Polishing plate glass in Pennsylvania factory

Coal, Coke, Steel, Cement and Glass Are Pennsylvania's Great Industries

Prepared by National Geographic Society, Washington, D. C.—WNU Service.

GREAT events have happened and the lives of all Americans have been transformed in many ways since Obediah Gore, the Connecticut blacksmith, moved to the Wilkes-Barre country and taught the neighborhood smiths how to fire their forges with anthracite; since Jesse Fell invented the grate for burning hard coal in homes; since Philip Ginter stubbed his toe on a piece of hard coal and thereby laid the foundations of the Lehigh Coal and Navigation system of coal mines and coal roads.

Even in the depths of the depression in 1931 Pennsylvania was producing 60,000,000 tons of anthracite and 97,000,000 tons of bituminous coal, or approximately a third of the nation's entire coal output. When you consider how much the country owes to its vast supplies of sunshine stored up in the earth through millions of years, you realize how great is its debt to Pennsylvania, for in service to humanity coal far outshines the magic wonders of Aladdin's legendary lamp.

As one travels through the coal fields, there are many sights reminiscent of a century of mining. One sees in the anthracite fields every type of coal breaker, from the old dry breaker with dust everywhere and much of the coal wasted, to the latest Rheolaveur breaker where water is used from beginning to end, and where even the dust is saved.

Tremendous Coke Production.

Pennsylvania is the nation's foremost producer of coke.

For generations the beehive coke oven had its day. It was a wasteful day, it is true, but the beehive oven fitted its time. It was not until the World war period that it relinquished first place to by-product ovens.

Then the cry went up for more and more of the chemicals hidden in bituminous coal to take their place in the explosives that were indeed "the power behind the gun" of war-making. Now the alchemist of coal is getting more coke out of a ton of coal made in a by-product oven than could be obtained in a beehive oven, and in addition he is able to capture enough ammonia and its compounds, light oil and its derivatives, gas, tar, fine coke, and other products to bring the total value of by-products up to $3.86 per ton, all of which were lost in the old-time beehive oven.

Those were spectacular nights before the World war when one rode for miles through the beehive oven districts. Today those old ovens stand row after row along scores of railroad tracks, some almost completely in ruins but others looking as if they might be fired again tomorrow.

Pig Iron and Steel.

Pennsylvania's role in the iron and steel industry is as remarkable as her position in the coal and coke industry of the nation. In 1931 the Keystone state produced only 1 per cent of the nation's iron ore, but it turned out 28 per cent of its pig iron and 32 per cent of its steel.

With every 1,000 tons of pig iron requiring in its making about 1,800 tons of ore, 700 tons of limestone, 1,000 tons of coke, and 4,500 tons of air driven by powerful fans, one may easily imagine that its production is the Keystone state's heavy industry.

There was in the days of peak production no more inspiring night sight than the view from a high hill at Pittsburgh, looking down the Ohio and up the Monongahela and the Allegheny rivers, beholding Titan at work, transforming ore into pig iron.

The era of the Bessemer process in converting pig iron into steel is largely gone in the Keystone state. No longer do these huge metallic eggshells send their streams of fiery sparks heavenward. The awesome "spitting" of the spectacular converter during certain periods of the blowing of air through its molten contents has given place to the open hearth.

Here enormous jets of gas flame are played over the molten pig metal, producing iron oxide which combines with added iron ore to form a basic slag—the "skimmings" of the fiery caldron.

Nowhere in industrial Pennsylvania does one discover more progress in processes than in the cement industry. A pilgrimage through a cement plant 20 years ago was like working at the "bunghole" of a threshing machine before the days of the straw blowers. There was dust everywhere. As one surveyed the horizon of Lehigh and Northampton counties, it seemed that there were a hundred whirlwinds perpetually blowing and marking the sites of the cement plants scattered over the countryside.

Today it is different. Now the rock is crushed under streams of water and the final powdering of the stone produces a sludge of about the consistency of mush. This is introduced into the big rotary kilns —some of them as much as 120 feet long and 15 feet in diameter.

Here it meets a stream of powdered coal under a flame that gives a temperature of from 2,500 to 3,000 degrees Fahrenheit. The coal has been so finely ground that 95 per cent of it will pass through a screen that has 10,000 meshes to the square inch. When the powdered coal, the sludge, the fiery heat, and a regulated amount of air meet, glass-hard clinkers are formed.

These clinkers in turn are the intermediate materials between cement rock and the finished product. They are mixed with heavy steel oval-shaped globules and conveyed into rotary grinders. Round and round these big machines turn hour after hour until all the clinkers have been ground almost to impalpable dust, in which form it is Portland cement.

