when the Knights of Labor dominated in Schuylkill county. The price of powder elsewhere was reduced when the United Mine Workers demanded it. During the years 1880 to 1900, many wrongs had accumulated, due, not so much to the egoism of operators, as to the officialism of petty bosses in and around the mines. These have almost wholly disappeared. The abuses practised by company stores have largely sought a hiding place. And, as in the reign of the Workingmen's Benevolent Association from 1868 to 1875 the power of large corporations was enhanced by the spirit of unionism among the employes, so it is to-day. The small percentage of individual operators are being bought out, and the whole of the anthracite industry is passing into the control of a few hands.

The spirit of unionism among the employes brings about many strange and inconsistent actions. Men who insist upon individual rights and personal liberty are the least tolerant of these rights when governed by the union. One of the aims of the organization is to promote peace and order, and yet many acts are done by its members which disturb the peace of society. When a member of the Thirteenth Regiment secured work in one of the collieries of Lackawanna county a committee of the local union asked the foreman to dismiss him. He refused to do so and the employes went on strike. If a miner will not join the union the driver will not give him cars. Last December, a small boy, not fifteen years of age, driving in one of the collieries of the Northern field delivered a car to an elderly man, old enough to be his grandfather, and told him, "You put your tools in that and get out for you won't get no more cars." The miner appealed to the foreman. The latter went to the boy and ordered him to drive cars to the chamber in question; he told him he would not do it. The foreman told the child, "You had better take my tape and book, for you seem to run this shaft." That child was the hero of the hour. Five driver-boys, from the age of 15 to 18 years, in another shaft, had wage grievances not involving, all told, more than fifty

cents a day. Without a word of warning to their parents, or a single attempt at adjusting their grievance by seeing the foreman or superintendent, they declared a strike. The employes lost by it over \$30,000 in wages, and the boys were referred to in mass meetings as examples to their fathers in "manhood, courage and liberty." A father and son worked at a washery during the strike. When resumption came, the employes of that colliery would not begin work until the father and son were discharged. The foreman had to do it. The offenders had to appeal to the local union for membership as the only condition of securing work. They were admitted by paying an entrance fee of \$15. The regular fee was \$1 a member. Miners often have two and three laborers to work for them, but when a miner takes a contract which enables him to hire miners and laborers he is disqualified as a member of the union, although he pays the standard wage in the colliery to the men he hires. During the last strike some of the miners were sworn in as deputies by the companies to guard their property. These men are now members of the union, but they are closely watched and suspected of being spies in behalf of the operators.

Instances of the spirit of unionism often met with are more ludicrous than serious. Four boarders left a boarding house at the same time, saying, "They weren't going to board with no scab boarding boss." A butcher wagon in its rounds stopped to sell meat at the door of a non-union man. Some of the union men told the butcher, "If you sell to him you can't to us." A miner sat in a barber's chair being lathered for a shave. Six union men entered and took their seats. They identified the man in the chair as one of the non-union men. As the barber was about to apply the razor, one of the men said, "If you shave that man you don't shave us." The man had to vacate the chair unshaved. A storekeeper insisted on his personal liberty, which finds so large a place in the addresses of the labor leaders, and declared he would not discharge clerks who were not union men. Half-a-dozen men visited his store, made their purchases, and then asked the clerk to show his union card. He could not. The men left the goods on the

counter. That invariably makes the storekeeper less pronounced in his personal liberty claims. The spirit of unionism is everywhere. All classes of labor which can be organized are formed into unions. It is the fashion of the day to be one of the union, and if you are not, the boycott falls on you.

Possibly the most dangerous element of the anthracite population dominated by this spirit are the lower classes of Slavs and the Italians. English-speaking mine-workmen have some respect for personal rights, even when unionism appears in its most rampant form, but some Slavs and Italians pass beyond all restraint. The workingmen in a shaft in Lackawanna county held a meeting to discuss the situation on September 8th, ten days before the strike was ordered. The "foreigners" said "strike now"; the English-speaking element, which was in the minority, argued that there was no order issued, and tried to persuade them to keep at work until the order came. The question was decided by an Italian swinging a revolver around his head and shouting "Strike, strike." The shaft was shut down a week before the general strike.

When the strike was about to be declared, a company of "foreigners" visited a mining town to purchase firearms. There were two hardware stores there which carried a stock of these goods. They entered one place and bought the implements and the other store lost that portion of its stock that night. A carpenter on the first day of the strike was engaged repairing a house as some of these men came along. They shouted, "You strike, strike all over," and the prudent man packed up his tools and went home. In a shaft in Luzerne county where this class of labor was in the majority, the local union was governed by them. The English-speaking employes were members of the union, but held different views from those of the Slavs and Italians. When the Anglo-Saxons expressed their opinions in a meeting of the union they were thrown out. When notices were posted at the head of the shaft, stating that work would be resumed the following Monday, the "foreigners" were up at dawn. Five ways led to the mines. On each road an organized troop was posted, and if any employes had

come to begin work that morning, there would have been bloodshed. In another shaft, twelve Italians, said to be members of the Mafia, held all the colliery in terror, and nothing could be done unless endorsed by them. Anglo-Saxons know how to slug a "scab," but the "foreigners" use the knife and revolver. In Shenandoah, two of the business men signed the petition sent to the Governor of the State asking for troops to protect life and property at the time of the riots. The Sclavs boycotted them in a manner wholly their own. They organized themselves in squads, and stood sentinels before these business houses, and anyone who attempted to enter was prevented by physical force. The officers arrested some of the ringleaders. The crowd instantly gathered and demanded the release of the men, and the burgess prudently conceded their demand.

A most atrocious deed was perpetrated last summer, which was by public opinion attributed to unionism, though no direct proof was ever found. A non-union Polander had a cow. One night some wretch tied a stick of dynamite to its horns and blew its head to atoms. With such an element forming a large percentage of the mining population, there is every reason to believe that, should a conflict develop to its most serious stages, riots, bloodshed and arson would be the inevitable result.

While a strike lasts, the enthusiasm of the strikers must be kept up, and one of the means to this end is parade and mass-meetings. The labor agitator has his hands full when there is a strike of any magnitude going on. If there is defection in the ranks anywhere, he must use means to keep the men in line, and one of the most effective is to arrange for a grand procession with martial music and harangues. In the parade, mottoes are carried which generally represent the grievances of the men. During the last strike among many other mottoes carried in the parade were the following: "Do not handle washery coal, that is what the company stole from the miners." "We don't live to strike, but we strike to live." "We want our pails filled with substantial food and not with coal baron's taffy." "Our union must be recognized." "We will no longer

be slaves." "We need school but must work." "Save us from the whims of sheriffs and deputies." "Down with oppression; we stand by Mitchell." It is seen from these that very little sentiment of a truly socialistic type is found among these people. And it is a noteworthy fact that after the strike of last fall the Social Democrats were not able to secure one per cent. of the total vote cast in Lackawanna and Luzerne counties.

THE LIMITS OF UNIONISM.

In a circular issued June 9, 1869, by the officers of the Workingmen's Benevolent Association, the object of the order is declared to be to reduce production and advance prices, so that the laborer might get a "fair day's wage for a fair day's work." The same circular contains the following statement: "We claim that we should receive pay commensurate to the said work and danger and not be stinted down to the lowest prices given to common laborers where employments are safe and free from the risks to life, limb and family." The object of the present union is to secure for the mine workmen higher wages. One of the organizers expressed an opinion that no man going underground should work for less than \$3.00 a day, while miners ought to get at least \$3.50.

In a convention held at Hazleton in 1869 by the above-mentioned labor organization, one of the propositions discussed was "That we as workmen should demand 20 per cent. of the production as the just share of labor." One of the present labor leaders in the anthracite regions made the statement that only 17 per cent. of the wealth produced to-day was distributed to labor. Both these facts indicate that the prevailing opinion of the union is that there is a large fund of inexhaustible wealth upon which labor can draw, and in order to effectually do that, all that is necessary is to combine.

All must admit that combination of labor has had the effect of raising wages, but it does not follow that it can raise wages without limit. Even combinations of labor are not all-powerful, any more than combinations of capital. Both are circumscribed by limitations and these are determined by the

service rendered to society by the combinations. If they antagonize consumers, they carry in themselves the seeds of their ultimate defeat, no matter how well they are organized.

One of the essential conditions of permanency in unionism is that the members sufficiently recognize the fact that the amount of wealth is limited. As this is recognized or not, the policy of the organization will succeed or fail. The "inexorable limits of the wage fund" has been banished from the field of Economics, because it was false. There is an equally fallacious doctrine too prevalent in unionism, namely, that there is a limitless supply of wealth produced annually, whereby all classes of labor can be bountifully supplied, regardless of the productive efficiency of labor. That doctrine must be banished, for, ultimately, it is fatal to all success. Labor leaders are right in their contention that the rate of wages can be changed by united action. There is no reason why wages should be left to the influence of the law of supply and demand, any more than a river should be left to follow its sweet will. We modify this by artificial barriers, and that can also be modified. Economic environment is largely the artificial production of man, and we can effect changes in it which react upon the rate of wages. But as there are limits to human modifications in the sphere of natural law, so also there is a limit in fixing the rate of wages which labor must recognize. Capitalists are subject to competition; the skill and management necessary to successfully conduct a large industry must be rewarded. Society cannot do without the entrepreneur, and his remuneration must be commensurate with his ability.

Capital, if it is to stay in an industry, must get its interest, and there must also be recompense for risks, else the work of production will not proceed. All these forces diminish the part of production available for labor to draw upon.

Under the capitalistic system, the laborer can never expect to get the total product of his labor. No capitalist will employ labor save on the condition that he can make something out of the operation which he undertakes, that is, he will never pay to the laborer all that he gets out of the operation. If, then,

the capitalist has a voice in determining the rate of wages ; if he will pay to labor a price on which he thinks he can make some profit ; then it stands to reason that the laborer cannot fix the rate of wages to please himself ; or, in other words, there is a somewhat narrow limit to the supply of wealth upon which combinations of labor can draw.

Another fallacy closely akin to the above is expressed in the words "wages ought to determine prices." This is unsound doctrine for unionism to stand upon, for the reason that it takes no thought of the consumer. Social utility sets its stamp on all production and determines what the producer is to get. The miners get food, clothing, shelter and a thousand other enjoyable things as their wages for cutting coal, simply because society says, "The fuel you furnish us is worth it." But suppose labor were to say, "We want twice as much of these comforts of life as we now enjoy, and you must give it to us if you want anthracite coal ;" the consumer may, as Mr. Nicolls suggests, go back to "young hickory" or bituminous coal, and give the anthracite miner nothing. If the laborer insists on a rate of wages while he does not render to society a service which the consumer could obtain otherwise for less, then no amount of combination will enable the producer to enforce his demand. Labor has the right to refuse to work, and the consumer has an equal right to refuse to buy. No doctrine can be taught labor that is more dangerously fallacious than that wages can be paid without an equivalent efficiency in production, which society approves. Unionism will render good service to society if it couples with the demand for higher wages, increased efficiency in production. In that way it will make good its claim and attain its object, and the demand will be salutary in its influence upon industrial life. If, on the other hand, labor tries to drive a bargain with capital on the principle "get as much as possible and give as little as possible," it antagonizes both capitalist and consumer, and must necessarily fail in its purpose. Unionism has great possibilities of good, but the condition of their attainment is that the labor leaders should recognize the fact that the wages of labor bear a direct relation to its usefulness to the capitalist

and the consumer, and the only sure foundation upon which wages can advance is increased efficiency in production.

In the effort to secure collective bargaining, the union is undoubtedly right, and the reluctance of operators to meet the leaders of organized labor finds no justification either on industrial or moral grounds. "The exigencies of modern industry compel men to move in masses." This is true of labor. To ask or expect workmen to treat single-handed with their employers, is to place labor at a disadvantage. Labor cannot wait, capital can. Labor cannot find an employer any hour of the day; unfortunately, employers can find laborers in plenty. Employers have wit, wealth and wide knowledge of the markets; labor generally has nothing but empty hands and a family. To ask labor to stand alone in its bargaining with capital is to demand conditions decidedly disadvantageous to the laborer. Labor has a right to combine and do business collectively with capital. It will thus get the support of the union in its demand. The employer will be more apt to do rightly by labor when he feels that he has to do with all and not with one employe. United action under wise leadership will give labor an equal advantage with capital, in securing knowledge of economic conditions which may accrue to its advantage. These advantages of collective bargaining the mine workmen will not forego, and the employers should concede.

