

***EVA MARCH
TAPPAN***

***DIGGERS
IN THE EARTH***

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Diggers in the Earth

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TABLE OF CONTENTS

PREFACE

THE INDUSTRIAL READERS

BOOK II

DIGGERS IN THE EARTH

I

IN A COAL MINE

II

DOWN IN THE QUARRIES

III

HOUSES OF SAND

IV

BRICKS, THEIR FAULTS AND THEIR VIRTUES

V

AT THE GOLD DIGGINGS

VI

THE STORY OF A SILVER MINE

VII

IRON, THE EVERYDAY METAL

VIII

OUR GOOD FRIEND COPPER

IX

THE NEW METAL, ALUMINUM

X

THE OIL IN OUR LAMPS

XI

LITTLE GRAINS OF SALT

FIRST YEAR IN NUMBER

THE EVERYDAY ARITHMETICS

" A STEP FORWARD IN READING "

THE RIVERSIDE READERS

JAMES H. VAN SICKLE

WILHELMINA SEEGMILLER

FRANCES JENKINS

PREFACE

Table of Contents

The four books of this series have been written not merely to provide agreeable reading matter for children, but to give them information. When a child can look at a steel pen not simply as an article furnished by the city for his use, but rather as the result of many interesting processes, he has made a distinct growth in intelligence. When he has begun to apprehend the fruitfulness of the earth, both above ground and below, and the best way in which its products may be utilized and carried to the places where they are needed, he has not only acquired a knowledge of many kinds of industrial life which may help him to choose his life-work wisely from among them; but he has learned the dependence of one person upon other persons, of one part of the world upon other parts, and the necessity of peaceful intercourse. Best of all, he has learned to see. Wordsworth's familiar lines say of a man whose eyes had not been opened,—

"A primrose by a river's brim
A yellow primrose was to him,
And it was nothing more."

These books are planned to show the children that there is "something more"; to broaden their horizon; to reveal to them what invention has accomplished and what wide room for invention still remains; to teach them that reward comes to the man who improves his output beyond the task of the moment; and that success is waiting not for him who works because he must, but him who works because he may.

Acknowledgment is due to the Lehigh Valley Railroad, Jones Brothers Company, Alpha Portland Cement Company, Dwight W. Woodbridge, the Utah Copper Company, the Aluminum Company of America, the Diamond Crystal Salt Company, T. W. Rickard, and others, whose advice and criticism have been of most valuable aid in the preparation of this volume.

Eva March Tappan.



THE INDUSTRIAL READERS

[Table of Contents](#)

BOOK II

[Table of Contents](#)

DIGGERS IN THE EARTH

I

[Table of Contents](#)

IN A COAL MINE

[Table of Contents](#)

Did you ever wonder how beds of coal happened to be in the earth? This is their story.

Centuries ago, so many thousand centuries that even the most learned men can only guess at their number, strange things were coming to pass. The air was so moist and cloudy that the sun's rays had hard work to get through. It was warm, nevertheless, for the crust of the earth was not nearly so thick as it is now, and much heat came from the earth itself. Many plants and trees grow best in warm, moist air; and such plants flourished in those days. Some of their descendants are living now, but they are dwarfs, while their ancestors were giants. There is a little "horse-tail" growing in our meadows, and there are ferns and club mosses almost everywhere. These are some of the descendants; but many of their ancestors were forty or fifty feet high. They grew very fast, especially in swamps; and when they died, there was no lack of others to take their places. Dead leaves fell and heaped up around them. Stumps stood and decayed, just as they do in our forests to-day. Every year the soft, black, decaying mass grew deeper. As the crust of the earth was so thin, it bent and wrinkled easily. It often

sank in one place and rose in another. When these low, swampy places sank, water rushed over them, pressing down upon them with a great weight and sweeping in sand and clay. Now, if you burn a heap of wood in the open air, the carbon in the wood burns and only a pile of ashes remains. "Burning" means that the carbon in the wood unites with the oxygen gas in the air. If you cover the wood before you light it, so that only a little oxygen reaches it, much of the carbon is left, in the form of charcoal.

When wood decays, its carbon unites with the oxygen of the air; and so decay is really a sort of burning. In the forests of to-day the leaves, and at length the trees themselves, fall and decay in the open air; but at the time when our coal was forming, the water kept the air away, and much carbon was left. This is the way coal was made. Some of the layers, or strata, are fifty or sixty feet thick, and some are hardly thicker than paper. On top of each one is a stratum of sandstone or dark-gray shale. This was made by the sand and mud which were brought in by the water. These shaly rocks split easily into sheets and show beautiful fossil impressions of ferns. There are also impressions of the bark and fruit of trees, together with shells, crinoids, corals, remains of fishes and flying lizards, and some few trilobites,—crablike animals with a shell somewhat like the back of a lobster, but marked into three divisions or lobes, from which its name comes.

Since the crust of the earth was so thin and yielding, it wrinkled up as the earth cooled, much as the skin of an apple wrinkles when the apple dries. This brought some of the strata of coal to the surface, and after a while people discovered that it would burn. If a vein of coal cropped out on a man's farm, he broke some of it up with his pickaxe, shoveled it into his

wheelbarrow, and wheeled it home. After a while hundreds of thousands of people wanted coal; and now it had to be mined. In some places the coal stratum was horizontal and cropped out on the side of a hill, so that a level road could be dug straight into it. In other places the coal was so near the surface that it could be quarried under the open sky, just as granite is quarried. Generally, however, if you wish to visit a coal mine, you go to a shaft, a square, black well sometimes deeper than the height of three or four ordinary church steeples. You get into the "cage," a great steel box, and are lowered down, down, down. At last the cage stops and you are at the bottom of the mine. The miners' faces, hands, overalls, are all black with coal dust. They wear tiny lamps on their caps, and as they come near the walls of coal, it sparkles as it catches the light. Here and there hangs an electric lamp. It is doing its best to give out light, but its glass is thick with coal dust. The low roof is held up by stout wooden timbers and pillars of coal. A long passageway stretches off into a blacker darkness than you ever dreamed of. Suddenly there is a blaze of red light far down the passage, a roar, a medley of all sorts of noises,—the rattling of chains, the clattering of couplings, the shouts of men, the crash of coal falling into the bins. It is a locomotive dragging its line of cars loaded with coal. In a few minutes it rushes back with empty cars to have them refilled.

All along this passageway are "rooms," that is, chambers which have been made by digging out the coal. Above them is a vast amount of earth and rock, sometimes hundreds of feet in thickness. There is always danger that the roof will cave in, and so the rooms are not made large, and great pillars of coal are left to hold up the roof.