Among all of Pennsylvania's dramatic industries there is none possessing greater fascination than plate-glass making. Such opaque substances as salt cake, pure limestone, and quartz sand go into a furnace in 3,500-pound batches, become liquid, and then pass out as a continuous sheet of plate glass which is cut, ground, and polished until it is as transparent as thin air.

In a Plate Glass Plant.

Up the Allegheny river from Pittsburgh stands the little village of Creighton. On its outskirts is the largest plate-glass plant in the world. The company owns at its back door the coal mine that supplies its fuel, for coal is used in such quantities that such a plant is always located near its fuel supply rather than close to its raw material.

Here are huge bins for storing salt cake, soda ash, glass sand, limestone, and other ingredients.

There is the giant furnace that holds 1,200 tons of molten glass. With a colored glass shield before your eyes look into the fiery furnace. Here are little hills and tiny mountains, survivals of the last 3,500-pound mouthful of material dumped in. There you see a miniature lake of incandescent molten mixture.

Twenty-one days of warming are required to bring the temperature of the furnace up to operating requirements. The marvel is that its linings can be made heat-resistant enough to stand temperatures that convert sand and limestone into liquid and to take that punishment for months on end.

At the rear of the furnace is a giant lip out of which the molten glass flows. Glowing hot, of doughy consistency, it passes under tremendous rollers, which convert it into a ribbon about 7 feet wide. Along this it travels through an annealing lehr for 400 feet. By now it is cool enough for the cutters who trim off the edges, cut it into lengths, and mark the defective spots.

Making Non-Shattering Glass.

Then a sort of mechanical spider with vacuum-cup feet swoops down on each piece, lifts it high overhead, and deposits it in a plaster-of-paris film on the six-ton cast-iron car that is to be its bed while passing under the grinding machines, where sand and emery smooth it down. From these grinders the plate passes under the felt-footed polishers where enough rouge to color the lips and cheeks of an army of women is used to produce that perfection of smoothness which gives perfect vision through your motor window.

After the glass has traveled 125 feet in the fiery furnace, 400 feet on the cooling lehrs, 400 feet under the grinders, and 400 feet under the polishers, it is ready for its trip through the Duplate works where two pieces are cemented together with a DuPont product and become safety glass.

NATIONAL AFFAIRS

Reviewed by **CARTER FIELD**

● Strength of state political machines in primaries surprises observers . . . Proves power of federal spending can't swing an election in every case.

WASHINGTON.—The tremendous strength exhibited by local organizations in many states, despite the power exercised by Washington through federal spending, has been a constant source of surprise to political observers during the primaries so far.

It was the powerful political organizations in Illinois which made it impossible for President Roosevelt to obtain the renomination of Senator William H. Dieterich. It was the powerful state organization in Iowa which renominated Senator Guy M. Gillette over the New Deal opposition as voiced by Harry L. Hopkins and James Roosevelt.

It was the organization of Boss Ed Crump, of Memphis, and Senator Kenneth McKellar, in Tennessee, which defeated a sitting senator—and three other candidates — to name their own man for senator in place of George L. Berry. It was the organization in Indiana, interested more in the presidential boom of former Governor Paul V. McNutt than in the New Deal purge, which forced the renomination of Senator Frederick Van Nuys.

The New Deal burned its fingers badly in Virginia, making a national story of the fight of young William E. Dodd Jr., son of the former ambassador to Germany, against the sitting congressman, Howard W. Smith, but the reason for the failure of Dodd to make much headway, and the reason for the only upset in the state, the defeat of Representative Norman R. Hamilton, was the strength of the state organization headed by Senator Harry Flood Byrd.

In Pennsylvania the Republican machine won easily both senatorial and gubernatorial primaries. In the Democratic primary David Lawrence and several other lieutenants took the machine away from Senator Joseph F. Guffey.

PRESIDENT'S PREFERENCE FOR JACKSON IGNORED

But the most amazing development of machine strength of the year was in the President's own state of New York. Jim Farley himself headed the revolt, apparently, when the President decided that he wanted his brilliant young Brain Truster, Robert H. Jackson, nominated for governor. The wish was pointedly ignored.

The only case which seems to go against the grain is Kentucky, and there is room for argument there. It is true that the state house organization, dominated by Governor A. B. (Happy) Chandler, was beaten, but it is scarcely accurate to term Chandler's organization THE state organization. Senator Alben W. Barkley has been regarded the Democratic boss of the state for a good many years. He had his own organization. It was strong enough to re-elect him to the senate the first time he came up, although Kentucky had never before, since the Civil war, re-elected a senator. This was before Chandler was a state-wide figure. It was before Senator Barkley had any federal patronage. It was long before there was any WPA and PWA.