The leadership of the United Mine Workers has displayed great judgment and wisdom. Blatant orators are not in control. The leadership is in the hands of men who have thus far proved competent to exercise it. Under wise leaders and conciliatory operators, the labor disputes in the anthracite coal fields ought to be reduced to a minimum. The interests of both employers and employes lie in doing all they possibly can to evade industrial warfare. There are dangerous elements among the present population of the anthracite coal fields, and if a fierce conflict occurs nothing can be expected but bloodshed and arson. The better part of valor is prudence. When both parties to a dispute are open to reason, conciliatory measures should prevail to settle disputes before they reach the stage of

open hostility. When the intelligent operator and the responsible labor leader come face to face they understand each other's position better, and misunderstandings, which are responsible for much friction, can be evaded. Both parties ought to meet to discuss grievances, to fix the rate of wages as far as that is possible, and to make long-time contracts on that basis.

This would preclude the danger of labor troubles and the coöperative forces in the anthracite coal fields would harmoniously work together in the production of wealth.

Capital and labor should not be antagonistic for the prosperity of each is bound up with the strength and activity of the other.

CHAPTER XI.

RECLAIMING THE WASTE.

1. CAUSES OF WASTE.
 2. IMPROVED METHODS OF ECONOMY.
 3. FLUSHING THE MINES.
 4. OVERHAULING THE CULM HEAPS.
-

It is impossible for men to form correct judgments when their prejudices or interests predispose them to a certain conclusion. Among the industrial classes, economic conditions warp their judgment more than any other influence to which they may be subjected. If labor cannot get enough to supply its need, according to the prevailing standard of living, the cry of theft will soon be raised in the camp. When the pressure of want pinches the home, men are disposed to think that they do not get their rightful share of the national dividend. The opinion that capital exploits labor is very prevalent among the working classes. Good men, who do not wish to wrong their fellow citizens, are disposed to look upon the returns to capital as exploitation of labor. For the last half century there has entered into the life of labor a sentiment which predisposes laborers to look upon the capitalist as a thief and a robber. This sentiment finds expression in a concrete form among the miners of the anthracite coal fields, in the motto quoted in the previous chapter: "Don't handle washery coal; that is what the company stole from the miner."

Washery coal is that which is reclaimed from the culm heaps, where the refuse of collieries for many years was dumped. The course of reasoning by which the miners arrive at their conclusion is as follows: The mining companies only paid the miners for coal they sent to market; the refuse sent to the dump was not paid for. That refuse is now turned to a source of profit by the operator, and since labor was not paid any-

thing for mining it, the product of these washeries is a theft : it is robbing the miner.

That is bad reasoning and utterly inconsistent with commercial ethics. Capital and labor, when they enter into the work of producing wealth, form a contract. If the terms of the contract be fulfilled, nothing more can be asked of the parties to it by commercial morality. Subsequent advantages may accrue to one of the parties by the bargain, but that does not make the transaction immoral. Suppose a man buys a lot for \$100, and in a month after, a railroad company expects to construct a line passing that way, and desiring the lot, pays him \$1,000 for it; no one will think for a moment that he has robbed the man of whom he bought the property, although he made \$900 in the transaction. Producing coal is a contract between capital and labor. When capital pays labor the wages agreed to, it has discharged its obligation and is above reproach according to the laws of commercial policy. Labor cannot demand more. When the coal partly represented by these coal heaps was mined, the miners were paid the wages agreed to, and in all justice they cannot demand more. If subsequent inventions have made it possible to use some of the refuse of past years, that is the advantage of the capitalist; but it is bad logic and bad morality to raise the cry of "thief," when this is done. The cause of labor will not be benefited by false reasoning and erroneous conclusions.

Our purpose in the present chapter is to trace the improvements made in recent years in greater economy in producing coal.

CAUSES OF WASTE.

Nature is said to have carried away ninety-nine per cent. of the original coal area in Pennsylvania by erosion. When the first generation of operators mined coal in the anthracite regions, they hardly turned 25 per cent. of the original contents of the veins to commercial use. The methods of mining, transporting, and preparing coal were exceedingly wasteful. The operators did not study economy in operating the veins. They thought the seams exhaustless, and when the miners of Summit

Hill struck bottom at the depth of 60 feet when operating the Mammoth vein, it was a surprise to all. It created a sensation in Philadelphia, and lowered the stocks of the mining company. The whole mountain was thought to be a solid mass of coal. In the early years of mining, the veins were rich, labor cheap, and prices, comparatively speaking, high. There was nothing to enforce economy in production. Those days are referred to by some as the halcyon days of mining. During the Civil War and for some years after, there was no external pressure demanding economy. Prices were high, royalties low, and the richest veins were operated. The *Nation*, referring to the returns to capital during the latter part of the Civil War, says: "all made profits to their hearts' content and such dividends too that they were almost ashamed to let them be known, but handed them to their stockholders in various disguises."

Such conditions were not favorable to economy in production. In the next decade, however, profits diminished, and the management looked around to see if there were not leaks which could be stopped. The supplies were more carefully handled, the veins more scientifically operated, and attention was given to the great waste which was annually going on in the amount of coal sent to the dumps. This attention was demanded in order that interest might be paid on the capital invested in railroads, canals, equipment and coal land. Wages also had advanced and the cost of production increased. All these forces worked in the direction of greater economy, which has been studiously effected in the last thirty years. This results in a gain to society. If methods of production improve so that 75 per cent. of the coal mined is of commercial value, whereas only 35 per cent. was formerly used, society is benefited; it is producing wealth where it did not formerly exist, and that adds to the national dividend, on which all must depend for the necessaries and comforts of life.

Waste in mining occurs in various ways. We saw that all the coal in the seams cannot be mined. Some must be left as pillars. The amount to be left in pillars varies with the thick-

ness of the coal, the nature of the roof, and the depth of the shaft. On the average throughout the anthracite coal fields about 30 per cent. of the original contents of the seam must be left. In many sections, however, it goes over 50 per cent., while in others it may be reduced to 15 per cent. Often a squeeze occurs in a mine which makes it impossible to continue the work of mining coal. Water may break into a colliery in such quantities that the mines must be abandoned. A fire in a seam on the Hazleton Mountain has been burning for a generation, and has defied all attempts to extinguish it. All these are sources of waste.

Then waste comes in through lack of judgment in the miner in using powder to blast the coal. If his charge is too large, he may possibly blow the major part of the dislodgment to fragments which cannot be gathered together and sent to the breaker. In the pitching veins of the Middle and Southern fields coal to the amount of over 2,000 tons is often left in the chamber, which must necessarily, by its own weight, grind a certain percentage to powder.

In some veins coal clings to the rock, so that it cannot be severed and must go to the rock dump. Then in transporting coal from the chambers to the breaker, a waste of about 5 per cent. takes place. In preparing coal in the breaker waste again comes in. Coal cannot be broken to the market sizes without some of it being ground to culm. The total waste from all these sources amounts on the average to about 50 per cent.

We have had occasion in previous chapters to speak of the great variety of conditions in different sections of the anthracite coal fields. There is a similar variety in the matter of waste. J. A. Stearns measured a coal-bed five feet eleven inches thick, in the Wyoming Valley, and showed that 44.8 per cent. of the coal in the bed was shipped to market; but an estimate made, by the same method, of a bed in the Middle coal field, showed an average of only 25 per cent. shipped to market. Dr. Chance, writing in the year 1883, said, that by the methods of mining then practiced, from 66 to 72 per cent.

of the total amount of coal in the ground was wasted. He argued for greater economy in production by the introduction of improved methods. One of the inspectors, writing in 1872, said that he thought "one-half of the product of the anthracite mines is put to waste."

Early in the fifties, mining engineers in England directed attention to waste in mining. In 1861, Mr. Crossham, addressing a body of engineers in Swansea, South Wales, specified three causes of waste :

1. Coal left in the ground untouched.
2. The unskilled and unscientific management in raising it.
3. Waste after it is brought to the surface.

It was many years after this that mining engineers directed attention to these sources of waste in the anthracite coal fields. The chief mining engineer of the Girard estate estimated that over 50 per cent. of the original contents of the thick veins was left untouched in the ground. There are veins from four to five feet thick in Lackawanna Valley, about 200 feet below the surface, from which 90 per cent. of the total contents is taken out. Coal operators to-day see the end of the anthracite coal fields, and they want to make the best possible use of them, so that the greatest care is exercised in mining, and the sources of waste, which proved so heavy a drain in the early years of the industry, are curtailed. More coal is mined from the seams, better methods have been introduced in handling coal, and better machinery has been put in the breaker. The successful engineer of to-day is the man who can cause the seams to yield the greatest percentage of marketable coal.

IMPROVEMENTS AND ECONOMY.

Waste in mining can be curtailed in two ways—by improved machinery and by the use of sizes of coal which were once thrown to the refuse heap. These have been the two lines along which the operators have acted.

The returns to capital and labor depend on the amount of marketable coal extracted from the earth. To increase the percentage of coal which can be consumed has always been and

still is the aim of engineers. In the years 1820-1870 it is computed that after deducting the percentage due to impurities and waste, only about 27 per cent. of the original contents of the seams was sent to market. By the year 1882, improved methods and the use of smaller sizes brought this up to 46 per cent., so that up to twenty years ago more than 50 per cent. of the coal did not yield any returns. To-day, it is estimated that 75 per cent. is sent to market, and only 25 per cent. goes to waste.

The greatest improvement in machinery is in the breaker. The old breakers sometimes wasted 25 per cent. of the coal prepared by them. The rollers were made of cast iron and revolved at a comparatively slow speed. The blunt teeth crushed much of the coal and ground it to dust. To-day, steel-toothed rollers are used which revolve at a high speed. They break the coal and do not crush it, and thus greatly diminish the waste caused by the old style of rollers. All screens formerly used for separating prepared coal into various sizes, revolved, and caused waste by friction in the process of assorting the coal. In breakers equipped with modern machinery most of these revolving screens are supplanted by long flat screens attached to eccentric rods, over which the coal passes, while they are being moved to and fro on a slightly inclined plane. These improvements have resulted in greater economy in the preparation of coal. Interesting experiments have been made by engineers with the improved devices and the following was the result :

EXPERIMENTS IN PREPARING COAL.

Place of Experiment.	Percentage of Waste by Old Method.	Percentage of Waste by New Method.
Empire Breaker (Baltimore Bed)...	11.96%	8.03%
Sugar Notch.	18.75	13.15
Empire Breaker (Hillman Bed).....	17.68	11.96

Experiments were conducted at Shenandoah with the Mammoth vein which resulted in 15 per cent. waste. But in Wilkes-Barre tests made at the Red Ash breaker showed that the waste was only 6 per cent. If an average saving of 5 per

cent. is effected in a breaker of 1,000 tons capacity a day, it would amount to 50 tons of coal daily, which in a year of 200 days would yield an increase of 10,000 tons over the old method.

Large as the saving from improved machinery is, when we consider the whole extent of the anthracite coal fields, nevertheless, that is but a fraction of the economy effected in recent years by the use of smaller sizes. In 1836, a visitor from New England to the coal fields of northeastern Pennsylvania wrote the following in the *North American Review*: "In Philadelphia, New York, and Providence, it is understood that very small coal and coal dust, which hitherto could not obtain a market, is employed to some extent in the steam engines of manufactories." That is a curious piece of history, when we remember that the smaller sizes did not come into general use until the year 1882. The probable explanation is, that at this early date, an experiment to burn the smaller sizes was made by some manufacturers, but that the inventive mind of the day did not devise the proper grate to make a success of it. Experiments to use the smaller sizes were made in the year when Dr. Chance wrote on "Anthracite Coal Mining" (1883), for he refers to them: "A certain quantity of fine coal is now consumed, but it represents only a very small percentage of the amount annually thrown away."

During the depression of 1865-1866, a writer to the *Pottsville Miners' Journal* advised the throwing to the dump of chestnut coal, for the reason that it interfered with the sale of larger sizes. This was done by some collieries in the fifties, for consumers were prejudiced against coal of the size of chestnut and it did not pay the operators to ship it to market. Heber S. Thompson, engineer of the Girard estate, writing in the year 1892 says, that in the leases of that estate prior to the year 1869, the smallest marketable coal was chestnut or such as would pass over a screen mesh one inch square. In the leases of 1869, peanut coal was first recognized, or such as would pass through a screen mesh five-eighths of an inch square. Buckwheat coal, or such as would pass through a screen mesh of half an inch, appeared separately in the railroad toll reports

for the first time in 1878. In 1893 still smaller sizes were screened. No. 2 buckwheat was made of what would pass through a screen mesh three-eighths of an inch square, and rice size was prepared of what would pass through a screen mesh a quarter of an inch square. Still later we have birds-eye size which is screened through a mesh three-sixteenths of an inch square. Thus from 1870 to 1895, four or five sizes of coal were prepared for the market, which were wholly unknown to the trade before.

To-day these sizes comprise 30 per cent. of the coal shipped to market. In the year 1899, 48,000,000 tons were shipped from the collieries, of which 14,400,000 tons were composed of sizes which prior to 1870 would have gone to the dump. To this sum must be added another 5,000,000 tons which is consumed at the collieries to generate steam. Thus we have an economy of some 20,000,000 tons annually, due to the utilization of smaller sizes.

This is the creation of wealth which is a source of profit to society. These smaller sizes revolve thousands of wheels, furnish power to hundreds of thriving factories and workshops, speed electric cars on their way, illuminate our streets and homes, and bring wealth and comfort to humanity in a hundred different ways.

FLUSHING THE MINES.

Another scheme to curtail the loss due to pillars is that of flushing the mines, which was first introduced at Wilkes-Barre in the year 1891. The custom which generally prevails in anthracite mining is to first take out all the coal which can be safely mined, and then begin in the farthest part of the workings to "rob" the pillars; that is, to take as much coal as possible from the pillars, and work back toward the foot of the shaft. Sometimes, when a corporation has sufficient capital, the veins are opened by driving the gangways and airways to the greatest length to which they propose to work the seams, then chambers are opened in the farthest part of the mines and all the coal which can be removed from the vein is taken out and as the work-

ings approach the shaft the worked-out sections are abandoned. This latter method of developing a mine is most expensive and is seldom adopted, although it has the advantage of taking out at the one time all the coal that can be mined. Operators, however, want to produce coal for the market as soon as possible, hence they open chambers near the foot of the shaft and carry their workings farther and farther from the opening as the work progresses. This necessitates leaving enough pillar to keep the airways, gangways and counter-gangways in a perfectly safe condition for communication and transportation.

But after the seam has been exhausted by this method the operation of "robbing" the pillars begins, which is dangerous work. Sometimes it happens that even before any attempt is made to rob the pillars, a general squeeze comes and destroys large areas of partly worked coal. If a crush comes when the work of robbing the pillars is going on it must be abandoned and further operations in that area are impossible. In Shenandoah, Col. D. P. Brown estimated that a crush of this kind in the Mammoth vein resulted in the loss of from 50 to 70 per cent. of the original contents of the bed. What the companies in the Northern coal field hope to accomplish by flushing the mines is to render the old workings more safe so that a larger percentage of the pillars can be removed.

The scheme was first introduced from the necessity of finding a place to deposit the refuse from two portable washeries erected at the Dodson and Black Diamond collieries at Wilkes-Barre. The washeries were built in 1891, for the purpose of overhauling the culm bank, in order to secure the refuse coal thrown there in past years. In the process a large quantity of water was used, which, as it left the washery, was laden with coal dust. The law forbade the turning of this into the river, so large sumps were constructed, but these filled up too rapidly; hence it occurred to the operators to turn it into the old workings in the mines. The experiment was tried and turned out a perfect success. The plan is now adopted in many collieries, and not only is the refuse from the culm banks carried back into the mines, but arrangements are also made whereby the

refuse from the breaker is carried there, so that the force employed at the culm bank is wholly done away with.

The process is as follows: A washery is erected into which the content of the culm bank or the refuse from the breaker is brought. Here rock crushers are used, which grind up all the refuse to the size of chestnut. The water used in cleaning the coal, as it flows in six-inch wrought-iron pipes, carries this refuse along from the washery. These pipes are carried underground to the old workings to be flushed. The men in charge of the flushing operations have a certain area mapped out which is to be filled. The pipe is carried into this old working and the employes select the most advantageous chamber to begin the work. Their first duty is to close up all openings connecting the chamber with adjoining ones or with the counter-gangway or gangway. This completed, they erect boards at the main entrance into the chamber from the main road and turn in the water. The old chamber thus becomes a sump into which a constant stream of water laden with refuse from the washery and breaker flows as long as the machinery on the surface is in operation. The water in this enclosed space gradually flows to lower levels, where it is pumped to the surface, leaving in the old chamber a closely packed mass of coal dust and refuse. While one chamber is being filled another is made ready for the same treatment by closing up all exists from it into adjoining chambers, counter-gangway or gangway. A pipe is then adjusted leading into the chamber and it is only necessary to make a new connection with the pipe coming from the washery. In this way the old working can be packed up so tight with the coal dust and slate carried by the water, that one can hardly find space for his hand between the deposited refuse and the roof. It stands to reason that this affords greater protection in case of a squeeze.

The amount of dirt carried into the chamber by the water varies according to the lay of the vein. If the water flows down hill or on a level plain, three or four pounds of water will carry two pounds of dirt. If the chamber rises from 10 to 100 feet above the level of the shaft, the work of flushing is

more difficult. The pipe then must be carried to the face and it takes from three to six pounds of water to carry one pound of dirt. Conjectures have been made as to the resistance these artificially packed up chambers would offer to a general crush, should it come upon them. A cubic foot of coal, ground to powder, fills a space 12''x 12'' x 17.5'', so that the expansion is 5.5''. In case of a squeeze, the contents of the packed chamber would be somewhat compressed, but not to the density of the original state of the rock and coal. It greatly strengthens the various kinds of props used in the mines, preserves the timber, and fills up all the crevices between the various layers of rock known as the "gob." Fear was expressed that spontaneous combustion might occur in these dirt piles, which would destroy the mines. Careful tests have been made, and no signs of fire have been detected. In a breaker producing 150,000 tons a year, the amount of stuff sent down the shaft by this process was 33,750 tons, which was spread over a surface of 6.5 acres.

This method of disposing of the refuse has many advantages. It does away with the force and appliances formerly used at the culm bank, which involved an expense of one cent per ton of coal produced. To carry the stuff to the mines is cheaper. The companies which first experimented with this system estimated that they saved from \$10 to \$13 a day. In many of the collieries, surface room is very valuable. By this process, no surface property is taken up by the refuse. By turning the water laden with coal dust into the mines, there is no danger of litigation arising from pollution of streams or the flooding of adjacent properties. And last, but not least, the total percentage extracted of the original contents of the seam is increased.

OVERHAULING THE CULM DUMPS.

One of the chief disfiguring elements due to the mining industry in the beautiful valley of Wyoming, is the huge culm heaps which are everywhere seen. They are an eye-sore and always observed by visitors to the coal fields. The recent economies effected in the preparation of smaller sizes for the

market will in a few years remove all these. Many companies have recently erected washeries near these culm heaps, and by a system of conveyors, all the contents of the banks will ultimately pass through these appliances, so that a large part of them will be sent to market as fuel, and the remainder returned to its original home beneath the sod. Dr. Chance, writing in 1883 said, "there are enough of these heaps to cover ten square miles of ground forty feet deep, or almost enough to form a pyramid one mile square at the base and twelve hundred feet high."

Attention was first directed to the old culm heaps in the year 1890. Some of the enterprising operators of the Northern coal field brought the question before the annual meeting of the American Institute of Mining Engineers held that year. There was a division of opinion on the subject. However, the Lackawanna Iron and Steel Company of Scranton had in the early eighties conducted an experiment in using the smallest sizes to generate steam, and it had proved a success. Its agent appeared before the above Institute and said that they paid from 20 cents to 25 cents a ton for the smallest sizes delivered at their boilers, and that ample steam was generated by their use. It was cheap fuel. The company had estimated the cost of generating steam by it, and it amounted to only 2 cents per horse power per day of 24 hours, while the labor in firing and taking care of the ashes was not greater than with coarse coal. Eckley B. Coxe vigorously opposed the conversion of the old culm heaps into marketable coal. He affirmed that it was deteriorated by the action of the atmosphere; that much of it was destroyed by fire; that to mix it with the coal turned out from the breaker would surely tell upon their trade; and that former attempts in this direction had resulted only in disappointment.

The miners also objected to the erection of washeries, for the reason that the coal sent to market from them would lessen the demand at the mines, and so give them fewer days' work in the year. But notwithstanding all objections, the washeries were erected, and according to the last report of the Bureau of Mines (1899), there are twenty of them in operation in the Northern coal field.

Before 1870 all sizes below chestnut were sent to the culm dump. The total tonnage sent to market from 1820 to 1870 was 200,928,364 tons. Mr. Thompson estimated that 38 per cent. of the total tonnage sent to market went to these refuse heaps, so that they contained about 76,000,000 tons of marketable coal. Buckwheat, according to Arthur S. Shaffer, of Pottsville, was first prepared for market in 1880, so that between 1870 and 1880 all sizes smaller than peanut coal went to the culm heap. During this decade over 195,000,000 tons were sent to market. Buckwheat to-day forms about 10 per cent. of the total shipment at the breaker, so that in the above decade about 19,500,000 tons were thrown away, most of which the present operators are resolved to reclaim.

The oldest culm banks are the richest. When the Girard estate made tests of some of them, 42 per cent. of the contents was found to be marketable coal. Of the sizes shipped, 19.94 per cent. was peanut coal, 80.06 per cent. was smaller sizes. In 1893 by the introduction of new machinery, whereby they were able to prepare still smaller sizes, the above percentage was raised to 50.

The portable washeries erected in 1891 at the Dodson and Black Diamond collieries cost about \$6,000 each and had a capacity of about 150 tons a day. The washeries which are put up in recent years are fixed and cost from \$15,000 to \$20,000, having a capacity of about 600 tons a day. They are built in the most convenient place to get the culm into them. The stuff from the heaps is carried to the washery by a system of conveyors. A long trough lined with steel sheeting is laid, sometimes over 200 feet in length. In this trough an endless chain is kept in motion by a small engine. Attached to the chain are plates of steel exactly fitting the groove of the trough; these are drawn along the trough by the chain and thus convey the culm matter to the washery. A force of five or six men are kept at the bank, whose duty it is to bring the dirt into the trough. In some places they simply use the shovel, but the more successful method is flushing. A chute, made of sheet steel, is laid on a pitch, with one end in the trough and the

other on the bank. Then two men ply a large hose and the water carries the contents along the chute and into the trough.

In the washery very ingenious devices are used to wash and assort the coal. Several boys are employed, but most of the work is now-a-days done by machinery and water. The slate is separated from the coal by plunging both into a cistern filled with water, which is kept in motion by a small engine attached to it; the coal being lighter than the slate, rises to the surface, where it is caught by mechanical appliances and taken to its proper destination; the slate is also caught by another apparatus and taken in another direction, where it passes into the rock crusher and then down the mines. It is the age of machinery and economy, and nowhere is one more impressed with this thought than by a visit to the culm dump and washery, now a constituent part of the anthracite coal industry.

Some of these banks are very rich in coal. There was one tested last fall in St. Clair in which 75 per cent. of the stuff conveyed to the washery was converted into marketable commodity. Sections of the same bank vary greatly. Some days a section will yield a surprising amount of chestnut and peanut coal, while other parts will yield little but dirt. The foreman of one of the largest washeries in the Northern coal field said that, on an average, nine tons of stuff yielded six tons of coal. In this washery, the smallest screen mesh used was $\frac{3}{8}$ of an inch.

Two systems of overhauling the culm dumps are in practice: one, where the operators themselves do the work, and the other, where they lease the culm heap to a second party, who pays the proprietor so much for every ton of coal sent to market. The Reading Company leases some of its banks on the following terms: 30 cents a ton for chestnut; 20 cents for peanut coal; 10 cents for buckwheat and 5 cents for rice. A rich bank in the neighborhood of Pottsville, which belongs to the Reading Company, was estimated to contain 300,000 tons of marketable coal. Parties who leased it expected to get 6 per cent. of chestnut, 12 per cent. of peanut coal, 28 per cent. of buckwheat and 54 per cent. of rice. According to the

above rates, the company would realize from this old bank, which the fathers thought worthless, the sum of \$28,100. Men leasing a culm bank sell the coal they prepare to the railroad companies; they get for chestnut from \$1.50 to \$2.00 a ton; for peanut \$1.00; for buckwheat 60 cents and for rice 40 cents, at the washery. Many of the operators, however, put up their own plant and overhaul the culm themselves.

The total force employed at a washery which turned out 600 tons a day, was 35 hands; 14 men employed at from \$1.30 to \$1.49 a day, 20 boys getting from 58 cents to 83 cents a day,* and a foreman who was paid \$75 a month. The daily wage of this force amounted to \$36.60. The sum of \$5.00 a day would cover wear and tear, insurance, and 10 per cent. interest on \$20,000 capital. This would bring the daily expense of running a washery of 600 tons capacity, to about \$41.60. Thus the average cost of getting the coal to market would be about 7 cents a ton. Officials of the company say it costs between 8 and 9 cents a ton. Some of the employes say it does not cost more than from 4 to 5 cents. Probably the truth lies between these two estimates. The exact truth can only be learned from the books of the operators.

Of the 600 tons of coal sent to market, the following would be about the proportion of the various sizes: from 20 to 30 tons of chestnut; from 50 to 60 tons of peanut; from 100 to 150 tons of buckwheat; and from 360 to 430 tons of rice. Some of the banks in Schuylkill do better than that. One of them got 35 per cent. of chestnut and peanut, and 65 per cent. of buckwheat and rice. If we take the average proportion of these sizes as given above, and the prices paid the men who lease washeries, we have the following estimate of the daily returns from the coal prepared by a washery.

ESTIMATED PRODUCTION OF A WASHERY.