Senator Barkley

Estimates have it that there are about 100,000 WPA workers alone in Kentucky, many of them employed just a few months before the primary. Senator Barkley never made any bones about the use to be made of this pay roll. In fact he virtually told the senate, when that body was considering the Hatch amendment aimed at preventing this "playing politics with human misery," that he had to use this power in order to offset the state machine of Governor Chandler.

But in view of the final vote, it would seem reasonable to doubt that this would have been enough had it not been for the organization Barkley had built BEFORE Roosevelt.

BARKLEY OBSESSED WITH PRESIDENCY IDEA

Incurable conservative optimists are now predicting that, with six sure safe years ahead of him, Senator Barkley will not be the rubber stamp for New Deal measures he has been in the past.

The trouble with this reasoning is that President Roosevelt will or will not run for a third term. If he is elected again he will be President for the precise length of the new Barkley term, and Barkley has never shown any particular originality. He just follows the leader.

Barkley is obsessed with the notion that if Roosevelt does not run, he will be the candidate to succeed Roosevelt, which involves the necessity of having New Deal support for he would never get to first base with the conservatives. Their leaders not only distrust him but do not appraise him very highly.

COCKEYED POLITICS IN T.V.A. INVESTIGATION

Just how much juggling with figures to prove that government ownership is fine the expert accountants employed by Senator James J. Davis of Pennsylvania will discover in TVA is a matter of conjecture. Never, however, in the history of Capitol Hill has such a procedure occurred before. A minority member of a committee employs experts, without even revealing who is paying their salaries and expenses. These experts are given carte blanche by the committee to go delving.

The explanation of this cockeyed politics is twofold. First, the committee is sore because its purse strings were drawn so tight in the closing days of the last session. Second, it doesn't believe anything can be found which would smear the administration, or even the TVA concept. They would not mind in the slightest if the present personnel of TVA is ruined. That would just make more jobs for lame ducks after November.

Victory to Senator Bennett C. Clark of Missouri by a tremendous margin over two 100 per cent New Dealers combined, plus a fourth candidate, strengthens the prospect that New Dealers will not be able to control the 1940 convention. Interesting here is the fact that the Pendergast Kansas City machine was not able to nominate its judicial candidate in a state-wide contest. Similarly the grip of Senator Matthew M. Neely of West Virginia on his state organization was upset by triumph of candidates in several state-wide contests. Neely never hesitates about taking White House orders.

Senator Clark

Senator George McGill of Kansas, another 100 per cent New Dealer, was renominated without trouble, but will face a very progressive Republican in the election, former Governor Clyde M. Reed. Standpat Republicans dislike Reed, but opinion here is that he will be driven against Roosevelt by the very fact that all the New Deal strength will now be thrown against him in the election battle. Most observers figure a close race.

Inflation talk is what is forcing the use of midnight oil around the treasury in a search for new taxes which congress might reasonably be expected to impose next session, and which would not be too certain of inviting the often talked about but never realized taxpayers' revolt. The treasury's view of the other branches of the government—and of congress—is that there is no chance of cutting down on government spending. It fears the spending is more likely to increase than diminish. It knows also that corporation and individual income tax returns next March are apt to be well under those of March 15 last, even though the present business improvement should continue.

Switch Game Still Good; Cobbler Loses $2,000

CARTERET, N. J.—Karl Born, fifty years old, a shoemaker, asked police to help him find two men who swindled him of $2,000, most of his savings, in one of the innumerable variations of the perennial switch game.

The two confidence men, one of them elderly, made his acquaintance by bringing several pairs of shoes to his shop to be repaired. On their third visit, Born said, the older man brought a metal lock box in which he said was $20,000. He said he was ill, feared that death was near and wanted to give his money to the poor.

Born said that the man pleaded that, being unacquainted in Carteret, he wanted his companion and the cobbler to select a list of deserving recipients of his munificence. The two were to receive $600 each for their services, but the older man asked that a cash bond be posted. The younger man offered $2,000 as his bond, and Born went to his bank and drew out $2,000. He thought that the two bonds, $4,000, were placed in the lock box, which was left in his care. When the supposed philanthropist and his young helper did not appear Born forced the box open and found that it contained only strips of paper and a few $5 bills.

Defies Curse; Lies in Desecrated Sarcophagus

LONDON.—A curse which is said to have cost many lives was defied by F. W. Jacquemin, of Wolverhampton, England, when he lay down in the desecrated sarcophagus of the last abbot of the ruined Bindon abbey at Wool, Dorset.

By his action, Jacquemin has, according to local superstition, doomed himself to violent death within a year.

Since the abbot's tomb was robbed more than 200 years ago, the curse is said to have been on it. It was in this sarcophagus that Angel Clare, in Thomas Hardy's "Tess of the D'Urbervilles," while sleepwalking on the first night of his honeymoon, placed the tragic Tess.