25 tons of chestnut @ \$1.50 a ton.....	\$ 37.50
55 " " peanut @ \$1.00 a ton.....	55.00
125 " " buckwheat @ 60 cents a ton.....	75.00
395 " " Rice @ 40 cents.....	148.00
Total.....	\$315.50

* These wages were paid before the advance of ten per cent. last fall.

Allowing \$50 a day for operating expenses, the washery would be a source of daily income to the operators of about \$265.50.

We showed in a previous chapter that the item of dead work has increased greatly in the last decade. Officials say that it has increased over 30 per cent. To counteract that increase in the cost of production, the income from washeries is of considerable importance. And this economic advantage derived from overhauling the old culm banks, is a sure guarantee that all of them will in time disappear.

CHAPTER XII.

REFLECTIONS.

1. THE CAPITALISTIC SYSTEM. 2. FACTS THAT LABOR OUGHT TO KNOW.
 3. POSSIBLE IMPROVEMENTS BY THE SYNDICATE. 4. THE CONDITIONS OF PEACE AND PROSPERITY TO CAPITAL.
-

At the close of our study of the anthracite coal industry, reflection on the problems involved has led to certain conclusions regarding the system under which production is carried on, as well as the obligations imposed upon labor and capital in their industrial relations. These reflections form the present chapter.

The French triad, "liberty, equality and fraternity," has entered into the fiber of modern civilization, and is the watchword of social reformers. The practical common sense of Anglo-Saxons has not been hypnotized by the loud-sounding triad. Some have gone so far as to call it the "dry rot" of modern civilization. Be that as it may, we know that the public conscience of the Anglo-Saxon nations lays greater stress on truth, sympathy and justice, than upon "liberty, equality and fraternity." The old Puritan characteristics of seeking the truth, practising sympathy and enforcing justice, are not extinct. Our surest hope of reform of existing abuses is in the strong and active conscience of the leaders of men.

The richest inheritance bequeathed us by our fathers is a conscience trained to duty and to right, and its efficiency in regulating the industrial relations of life is more potent than all police regulations.

There is every reason to believe that the public conscience of this present age is more influential in modifying public and private life than ever before in the history of the world. Pub-

licity is fast becoming the watchword of industrial reformers. The press is ever alert and daily passes judgment on national and local undertakings, while students and teachers everywhere voice the demands of public conscience, and speed on the reign of righteousness among men.

THE CAPITALISTIC SYSTEM.

Many wise and thoughtful men pass a condemnatory judgment on some of the results wrought by the capitalistic system. The basis of their judgment is *a priori* reasoning. They have neither the time nor the inclination to investigate into the historical development of industry, and trace the foundations upon which rests our economic life. Were they to do this, their views would be less radical, their opinions more tempered with reason, and their judgments more just.

Industrial history at every stage reflects the moral relations of the age. The public conscience acts upon industrial life and is in turn acted upon by it. This process of action and reaction is the method of development of commercial ethics and public conscience. Both are a growth and represent the cumulative effects of centuries of civilization. At all stages there have existed ideal industrial relations which the actual are ever pursuing, but never reaching. This fact is represented by the relation between public opinion and legal enactments—the one ever keeps in advance of the other. Laws passed for the modification of the economic environment are only reflections of matured opinions, which have gradually come to the crystallized stage by the action of an enlightened moral sentiment. Before positive law declares what is right and just, the concepts for years and perhaps for centuries floated in the air. One of the distinctive characteristics of genius is that it grasps these nebulous concepts and interprets them to the people of its time. It gives expression to what others have been dreaming about, but which, up to that hour, none could propound. These ideas of right and wrong, when once they become articulate, find their way into the laws of nations and become a part of their industrial life.

When this historical view of the relation of economic life and moral sentiment is taken, a more temperate, sympathetic and sane judgment of existing industrial conditions is attained. The capitalistic system is a growth. It is a development. It has constantly been modified by the demands of justice and sympathy. This modification is still going on, and this method of reform and progress which our fathers trod, is the sphere of activity for moralists and economists now-a-days. The duty imposed upon those who would lead has been well expressed by President Hadley, when speaking of measuring the aggregate merit of the total system of industrial life. He says: "The economist with his scientific knowledge should undertake to realize the very highest ideals as a scientific man who stands above the clouds of prejudice and therefore sees farther than those about him; it is his high mission to be the representative and the champion of the permanent interests of the whole community in the face of conflicting claims from representatives of temporary or partial ones."

The capitalistic system is the one established among all the civilized nations of the world, and is the highest product of our civilization. We are to judge it by its results. It is part and parcel of our institutions and its influence pervades every phase of life. It is not the only one known to man. It has been preceded by the domestic and the feudal systems, and it may be succeeded by others, but as long as it is the prevailing one, industrial relations must be judged by it.

The leading indictment brought against the capitalistic system by social reformers is, the great inequalities in the distribution of wealth which take place under it. While many are struggling hard to keep the wolf from the door, the Standard Oil Company has, since the autumn of 1895, disbursed to its stockholders more than twice its capital stock. It has paid 40 per cent. dividends annually. When miners work in the coal fields for an average of \$35.00 a month, J. P. Morgan, the banker, made, by one deal in anthracite coal property, the sum of \$2,300,000. The total wages paid the 140,000 anthracite employes for two weeks' work will only exceed that sum by a

few thousand. And yet, under the capitalistic system, both the above transactions are legal. When the courts of New York were asked to issue an injunction to stop the consummation of Mr. Morgan's deal, they refused to do so. He only made 9 per cent. on the transaction, and very few merchants will be found who conduct business on so close a margin. There are scores of miners who have realized 40 per cent. profit on an investment in real estate. The only difference between these men and the large corporations is that of quantity and not of quality. In the one case, the business means a few hundred or thousand; in the other it amounts to millions. The principle upon which they rest is the very same, and if we condemn the one, we must condemn the other. Judged by our system, there is no escape from the conclusion that in an open transaction between two parties, the man who reaps the golden harvest by superior genius is not guilty of moral misconduct.

Socialists of various shades of belief say the capitalistic system should be changed. A system under which such inequalities exist is intrinsically wrong. Many sober men have arrived at that conclusion, but have no suggestion to offer as to how the change can be effected. France tried to change it in a day, and after a sacrifice of blood and wealth which appalled the civilized world, returned to the same system as the people tried to overthrow. The change must come by way of evolution and not by revolution, and that process is now going on. Germany modifies the distribution of wealth by an elaborate system of insurance imposed upon the people by imperial power. England and the United States would not tolerate such an iron-clad system, but they have placed checks upon capitalists in the form of legislative restrictions, which diminish their net returns. The difficulty of the problem lies in devising means which will effect a more equitable distribution of the national dividend, and at the same time not diminish the total amount of productive wealth. Every observer knows that the wealth of the world has increased more rapidly under the capitalistic system than under any other. By its impulse, the command to subdue the earth has been obeyed more thoroughly

than ever in the history of man. It involves hardship, but whether the sum total of hardships is greater than under former systems, is very doubtful. Progress can only be achieved by toil and suffering. It is comparatively easy to make a catalogue of our hardships under existing industrial conditions for the data are at hand, but no estimate is possible of the aggregate suffering of humanity under former systems. We may get a glimpse at them by terrible famines and pestilences that scourge the land, which to-day, thanks to the progress of the arts and sciences under the capitalistic system, are unknown.

Suppose we throw this system overboard, what shall we substitute in its place? Shall we say socialism, and turn over all productive agencies to the State? Then we can be assured that our captains of industry will be there. Mark Hanna is on top in affairs of State as well as in industry. Brain and not brawn rules the world, and under any system the strong man will come to the front and rule. The only effective way to get rid of him is that of Marat, whose maddening cry "equality" sacrificed some of the brightest intellects of France on the guillotine.

The words of Professor J. B. Clarke, spoken recently before the Nineteenth Century Club of New York, are worthy of consideration. "The socialistic programme does not adequately provide for the increase of wealth. Great profits come from improvements and a machine lives to good old age, that remains in a factory to-day till it is worn out. As between a stationary paradise and a progressive purgatory, I think that purgatory has the better of it. We must judge a system by its fruit, and the fact is that the more wealth there is in the aggregate the better is the workingman off. The number of millionaires does not concern the workman; what does concern him is that the wealth is drawn out of present non-existence and is not stolen." If we turn to communism and make all wealth the common property of all regardless of their contribution to the social organism, we immediately take away the stimulus to production and saving, and soon the sources of national wealth will dry up. The other remedy proposed is

anarchy, which means the tearing down of the social fabric which has been laboriously built up by the labor of a hundred generations. The Anglo-Saxon mind is intensely practical and temperate and none of the above remedies will be adopted. The capitalistic system is in our present stage of development necessary to national prosperity. What we need is to put bit and bridle upon these magnificent combinations of wealth which are a tribute to the organizing genius of our nation, and make them of the greatest possible service while not impeding their progress. To do that requires time and patience, but the tentative efforts made by the legislative bodies of the Anglo-Saxon nations, show that the tendency of the times is in that direction.

Legislation has done much to modify economic environment and make the life of producers safer and more sanitary. It is undoubtedly possible to regulate the vast aggregation of capital in few hands so as to make it less menacing to the public weal. This is possible, because a large part of our social and industrial life is the artificial creation of man. The advantages enjoyed by the civilized, over those of the savage, lie chiefly in the environment. Our children in their games and in the schools, on the streets and in the homes, come daily in contact with the results of thousands of years of civilization and in this way they are largely prepared, by unconscious efforts, to take their place in the social and industrial life of the nation. The differences found in the various classes of society, are due more to the difference in their environments than to anything else. This idea accounts for the movement of recent times to bring the privileges of our public school education within reach of all children regardless of rank or condition. A similar process goes on in leveling up and down the economic conditions of industrial life. The factory laws, mining acts, employers' liability bills, interstate commerce acts, etc., all have but one aim, and that is to modify the conditions under which production goes on. There are natural forces which set limits to the combinations of capital and labor, but as we modify natural agencies, so also can we modify the effects of economic laws by wise and benignant statutes, education, and public sentiment.

FACTS WHICH LABOR OUGHT TO KNOW.

Organized labor can do much to ameliorate present conditions, but there are some things it cannot do. It cannot find a paradise, where all the necessaries of life will be supplied without work. Laborers must bravely and frankly admit the patent fact, that wealth cannot be produced save by hard and constant toil. Cutting coal will always be dirty, disagreeable and dangerous work, and those engaged in it will have to eke out their living under these hard conditions. "In the sweat of thy face shalt thou eat bread" is the universal experience of man.

There is no boundless store of wealth to be drawn from save that produced by the labor of our hands. Nature does not spread a bountiful table before the children of men, leaving them nothing to do but to sit at the feast. All such ideas are false to experience and history. The bread we eat, the clothes we wear, the houses which shelter us, and the enjoyments of life are all paid for in hard toil. They come by subduing the earth. The raw material of the earth can only be converted to articles useful to man by hardship and exertion. And the lot assigned to the vast majority of the children of men by Divine Providence is hard work.

If this be acknowledged, the miner will perceive that he cannot expect full pay and half work. The man who shirks his part of the load increases the part carried by his neighbors. Whoever leads an idle life increases the burden borne by the thrifty. There is an influential circle of wise and thoughtful men who cherish a serious objection to unionism because it tends to discourage productive efficiency. There are unions which are wholly free from such a charge. They have studiously aimed at raising the moral and industrial standard of their members, and the intelligence and strength of the men prove that they have succeeded. But this cannot be said of all combinations of labor. There are those who seek their interests, not in doing as much as possible, but as little as possible. The capitalist is regarded as an antagonist, with whom a hard bargain is to be driven, whereby the

largest possible quantity of wealth is to be taken from his store, and the least possible given in return. Some, indeed, think it no robbery to take wages from corporations without an equivalent return in labor. How many so called "good men" try to "beat" the boss? None knows better than the honest workman how many despicable schemes there are of wasting time, and a large class thinks it no wrong. These men don't even live up to the sentiment of the old English song

"Eight hours work, eight hours play,
Eight hours sleep, and eight shillings a day."

To shirk or skimp work, to drive a hard bargain with capital, is to antagonize the consumer, and short services given to him will react on both capital and labor. Labor leaders have a grave responsibility in this regard. To delineate Utopias and to persuade laborers that all can live in ease and comfort with little work, is to feed the people on wind. Their effort should be to increase the moral and industrial character of their followers, and thus increase their industrial efficiency. They then will build wisely and on a sure foundation; for they serve the public good. But if, on the other hand, they cultivate a disposition to rely upon the union to drive a hard bargain with capital, and forget to cultivate the old virtues of frugality, temperance, integrity and strength, the labor of their hands will not be established, and they will inevitably forfeit the possibilities of good contained in unionism.

Labor, in order to wisely defend its rights and preserve them, must have regard for the laws governing the industrial world, and which set limits to the activities of men. Every thoughtful observer intimate with the laboring classes is made to feel that many erroneous views on economics prevail among them. Arnold Toynbee, to whom "economic problems were pregnated with the fates of the suffering toilers whom he knew so well," felt that the centers of industry should be reached by the intellect of the universities, and that by inspiring and instructive lectures, the working classes should be taught the principles of Political Economy, that they may turn them to

good account. This line of work has been introduced and is effective in brushing away the cobwebs woven by shallow reformers and demagogues. It needs to be more intensively propagated. If the labor organizations were to open their doors for discussions of this nature, profit must necessarily accrue to them and to society. Wise and far-sighted leaders in unionism would strengthen their cause by favoring such discussions, which would widen the horizon of the labor world and quicken its intellect. Much time and strength in local unions is now consumed in petty details, trivial disputes and useless discussions. Better use could be made of this store of energy by the discussion of Economics on their social side, which are of vital concern to the working classes. Whatever permanent good we attain must comprise internal as well as external elements. It is good to change the environment, but it is better to change the man.

All the agitators in the anthracite coal fields, without a single exception, spoke of the wrongs of the system of production, but none of them spoke of the deeper wrongs in the production of the genus homo in mining communities. It was a favorite theme of theirs to dwell on the wife and the family, but they never touched upon the question of the relation of large families to the social and industrial welfare of the working classes. The procreative energy of the mining classes was often the subject of rude jest, but none touched on the influence of surplus labor on the rate of wages. The standard of living was depicted as miserable and mean, and wholly due to the low wages the men earned, when intelligent workmen knew well that some of the best kept homes had the smallest income, while some of the most slovenly and miserable received the highest. Professor Sumner, of Yale University, says no law is more clearly taught by the history of human progress than that "the number of men and the quality of men limit each other." This great law operates at every stage of the world's history. It is seen in the savage, barbaric, pastoral, agricultural, as well as in the industrial stage. If the people consume their strength in numbers, then conflict, hardship, suffering and death is the

result sooner or later, accompanied with a deterioration of the species. The quantity of human energy is limited, just the same as all other force is, and it is a question of great importance to all, whether we consume our strength in numbers, or reserve a part to improve the quality of the stock. Which is the better, to get more men or better men? That question has been long discussed by philosophers; the working classes of mining communities need to discuss it, for it is of far graver consequence to them than it ever can be to philosophers. J. S. Mill said that the man who begets children without adequate means to properly provide for their needs, was as great a curse to society as the drunkard.

Another fact which must be acknowledged is, that improved social conditions will not necessarily lead to paradise. Good homes, good clothes, abundance of good things and plenty of amusement will not bring the millennium. Let the wages of men be increased ever so much, that will not of itself bring an ideal social condition. Increased comfort may work in two ways: it may bring improvement or deterioration. The bountiful bread-tree which furnished the Samoan islander abundant provision without work, has not made him the leader in the civilization of the world. Something more than bread and good cheer is needed to improve society.

There is an ethical factor in the computation which cannot be left out. Industrial independence without moral freedom may be the beginning of a great tragedy. The old Workingmen's Benevolent Association was able to raise wages, but that did not save it from destruction. Indeed, the years of prosperity were the years of disintegration and the rocks upon which it was wrecked were moral and not material. Greed, distrust, arrogance, treachery, extravagance and lawlessness came in, and no combination of men can hold together long when these disruptive forces enter. The same is true also of the effort of unionism in 1884-1888. If unionism in the anthracite coal fields teaches one lesson more clearly than any other, it is that greater attention must be given to improve man as well as raise the rate of wages. The amelioration of the working classes must

stand on two feet, the economical and the ethical. Use both and there is progress which is sure and permanent. Stand on the economic only and whatever material improvement is secured will only be temporary and ephemeral.

The task of leading men to a true appreciation of the qualities of temperance, moral and intellectual improvement, is difficult and requires courage and perseverance. Men more readily appreciate a dollar's advance in wages than the value of thrift and industry, intelligence and integrity, and yet in the business of life, the latter qualities are beyond price. Men need education to set the right value on moral good. In the work of controlling and subduing the forces of nature, more and more emphasis is placed on the old qualities of honesty, truthfulness and temperance. In the progress of industry, when large aggregations of men are needed to conduct business, to what ingenious devices men resort to guard against theft and fraud! And what a comment is all this upon the moral fiber of humanity engaged in trade! There is abundant wealth in the world, but there is a scarcity of honest, reliable and trustworthy men to handle it. Labor organizations will be benefited when these intangible qualities shall occupy a prominent place in their program. The fabric of the institution must be built of moral elements if it is to stand the test of conflict and the trials of time.

Labor also will do well to duly appreciate and honor its captains of industry. They are men worthy of admiration and praise. No machine can ever be invented to take their place. The able man in every crisis is relied upon; he is the leader and others find their safety and profit in following him. That is the meaning of king. We have them to-day in every department of human activity, and by the law of natural selection they rule. Many imagine that wealth and ability do not go together. Their observation is superficial. Two sets of forces are at work, the one increasing the capital at the command of the able man, and the other destroying the capital that is in the hands of the weaker man, bringing about the result that there is a far closer correspondence between the ability of business

men and the size of the business which they own, than at first sight would appear probable. You cannot get industrial skill and ability without the broad faculties of promptness, judgment, resource, and steadiness of purpose accompanying them. These powers command a high price because they are rare. You can get many to direct profitably the labor of ten men, but very few are they who can do so with ten thousand men. Great captains of industry are as rare as great generals. Society profits by the work of intellectual giants, who conduct great enterprises, augment industrial efficiency, and increase the national dividend.

Never in the history of the world have such bold schemes of commerce, industry, and finance been launched upon the tides of life, as by the master minds of our country. Their reward is great, but it comes to them because of the public demand for their service. It is the tribute paid to ability. These men by telephone and telegraph have moored the continents of the earth side by side. Famine and pestilence are unknown among us, but less than a century ago these terrible scourges were a constant dread to the leading nations of the world. We have conquered them because the organizing genius of the last century spanned the continent with bars of steel, bound the ends of the earth with threads of copper, and made the lightning flash its speaking trumpet. Could the anthracite coal fields have been developed without the energy, the pluck and industry of the pioneers who developed the veins, financiered the railroad systems and canals, and opened up the markets for the production of the collieries? The picturesque figure of old Col. Shoemaker, who, hauling coal over a hundred miles to Philadelphia and giving most of it away, beats a hasty retreat pursued by a writ charging him with being a knave and a scoundrel for having palmed "rocks" on the good Quaker people for coals—that is representative of the courage, perseverance and hardship of these pioneers in the anthracite industry. Suppose the entrepreneurs of the coal industry of to-day were removed, how much would the 140,000 employes be able to do? In the evolution of industry we learn after many costly experiences, that

great industries cannot be managed by boards and committees. If they are to be successful, they must be put under one head—a master mind. The same is true everywhere, and this important fact accounts in large part for the growth of trusts, combinations, syndicates, etc. All honor then to the strong man—the man of brains who engineers and supervises large industries. He renders invaluable service to society, and his name is a tower of strength in the financial world.

Labor should also preserve its union, for it needs the advantages and benefits derived from organization. The laws which govern the economic world are the same in character as those of the natural—they wholly disregard the claims of morality. Competition, supply and demand, diminishing returns, etc., do not in themselves ask what is the physical and moral character of those under their influence. Under competition, the higher nature of man is ever liable to fall below the standard set by public opinion, and the men who preserve their integrity under the stress of business life, have achieved a triumph in moral discipline which seldom comes to those in the ordinary walks of life. The conditions of the game in which capital and labor are engaged are often hard and exacting, but they are the only means by which success is possible. The attempts made to couple philanthropy with business have not been encouraging. Under very favorable conditions it has been done, but most of the experiments were wrecked by the action of economic forces. In the domestic system, when the producers were a part of the family of the employer, considerations of sympathy and fellowship largely entered into business. To-day, when vast accumulations of wealth are under the control of one mind, and international lines are disregarded in industrial combinations, the capitalist does not exercise the paternal care that he formerly did. We may regret this, but it is the necessary result of industrial progress and personal freedom. Under slavery and serfdom, medicine, food, shelter and clothing were assured the slaves and serfs; to-day, men get their wages and satisfy their own wants. Our system may involve many in greater hardships than the former, but no one

will assert that it is not an advancement. It seems to be a law that increased productive efficiency under monopolies limits considerations of sympathy between capital and labor. Hence we find that monopoly will not generally yield its pound of flesh unless pressure is brought to bear upon it; and what good labor combinations can accomplish is to enforce monopoly to yield what public justice demands. This the miners tried to do in a bungling way by the Workingmen's Benevolent Association. Wages were raised when pressure was brought to bear upon the operators. Laws for the safety of life and limb were enacted when combined labor presented its claim. The company store and petty tyrannies went to hiding when labor presented a solid front. There are many good and upright men among the operators and capitalists, but somehow—possibly because of the inherent frailties of human nature—they do not generally concede to labor its rights, unless a well-regulated machine stimulates their moral sluggishness. Indeed, we may conceive of circumstances under which men of unquestioned integrity may not be able to execute the dictates of their moral nature. They have to compete with unscrupulous men, who cherish no regard for industrial honor or moral sentiment, and thus may be compelled to lower the rate of wages or change the conditions if they stay in the business. Unionism is the force necessary to bring up these moral stragglers into line, and impose upon them conditions which the best men in the trade desire perpetuated.

Professor A. Marshall, of Oxford, England, admirably sets forth this point by delineating the unfair master, who "endeavors to make his profits not so much by able and energetic management of his business as by paying for labor at a lower rate than his competitors—he screws a little here and a little there—and makes it more difficult for other employers in the same trade to go on paying straightforwardly and full rates. It is this unfairness of bad masters which makes trade unions necessary and gives them their chief force."

We heard many of the labor leaders in the course of their addresses say that labor had the right to strike, that it was its

implement of war and should not be given up. They were undoubtedly right. A strike is resort to industrial warfare, which is full of suffering and loss, but there are circumstances under which no other remedy is left for existing evils. We know not what the future may contain; let us hope that a day will dawn when there will be no war of any kind; but human nature being what it is, and industrial conditions as they are at present, there is very little hope of ridding ourselves of an occasional resort to industrial conflict in order to rectify prevailing abuses.

Human nature must be radically changed before industrial war will cease. Strikes then will have their place in the program of labor organizations, but they should not find room in the first or second part of it. They serve their purpose best as a potential force in the background. The capitalists should know that the weapon is in the arsenal of labor, and can be brought to play with terrific effect in case of emergency, but that in the foreground it puts boards of conciliation and arbitration. Labor organizations cannot afford to give their members and the public the impression that the prime object of their existence is to precipitate a strike. Combinations of either capital or labor which exist for war or pillage have not succeeded. Monopolies which have selfishness as their foundation and greed as their walls, must fail. Economic laws and moral sentiments wage war against them, and there is but one result to the conflict. The conditions of life are public service. This is the condition of perpetuation to the United Mine Workers. They cannot put monopoly prices on labor in and around the mines. To attempt to do it would be a serious mistake. The scheme must fail, for economic laws are against them. If they succeed to-day, to-morrow they must pay the penalty. The old guild systems tried to maintain a labor monopoly and failed, although they had many legislative and traditional advantages which modern labor does not possess. As monopolies they refused to serve the public and they were swept away by forces they were helpless to resist. The sugar and copper syndicates of modern times are notorious examples

of failures on the capitalistic side, due to the same cause. There is no other outcome for monopolies which disregard economic laws and violate the dictates of commercial ethics.

If labor combinations are to succeed they must learn lessons from past experience. There was one excellent feature in the old Workingmen's Benevolent Association which is wholly wanting in the present labor organization. It had a good scheme of insurance against accident, sickness and death. One of its avowed objects was to care for the fatherless and widow, and see that none of its members, or any dependent upon them, should suffer the want of any good thing while incapacitated from either sickness or accident.

Expenditures for accident and sickness occupy a prominent place in the financial records of the successful trades unions now-a-days.

This is wise and could be well adopted by the United Mine Workers. There are some excellent insurance schemes now in operation in the anthracite coal fields which we shall speak of in the second part of our study, but these are not general throughout the collieries. The union could, by a little effort, secure the general adoption of the best of these. The organizers believe that the dues of members should be collected through the office of the several mining companies; if an insurance feature were introduced this could be more easily done. Unionism would be strengthened by the insurance feature; it would add to the sense of responsibility of employes, furnish a bond of union that intensifies the elements of sympathy and fraternity, and divert attention from conflict about the rate of wages.

The union will have to guard against foes from without and enemies from within. The operators do not want labor combinations, and one of the ways whereby they defeat them is to enlist on their side some of the leaders by flattering offers. Politicians are generally fervent admirers of combinations of labor, and so are buzzards of carrion. There were many political aspirants in the ranks of labor when unionism was in its glory in 1848-1860, 1868-1875 and 1886-1888. The same will undoubtedly be true of the United Mine Workers, and to steer

clear of political reefs will require careful management. The union will doubtless invoke the aid of the Legislature to render more effective its principles, and there will be no dearth of candidates to serve its purpose.* We saw that legislative enactments have brought about both good and bad results. Laws are two-edged swords ; they often cut in a way never anticipated by those who originated them. Some acts have brought far greater injury than benefit to miners. Laws require great skill in framing, and when the keenest intellects have drafted them, it is possible, as an eminent English statesman once said, to drive a coach and pair through them.

Healthy public sentiment and a well-organized combination will be a far better bulwark against the encroachments of capital than any law passed at Harrisburg. Something more than acts of legislature is necessary to secure the rights of mine employes. Before legislative codes can be enforced, there must be an active public conscience behind them. The United Mine Workers, then, must never relax their vigilance and fall into a disorganized condition, thinking that the machinery of State set in motion by them will care for their interests. Men too often make too much of machinery and believe that they can be saved by institutions rather than by character, and the only safe way for the present labor organization to guard against dangers from without and within is, by creating a public spirit which will shape its course on the basis of conviction that is in harmony with natural ethics.

POSSIBLE IMPROVEMENTS BY THE SYNDICATE.

We can confidently look forward to the introduction of many reforms by the Syndicate which now virtually controls the anthracite coal industry of northeastern Pennsylvania. This great combination of capitalists will undoubtedly introduce many improvements which will result in better industrial conditions for the mine workers, and a more profitable use of the capital invested in the industry.

* In the last session of the Legislature of Pennsylvania, the United Mine Workers had seven bills which they desired enacted. Three of the seven passed the House and Senate and will become laws on January 1, 1902.

The Anthracite Syndicate will enforce stricter discipline. When we read the following words in the last report of the Chief Inspector of the Bureau of Mines: "It is the opinion of the mine inspectors, in which I concur, that from 50 to 75 per cent. of the accidents are due to the carelessness of the victims themselves," it needs no expert knowledge of the conditions of anthracite mining to see that there is gross neglect of discipline in the management of many of these collieries, which is partly responsible for this lamentable carelessness in providing adequate means for the safety of life and limb. This conviction is confirmed by the fact that the inspectors have constantly to insist upon the observance of mining laws and regulations, which are either neglected or violated by many individual and corporate operators. All operators are not equally culpable in this regard. It is the experience of mine inspectors and other persons familiar with the operation of anthracite collieries, that corporations observe the State laws for the regulation of the mining industry far better than individual operators. The reason for this is apparent. Strict discipline is essential to the very existence of a corporation. These large aggregations of capital take upon themselves the character of an army, where discipline is carried to its highest perfection. The present Syndicate in amount of wealth and control of territory far exceeds any corporation formerly organized in the anthracite industry, and we can safely predict that the discipline which it will introduce into its mines will be more perfect than anything thus far seen in the collieries. Can we not hopefully look forward to a reduction in the number of accidents from such an improvement? Legislative enactments have had very little effect in this respect. We look with greater confidence to the introduction of better discipline by the syndicate which may prove an effective means of reducing the annual waste in flesh and blood in this industry.

The Syndicate will also introduce improved methods in the art of mining. It will be able to command the best engineering talent in the country. Whatever schemes the ingenuity of these scientifically trained men may suggest in order to reduce

the cost of production, the necessary capital will be at hand to carry into operation. Great improvements have been effected in the last decade in mechanical appliances in and around the breaker. Labor-saving machinery has been introduced, which not only dispenses with a large number of employes, but also does the work better than the human machine. These improvements have been most realized in breakers operated by the large corporations. They have the highest mechanical skill in their employ, as well as the necessary capital to realize the inventions. There is no doubt but that great improvements can also be introduced underground. The art of mining has not been perfected by any means. The skill of mining engineers has not been exhausted. In the last decade more attention has been given to perfecting machinery on the surface than underground. There are at present signs of a change of policy. More attention is given to improvement in the art of mining, and there is reason to believe that this will be the line of operation of the men in control of the syndicate collieries. Some far-sighted and enterprising superintendents in charge of collieries predict a complete revolution in the art of mining in the next decade. These men are not given to dreams. They are wide-awake and practical men, and their predictions are based on practicable schemes which only lack the necessary amount of capital to put them in operation. This deficiency the Syndicate will supply. No scheme that has in it the promise of increased returns will fall to the ground for lack of capital when once the Anthracite Syndicate is in full control. Improvements are now under way in some collieries, which, when perfected, will do away with nearly all the mules and the drivers underground. This may be regarded as a prophecy of the future. With compressed air, electricity and increased engineering skill, great progress can be expected in the art of mining in the near future.

Better administration will also be introduced. Our study has shown what great waste in money and energy took place in the anthracite industry when conflict of interests prevailed. The competition of the Schuylkill operators and those of the Wyoming Valley in the sixties was the ruin of scores of capi-

talists. Last year the individual operators of Lackawanna and Luzerne counties formed an association for the purpose of constructing a railroad from the Wyoming Valley to tide-water. Their purpose was only abandoned when the controlling mind of the Syndicate successfully brought about a compromise, by advancing the prices paid for coal at the individual collieries 5 per cent. This one act of far-sighted policy saved to society a needless expenditure of between \$6,000,000 and \$7,000,000. The conflict of interests in any industry means waste of mind and money. It engenders friction, which retards motion and defeats success. Professor W. G. Sumner, after a life-long study of ancient, mediæval and modern society in its economic, political and social activity, says: "Every prosperous institution must embrace interests that are reduced to harmony; if not there will be unrest, agitation and change until harmony is reached; but while there is agitation in the institution its successful operation is hindered." This law the capitalist in the anthracite coal industry is learning after a century of costly experience, accompanied by untold suffering and loss. The Syndicate is bent on harmonizing the interests of capitalists by placing one master mind in control. Affairs will be so administered that an annual saving will be effected in supplies, in clerical work, in railroad transportation and at the terminals. We believe it will also attempt to harmonize the interests of laborers, and it can be done providing the workmen will be amenable to the dictates of reason. Concession and conciliation in both capitalists and laborers are favorable to harmony of interests. When both parties to the game understand that the success of the one is the success of the other, prosperity will follow. The words of Bastiat spoken to French workmen the first half of the last century are still appropriate to the men of to-day. He said: "Men of toil . . . the progress of man is unequal indeed . . . [but] no step of progress, even though prompted by the conscious striving for property, but it is a step of progress for you. No wealth is created which does not tend to enrich you, no property is acquired which does not tend to enlarge your own liberties. For the

order of things is so arranged that no man can work honestly for himself without at the same time working for all."

The Syndicate will also either abolish or improve the company store. The abuses which have clustered around this institution as conducted by individual operators have produced in the hearts of workingmen uncompromising hostility to it. The cry of most employes under the system has been and still is, "Abolish the company store." Yet this persistent opposition should not blind us to the fact that a syndicate could take hold of the institution and make it a benefit and an accommodation to the men. There are throughout the anthracite coal fields scores of buildings admirably constructed and well equipped for the purpose of conducting a store of general merchandise. If the Syndicate abolishes the company store these buildings and furnishings will be little better than useless. Why could not these appliances be turned into good use by conducting therein a general merchandise business wholly separated from the mining industry? One thing is certain, namely, that under Syndicate control favoritism in the mines will not be tolerated. The men who showed favor to those dealing in the company stores possessed souls singed by greed and scorched by avarice. It was a mean and sordid business and a constant source of irritation to the thrifty employe. The Syndicate will not stoop to such a despicable scheme to reap profits. The men in it are above such picayune devices. If it entered this line of business the stores would be conducted on strictly business principles. It could make money and at the same time offer the workingmen a greater variety and better assortment of commodities than they could otherwise get in small mining towns. The Syndicate would have many advantages in buying. The quantities it would purchase could be secured by its agents at lower figures than individual storekeepers could ever get. This would enable its salesmen to sell at lower prices than its competitors and virtually command all the trade. The Cross Creek Coal Company has conducted stores which are wholly separated from the mines. The company pays its employes in money and the men are at liberty to trade where they will.

These stores under such conditions do a large volume of business. The Syndicate could do the same. Stores conducted in this manner would be wholly different from the "pluck-me" store and others of the same type described in a former chapter. The objectionable features there specified would be wholly eliminated and the institution placed on a basis of public utility.

THE CONDITIONS OF PEACE AND PROSPERITY TO CAPITAL.

Capital should concede the demands of labor for boards of conciliation, before which disputes can be discussed and, for the greatest part, amicably settled. This method of free discussion, by bringing employer and employed face to face, has worked satisfactorily to both parties in the bituminous coal fields, and it is the system which has long prevailed in the mining industry of Great Britain. L. L. Price has described its operation in Durham and Northumberland, England, in his book on "Industrial Peace."

A committee of twelve men meet, six representing the Miners' Association and six the Coal-owners' Association, and both bodies annually choose the chairman. "All disputes arising at particular collieries between masters and men, which are laid before the committee, may be settled by its own decision or referred to arbitration, and should the arbitrators disagree about the appointment of an umpire, the selection is to be made by the judge of the Durham County Court." Over 2,000 cases came before this committee in four years and less than 7 per cent. of them were referred to arbitration.

This plan has many advantages. Labor feels that it is something more than a commodity, that it is a partner in the work of production. Its sense of responsibility increases when it freely discusses the conditions under which labor and capital will cooperate for another year in the work of production. Each one tries to put himself in the other's place and regulate its own demands according as they appear reasonable from the other side. It is not to be supposed, however, that all the meetings of the board are peaceful. Sometimes it meets in

anger and discussion is useless. With all the machinery of conciliation and arbitration an occasional appeal to strikes has not been avoided. But they are far less frequent than they were, for the committee affords an opportunity for explanation, so that misunderstandings may be removed and mutual concessions made. One significant fact in the scheme is that generally the men trust their representatives and submit to their decisions. This accustoms the workmen to trust in one another and to know each other, to cooperate and discuss under competent guides questions of wide and far-seeing policy.

It has benefits to the employers also. It helps them to look at the human side of the business of mining, and see how an insignificant move on their part may affect hundreds of families. They are shown how capital can expand and enrich life, or contract and sour it. Their notions of justice are broadened, and nothing tends to bring home to them in a more direct manner the responsibility of wealth, than to meet labor and learn its needs.

The Anthracite Coal Syndicate may also profit by past experience. Greed has wrecked former attempts at combination and the present one can only thrive by public service. The public conscience measures all things by their utility and the law of usefulness is the law of life. The Syndicate may be well organized, it may command the best financial skill and have abundant resources to draw from, but these will not save it from failure if the quality of public service does not characterize its activity. Unionism owes essential duties to the consumer and capitalist and those of the Syndicate to consumer and laborer are not less imperative. We have heard some operators say "business is business," meaning thereby that moral sentiment has no place in the game. There is no more dangerous fallacy conceivable. The threads which hold together the business world are interwoven with the principles of morality. There are principles of sympathy and justice, of humanity and equity, which no operator who looks for success can disregard. Temporary success may be achieved, but it is only apparent. Wrongs accumulate against the day of wrath and indignation

and the unjust operator pays a terrible price for his forgetfulness. It is a sad sight to see able men fleeing from their comfortable homes to hide in old workings in the bowels of the earth and spend the night there, hiding in fear and trembling from the storm of anger arising from outraged labor which has long suffered in patience and silence. The arson and violence of 1860-1876 are frequently referred to as dastardly deeds of workmen; breakers were burned and men were beaten and slain in cold blood; it was a reign of terror in many sections of the anthracite coal fields. These deeds of bloodshed and arson have been recorded in many books, but we have yet to find a single author who honestly tries to analyze the causes which led to these outrages on society and humanity. Their words imply that a vast body of mine employes in those days were murderers and incendiaries, as if they delighted in devilish pranks from pure malice and envy. That is not the case. Such an idea is false; it is a libel. There were gigantic wrongs in those days. Many operators then furnished arms to their foremen and only wanted men who could use them. Labor was cruelly oppressed and tyrannized and it had no one to defend its cause. The courts forbade combination of labor and prosecuted many of the men who attempted it. When labor in many instances sought relief, it was answered with an oath supplemented by the pointing of a revolver. Under such conditions was it amazing that a secret society was organized to avenge the insults and the gibes to labor? When once they came into existence, the worst men took the lead and arson, assaults, brutality and murder were the fruits. The memory of those dark days is not obliterated and operators should profit by the experience then dearly bought. If truth is crucified, the citadel is doomed. Throw out the considerations of morality from the industrial program and the end is ruin.

The policy of shooting down a few hot-heads will not give arrogant and tyrannical management a clear road. If you do some shooting to-day, it must be repeated to-morrow and firearms are not monopolized by capitalists. The better way is to observe the demands of justice and sympathy, and

the public conscience will secure peace and prosperity. In thousands of homes in the anthracite coal fields there are loving wives and innocent children who are as dear to the mine employes as are those of the employers to them. Capital is under obligations to these dependents, and the prosperity of the anthracite industry is inalienably involved in the faithful discharge of them. Money is power, but character is the ultimate foundation of business, and those who lack it are pushed out by the expulsive power of commercial ethics. It is not lack of material wealth that accounts for the tardiness of Spanish America in commercial development, but it is the presence of cunning and deceit in its trade. What accounts for the success of the Teutonic races in commerce and industry? It is the sterling moral worth, the strong uncompromising sense of justice, the ever-present spirit of fair-play of the people. Fair dealing has been their ship, justice has been their sail, truth has been their helm and honesty their anchor, and the craft has sailed around the world and stood the test of wind and tide for many generations. There is yet remaining in the anthracite coal field sufficient coal for three generations, but the conditions of successful coöperation are more moral than monetary. If the industry is to flourish it must be tempered with morality. Professor Hadley has well said, "The more completely our undertakings, whether private or public, industrial or political, take the character of trusts, the more impossible does it become for those who are placed in authority to represent personal or class interests without gross violation of what we in our everyday life recognize as fundamental dictates of sympathy or of justice."

A trust in itself is not a bad thing. If properly managed, it is a good thing. It can effect economy in production and management and prove beneficial to consumer and producer. President Truesdale, of the Delaware, Lackawanna and Western Railroad, speaking in his annual report for 1900 of the recent Anthracite Coal Syndicate, says: "All would seem to promise future market conditions that amount almost to a guarantee to this company of highly satisfactory results to its stockholders

from both its extensive coal properties and its railroad operations." Any measure which assures better results to capital must also benefit labor, so that trusts are good if they are not abused. Let them share with the producer and the consumer the savings due to economy, and the public will welcome their advent. But if, on the one hand, they sweat labor, and on the other pillage the people, then a wronged and outraged public will effect their destruction.

It has been suggested by some eminent writers that men of ability who distinguish themselves by great achievements are, as a rule, above the average in integrity and moral sensitiveness. When these men achieve success they possess other qualities than pure intellectualism. The sphere of their operations is mankind, and before they can approach it they must possess sympathy and social sensibility. Head and heart must go together, and where they are preëminent and well balanced, so as to give their possessor a place in the van of the industrial world, it is reasonable to suppose that accompanying them is also a sense of justice and sympathy equally preëminent. Of course, it does not follow that the successful financier or operator is more just and moral than men in the ranks of the industrial army, but it does suggest that on *a priori* grounds we can expect to find in the men of brains, who are our captains of industry, a refinement of moral sensibility that is above the average. If this be true, then where this higher sensibility is abused or atrophied, it adds to the responsibility of capitalists. A common laborer, incapable of filling any position save the commonest, lacking education and refinement, whose intellect has never been fully awakened, can be excused if he fails to perceive and feel the immorality of skimping work or idling away time. His education and training are defective and must be supplemented by discipline and supervision. But operators, the wide-awake men, the men of thought and training in the ways of life, cannot claim any such exoneration. They know what the dictates of justice are, and can by instinct tell where the right and wrong of business transactions come in.

This *a priori* argument, which however does not lack historical basis in industrial life, leads us to expect from capital a stronger defense of industrial ethics than from labor, and the need of the hour is for the keen moral insight of capitalists and entrepreneurs to be exercised so that they will deal justly by labor. Flesh and blood is of greater value than silver and gold. Pure women and strong men are more essential for the welfare of the nation than stocks and bonds. A well-developed mind and a sound, healthy heart in the national organism is the most sure foundation for industry and commerce.

The brilliant minds which are at the head of the anthracite industry are patriotic, humane and just. Most of them are far removed from the scene of the industry which yields them profit on their investment, but it would enrich their lives to come into closer touch with the men who dig coal under dangerous and disagreeable conditions. They would be better able to understand their position, sympathize with their difficulties, and intelligently comprehend their requirements. The returns in the coal industry of late years have not been adequate to remunerate the operators or to give the laborers a satisfactory livelihood. Stockholders in anthracite coal mines know this, but the suffering consequent to it among mining employes is not known to them.

Nothing proves more conclusively that anthracite mining has been profitable than the fact that the vast aggregation of capital invested in the industry has been a profitable investment under a system of mining that was extremely expensive. Machinery representing millions of dollars only working two-thirds time is far from reaching its maximum productive capacity. Here is room for the Syndicate to introduce reforms which will yield better returns to capital and a larger annual income to labor. More intensive mining is needed. Fewer collieries and greater regularity of employment is the way of reform. Periodicity is in the nature of the industry, for production depends partly on the seasons. But, in addition to the fluctuations due to the seasons, the greed of rival operators as well as railroad carriers, played an important rôle in intermit-

tent labor in past years. These elements can be eliminated by the Syndicate, which will result in more days' work, and thus increase the annual earnings of the workmen.

In the sociological part of the study we shall have more to say upon the social conditions of mining communities. Here, however, we may say a few words upon the subject relative to the responsibility of those who reap large fortunes from the industry. Mr. Carnegie, by his munificence, deservedly receives the encomiums of a grateful public. His good deeds will not be buried with his bones.

Those who have lived and labored among the mining communities of northeastern Pennsylvania know how much good could be done by a similar generosity in these towns, villages and cities, but the sense of responsibility for such use of wealth is sadly wanting in the men who have grown rich in the industry. Virtually, we can say, nothing has been done to provide for the intellectual and moral training of these thousands. In all these centers of human life, with very rare exceptions, no gift commemorates the name of any of the coal barons. When we think of the deteriorating influences working daily upon the lives of these youths, and actually nothing done to counteract their effects, this gross lack of the sense of responsibility in the use of wealth on the part of anthracite coal millionaires cannot escape censure. We are convinced that no better field for philanthropy is found, and everyone conversant with the situation knows how great the need is. These towns and villages are teeming with children. The prolific Slav is settling down and raising a family, and the high birth-rate characteristic of Austria and Hungary is common in Slav settlements. These children grow up in an environment which is far from favorable to steady and temperate habits, purity of life and intellectual culture. The public school, providing the child is sent there, furnishes a good foundation, but it only goes a little way. The child, raised on a hearth as truly Slav as if it were on the hills of Galicia, enters school at six years of age and is sent to the breaker before he reaches his eleventh year, so that the public school does not go very far. Something

more is needed to carry his education further, and a part of the wealth annually produced in these mines, and going to capitalists, ought to be consecrated to this great need. The moral and intellectual life of these communities ought to be a concern to operators from considerations of patriotism and humanity. Professor Marshall, speaking of degraded labor, says: "The fundamental wrong is in allowing large classes of people to grow up with so poor an education, physical, mental and moral, that they are unfit for intelligent and energetic work, and must crowd into and pull down the wages of the few kinds of work of which they are capable. For this evil, the ultimate remedy is in the higher education of the mass of the people."

The cry against the increase of wealth is largely misinterpreted and misrepresented. There does not seem to be a condemnation of wealth as such, but of the selfish use of it. The public conscience does not so much condemn the millionaire as it does the use of the power at his command. It demands that men of wealth use their means as an instrument for good purpose. The power of money should be devoted to the broadest and highest human utilities. This is the supreme social obligation demanded of justice, required of humanity, and commanded of patriotism. The people protest against selfish individualism which cares nothing to develop social duties and sympathies. Men of wealth, who separate themselves from the social body, and destroy every generous impulse toward the oppressed and lowly, are moral perverts and deservedly fall under public censure. Archbishop Butler felt ashamed of a \$1,000 that laid in his house unused when there was suffering and want in the streets; anthracite coal millionaires also should feel ashamed of their wealth, when the youths of anthracite communities are suffering physically, intellectually and morally for the want of proper and suitable means of culture. Selfishness in high places disturbs the peace of society, and its malevolent influence pervades the lower ranks of life. When disease consumes the vital force of the body, it renders it more susceptible to the influence of destructive forces. It is the same in the social organism. Where a community grows up

in ignorance, there we find bigotry, prejudice, and class-hatred rampant. Demagogism has disturbed the peace of the conservative classes in our country these latter days, and justly so, for in a Republic a tidal wave may lift it to the seat of authority. Communities, left to the degenerating forces of drink and vice, furnish the demagogue the material he desires, and in his hand it becomes a menace to the public weal. There are pathological symptoms of moral degeneracy in anthracite communities, which demand strong and vigorous remedies, and the means to apply the remedies should be supplied by the persons who reap large dividends from anthracite mining.

INDEX.

- A**CCIDENTS, causes of, 161
 classification of, 157
 number of, 152
 psychological effects of, 153
 Air, amount needed, 23, 87
 Airways, dimensions of, 26
 Aleatory element, 8, 43
 Allotment of production, 73
 Allowance, variation in, 115
 cutting down, 115
 Amalgamated Association, 182, 192
 Anthracite, component parts of, 4
 economical value of, 1
 geological formation of, 8
 nature of, 3
 semi-, 4
 Syndicate, benefit of, 128
 Area of coal fields, 5, 6
 Ashburner, C. A., 52
- B**ARN-BOSS, 90
 Bastiat, 247
 Bates Union, 172, 192
 Bidder, G. P., 45, 51
 Blasting, regulations of, 92
 Bob-tail check, 148
 Bore-holes, cost of sinking, 24
 Breaker, improvements in, 217
 Brooks, John Graham, 196
 Brown, Col. D. P., 220
 Bureau of Mines, expenses of, 97
 Butler, Archbishop, 256
- C**AMERON, Senator, 109
 Capital goods, estimate of, 42
 need of, 57
 Capitalistic system, the, 229
 Capitalists, moral sensitiveness of, 253
 Capitalization, transforming power of, 35
 Captains of industry, need of, 239
 Canals, miles of, 63
 Chambers, rate of progress in, 27, 28
 Chance, Dr. H. M., 50, 215, 218, 223
 Cheap labor, importation of, 104
 Children, employment of, 100
 Clark, Prof. J. B., 232
 Coal, amount mined and to be mined, 11
 basins, geological formation of, 8
 inspection of, 94
 land, appreciation of, 37, 40
 Coal land, capital in, 41
 measures, thickness of, 9
 Owners' Association, 249
 size of, 94
 Collective ownership, 13, 14
 Colonists, 37
 Community of interests, 71, 73, 74, 78
 Company houses, 130, 132
 stores, attempts to abolish, 129
 business and profits of, 139, 141
 good and bad of, 145
 number and kind of, 136, 138
 Competition, good and bad of, 46, 69, 78
 Conciliation, need of, 249
 Cost of production, 45, 47, 49, 51, 53
 Coxe, Eckley B., 223
 Crossham, 216
 Culm-bank, amount of coal in, 222, 224
 system of leasing, 225
- D**ELAWARE and Hudson Canal Company, 38, 39, 51, 62, 68
 Delaware, Lackawanna and Western Company, 43, 50, 67, 75, 202
 Dickson, President of Delaware and Hudson, 179
 Diminishing returns, 30, 32
 Discipline, need of, 85
 Distribution, inequality of, 58, 230
 Dockage, 119
 Drilling machines, 32
 Driver-boss, duties of, 90
- E**CONOMIC loss, 168
 Economics and morality, 229
 Economy, increased, 217
 Elwell, Judge, arbitration of, 180
 Employes, coal sold to, 133
 increase and classification of, 106, 107
 personnel of, 103
 Engineering, mining, 85
 Engineers, duties of, 93
 Environment, influence of, 233
 Ethical factor, the, 237
- F**AVORITISM, 123, 150
 Financial Chronicle, 185, 187
 Fire-boss, duties of, 89

- Fixed charges, 33
 Flushing the mines, 219
 Footman, duties of, 93
 Fowler, T. P., 55
- G**ANGWAYS, dimensions and length of, 26, 29
 Garner bill, 97
 Geological structure, influence of, 12
 Gide, Charles, 36, 59
 Gore, the blacksmith, 37
 Gowan compromise, the, 179
 Franklin B., 75
 Griffith, William, 11, 41, 65
- H**ADLEY, President, 230, 252
 Hanna, Mark, 232
 Harris, Joseph S., 11, 44, 70, 201
 Henry, William, 40
- I**NCIDENTAL profits of operators, 129
 Increased profits, 79
 Individual operators, 19
 possession, 12
 Injured, bill for care of, 164
 Inside foremen, duties and qualifications of, 88
 Inspectors, number and qualifications of, 96, 97
 Intermittent labor, causes and effects of, 126, 127
 Improved machinery, 32, 33
 Improvidence, 149
- K**ILLED, average age and nationality of, 169
 expectation of life of, 169
 number of, 159
 Knights of Labor, 182, 192, 200, 203
- L**ABOR, monopoly prices on, 242
 Laborers, no paradise for, 234
 rights of, 210
 wages of, 28, 112
 Lattimore riots, 186
 Laws, violation of, 151
 Legislation and monopoly, 15, 77
 Legislative interference, 59, 79, 95
 Lehigh and Wilkes-Barre Coal Co., 72, 95
 Valley Co., 62, 72
 Living wage, 59
 Local unions, 195
 Long strike, the, 181
 Lytle shaft, 25, 43, 49, 133
- M**AFIA, the, 206
 Marat, 232
 Marginal returns, 31
- Marshall, Prof. A., 241, 256
 Middle Coal Field, area and subdivision of, 6
 Miners' bravery and carelessness of, 153, 154
 duties and qualifications of, 91
 outfit and earnings of, 112, 113
 Miners' Benevolent Association, 174
 Journal, Pottsville, 109, 173, 177, 218
 National organization, 193
 Mining, early days of, 17
 improvements in, 246
 laws regulating, 96, 99
 methods of, 20
 plants, capital in, 44
 Mitchell, John, 184
 M'Leod, A. A., 70, 75, 76
 Mollie Maguire, 71, 193
 Monopoly, a natural, 14
 benefits of, 15
 restraints on, 77
 Moral training, need of, 255
 Morgan, J. P., 41, 66, 76, 230
- N**ARROW WORK, fixing prices for, 27
 Nation, the, 174, 201, 214
 Nicols, William Jasper, 201
 Nobles, David, 38
 Nominal wage, 117
 Non-fatal injuries, number of, 163
 North American Review, 218
 Northern Coal Field, area and coal measures of, 5, 6
- O**PERATORS, hostility of, 202
 rivalries of, 174
 Organizer, address of, 199
 Organizers of U. M. W., 197
 Orphans, number of, 164
 Outside foremen, duties of, 93
- P**EACE, conditions of, 249
 Pennsylvania Coal Co., 39, 41, 47
 74
 Pennsylvania Railroad, 73
 Pillars, robbing, 220
 Powder, increased use of, 118, 135, 136
 price of, 133
 Price, L. L., 249
 Production, regulation of, 69
 Promotion of employes, 166
- R**AILROADS, development and consolidation of, 65, 67
 profits of, 76
 rates of, 34, 55, 75
 Reading Coal and Iron Co., 42, 52, 62, 70, 102, 180, 202

- Reflections, 228
 Right of contract, 13
 Riley, Lewis A., 24
 Rivers in coal fields, 7
 Rosiers, Paul de, 196
 Royalties, 55
- S**CLAVS, number of, 104
 unionism among, 172
 Secretary of Internal Affairs, 103
 Self-help, 60
 Shaffer, Arthur S., 224
 Shafts, depths of, 10, 23
 dimensions of, 24
 cost of sinking, 25
 Shenandoah, 103, 186, 206
 Shift, length of, 122
 Shoemaker, Col., 239
 Slate boss, 91
 Sliding scale, 177
 Slope mining, 22
 Small sizes of coal, use of, 218, 219,
 224
 Smith, A. D. W., 11
 Abijah, 40
 John, 63
 Solidarity of labor, 190
 Southern Coal Field, area and subdivi-
 sion, 6
 Standard Oil Co.,
 State interference, 81
 Steam shovels, 20
 Stearns, J. A., 215
 Strike, the right to, 242
 Strikes, effects of, 188
 estimated cost of, 186
 history of, 172
 Stripping mining, 20, 21
 employes and wages in, 21, 48
 Sumner, Prof. W. G., 236, 247
 Supply and demand, 58
 Surplus labor, 105, 125
 causes of, 106
 Susquehanna, old valley of, 25
 Syndicate, improvements by, 244
 moral demands on, 250
- T**HOMPSON, HEBER S., 218, 224
 Timbering, cost of, 26, 29
 Ton, variation in, 120
 Toynbee, Arnold, 235
 Track, miles of, 29
 Transportation, early means of, 63
 rates of, 74, 76
 Truesdale, President, 252
 Tunnelling, cost of, 63
- U**NIONISM, 192, 205
 effects of, 203
 limits of, 207
 need of, 240
 politics in, 243
 United Mine Workers' Organization,
 195
 acknowledgment of, 124, 193
- V**ENTILATION, 23
 cost of, 29
 methods of, 86
 Veins, exhaustion of the richest, 19
 irregularities of, 10
 Veith, John, 42
 Virtue, Dr., 201
- W**AGES, a uniform basis of, 16
 history of, 108
 present rate of, 111, 126
 variation in, 114
 Waste, 50
 causes of, 213, 215
 Washeries, cost of and returns from,
 225, 226
 number of, 223
 when first erected, 220
 Water-level mining, 18
 Water tanks, 49
 Wealth, wrong use of, 256
 Widows, number of, 164
 Working days, number of, 121
 Workingmen's Benevolent Associa-
 tion, 69, 71, 73, 175, 192, 200, 243
 Wurts, William, 38, 62



ECONOMIC GEOLOGY

OF THE

UNITED STATES

WITH BRIEFER MENTION OF FOREIGN MINERAL PRODUCTS.

BY RALPH STOCKMAN TARR, B.S., F.G.S.A.

SECOND EDITION. REVISED. \$3.50.

COMMENTS.

"I am more than pleased with your new 'Economic Geology of the United States.' An introduction to this subject, fully abreast of its recent progress, and especially adapted to American students and readers, has been a *desideratum*. The book is admirably suited for class use, and I shall adopt it as the text-book for instruction in Economic Geology in Colorado College. It is essentially accurate, while written in a pleasant and popular style, and is one of the few books on practical geology that the general public is sure to pronounce *readable*. The large share of attention given to non-metallic resources is an especially valuable feature."—FRANCIS W. CRAIGIN, *Professor of Geology, Mineralogy, and Palæontology at Colorado College*.

"I have examined Professor R. S. Tarr's 'Economic Geology' with much pleasure. It fills a felt want. It will be found not only very helpful to students and teachers by furnishing the fundamental facts of the science, but it places within easy reach of the business man, the capitalist and the statesman, fresh, reliable, and complete statistics of our national resources. The numerous tables bringing out in an analytic way the comparative resources and productiveness of our country and of different states, are a specially convenient and admirable feature. The work is an interesting demonstration of the great public importance of the science of geology."—JAMES E. TODD, *State Geologist, South Dakota*.

"It is one of those books that is valuable for what it omits, and for the concise method of presenting its data. The American engineer has now the ability to acquire the latest knowledge of the theories, locations, and statistics of the leading American ore bodies at a glance. Were my course one of text-books, I should certainly use it, and I have already called the attention of my students to its value as a book of reference."—EDWARD H. WILLIAMS, *Professor of Mining, Engineering, and Geology at Lehigh University*.

"I have taken time for a careful examination of the work: and it gives me pleasure to say that it is very satisfactory. Regarded simply as a general treatise on Economic Geology, it is a distinct advance on anything that we had before; while in its relation to the Economic deposits of this country it is almost a new creation and certainly supplies a want long and keenly felt by both teachers and general students. Its appearance was most timely in my case, and my class in Economic Geology are already using it as a text-book."—WILLIAM O. CROSBY, *Assistant Professor of Structural and Economic Geology at the Massachusetts Institute of Technology*.

THE MACMILLAN COMPANY

66 FIFTH AVENUE

NEW YORK CITY

ELEMENTARY GEOLOGY

BY

RALPH STOCKMAN TARR, B.S., F.G.S.A.

*Professor of Dynamic Geology and Physical Geography at Cornell University;
Author of "Economic Geology of the United States," etc.*

12MO. CLOTH. 486 PP. PRICE \$1.40 NET

COMMENTS OF THE PRESS

"We do not remember to have noted a text-book of geology which seems to so go to the heart of the matter."

—*Philadelphia Evening Bulletin.*

"The author's style is clear, direct, and attractive. In short, he has done his work so well that we do not see how it could have been done better."—*Journal of Pedagogy.*

"It is far in advance of all geological text-books, whether American or European, and it marks an epoch in scientific instruction."

—*The American Geologist.*

"The student is to be envied who can begin the study of this deeply interesting, fascinating subject with such an attractive help as this text-book."—*Wooster Post-Graduate.*

"The Geology is admirably adapted for its purpose—that of a text-book."—*Brooklyn Standard Union.*

"So admirable an exposition of the science as is found in this book must be welcomed both by instructors and students. The arrangements of facts is excellent, the presentation of theory intelligent and progressive, and the style exceedingly attractive."

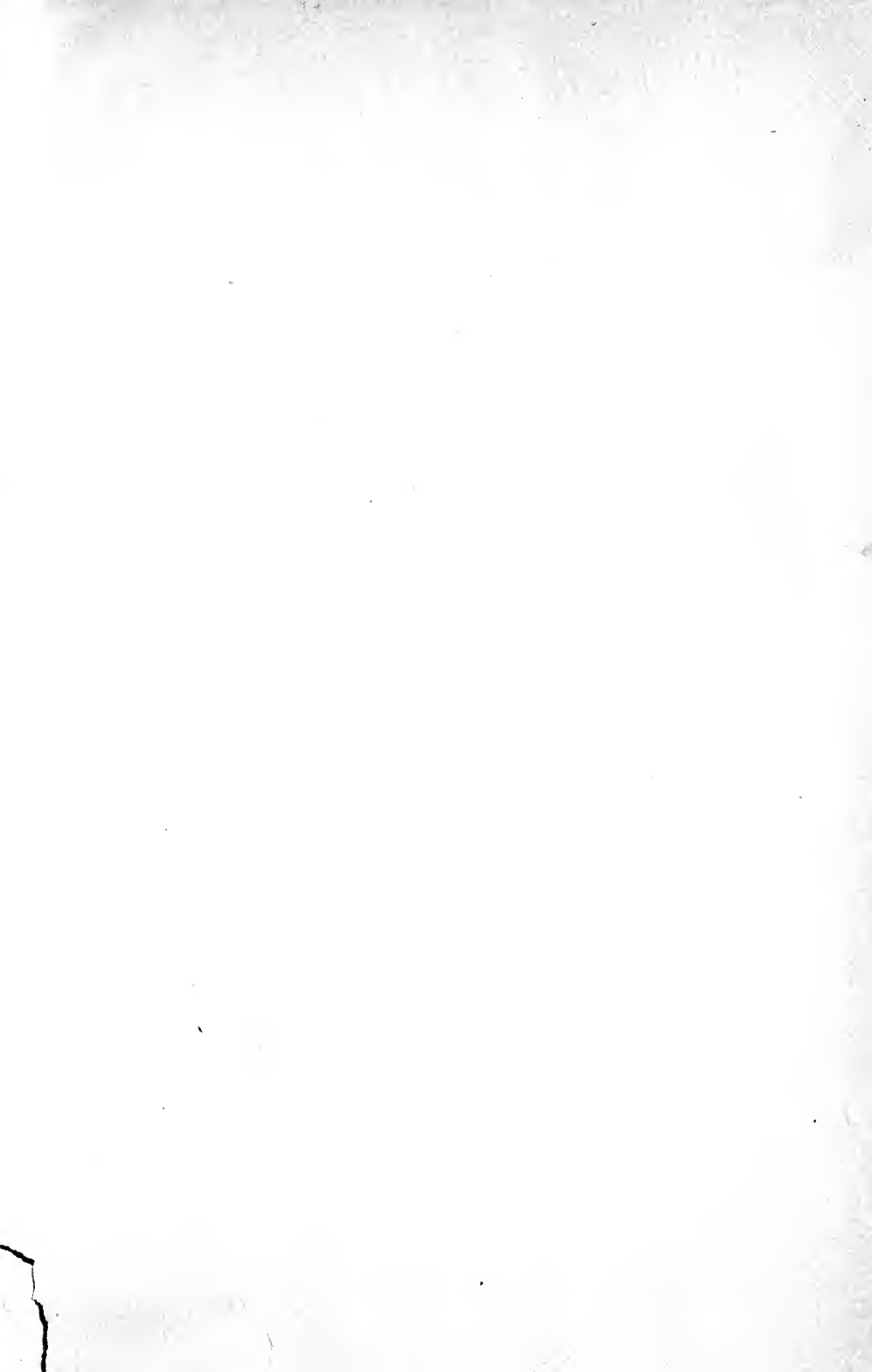
—*New York Tribune.*

THE MACMILLAN COMPANY

66 FIFTH AVENUE

NEW YORK CITY





RETURN CIRCULATION DEPARTMENT
TO → 202 Main Library

LOAN PERIOD 1	2	3
HOME USE		
4	5	6

ALL BOOKS MAY BE RECALLED AFTER 7 DAYS
 Renewals and Recharges may be made 4 days prior to the due date.
 Books may be Renewed by calling 642-3405.

DUE AS STAMPED BELOW

RECEIVED		
NOV 05 1995		
CIRCULATION DEPT.		
RECEIVED		
NOV 16 1995		
CIRCULATION DEPT.		
FEB 02 1999		

GENERAL LIBRARY - U.C. BERKELEY



8000707527

TN820
R6

98799