Several persons who have defied the curse have been killed in accidents

Inflamed Lumps In the Neck

By DR. JAMES W. BARTON

WE HAVE all seen children with a lump in the neck—an enlarged lymphatic gland. The gland is really a filter which takes out poisons from the lymph and then allows the poison to go back into the blood stream in small amounts so that the system can absorb it gradually.

Thus in infected tonsils it is not unusual for these swollen glands to hold some of the poison within their tissues for as long as two years after the tonsils have been removed.

Dr. Barton

Now a swollen gland can be a source of gradual poisoning of the system, particularly if the youngster is run down, has infection in teeth, tonsils, sinuses or has tuberculosis. It is often of help to him physically therefore to have the gland come down to its normal size again.

Removal May Be Wise.

If the gland is broken down it is usually removed by surgery, but naturally the physician or surgeon does not like removing any lymph glands because "every gland that is needlessly removed weakens by just so much the ability of the system to protect itself against all infections. However, it is a serious mistake to allow enlarged glands to cause such inflammation of the surrounding tissues as to make it necessary to remove parts of muscles, with the possibility during operation of injuring important nerves and blood vessels."

When the gland is actively inflamed—adenitis—causing pain or distress, the X-ray is now being used.

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Flat Feet.

An elderly man consulted his physician about a pain in inner side of his right knee. Examination showed a flat foot which allowed the lower leg (below knee) to swing inward thus putting strain on inner side of knee. A plaster cast was taken of the foot, a support made, and the pain in the knee disappeared.

Flat feet are common and if not brought up by exercise or supports or both, it may mean other symptoms besides painful feet. The knee joint and all the joints in the spine between bones are put under a strain when the arch of the foot falls.

The first thought in the majority of cases of flat foot is to try to strengthen the muscles which hold up the arch of the foot, making the foot look like a claw.

Two simple exercises done twice daily to a count of 20 each are:

1. Trying to grasp a marble or other object with the toes.

2. Raising the body slowly from heel to toe, holding a few seconds, and then coming down slowly.

A third exercise is to walk around the room three times on the outer sides of the feet. Results can often be obtained in six weeks to six months.

Putting the feet in hot water for five minutes before exercise and for five minutes after exercise will prevent or remove soreness caused by the exercise. When the individual is elderly, greatly overweight, or unwilling to take exercise, arch supports, properly fitted, act as a crutch and give much relief.

Root-Growth Factor Is Found by Acid Testing

A clew to the mystery of what takes place in a plant to make it form roots when certain chemicals are applied has been found in simple experiments by Dr. William C. Cooper of the United States department of agriculture. Compounds containing indolic acid when applied to stems or leaves cause a rapid growth of functioning roots. Dr. Cooper has discovered that the active substance is a factor within the plant.

He used lemon plant cuttings in three groups. The first he planted in their normal state. The second had the stem ends painted with indole-acetic acid, and they produced far more roots than the normal group. The third group he treated with the root-forming substance but did not plant immediately. Instead, he cut off the treated portion and applied indole-acid to the stem end. He then planted the cuttings, but got no better root-forming results than from the untreated group.

The explanation, Dr. Cooper said, is that the indole-acetic acid attracts to the part of the plant to which it is applied a substance in the plant which causes root formation. In the third group this substance was attracted to the stem end, and when he cut off these ends there was little of the substance left to respond to the second application of the acid. It takes about 40 hours to draw to the end of the stem all of the root-forming substance

Mud

By HAZEL R. LANGDALE

THE Petitcodiac river, whose bottle-shaped mouth where it empties into the Bay of Fundy is responsible for the world famed Bore, is, at certain portions of its length, margined with steep banks of mud of such insidious, slimy slipperiness that to look at them has somewhat the same effect on the observer as the glistening eye of the snake on its bird victim.

It had that effect on Marcia Makepeace, who had come up from Boston to visit her grandparents.

For 19 years—that is to say, since the day of her birth, Marcia's life had been bounded by Massachusetts bay and the Charles river. Of course, she had summered on the Cape and had motored through the White mountains. She had even spent a few weeks at Ogunquit. But none of these places, not even the Cape Cod creeks or the flats exposed on the Maine coast at ebb tide, could offer the mud of the Petitcodiac and its tributaries.

"Looks like primeval ooze, doesn't it?" asked Barry Robins, between

SHORT SHORT STORY

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puffs at his disreputable old briar. Barry lived in one of the five white farmhouses that made up the hamlet of Ste. Stephanie and Marcia had been warned against him by her grandparents.

"It certainly does!" agreed Marcia, amiably, but not for worlds would she have disclosed the horrid fascination those unbelievably smooth declivities had for her.

Barry had rather fallen in love with Marcia at sight and was trying to fall out again because it was evident on the face of it that he was a poor sort of fellow for a girl like her.

Three days after this conversation, Marcia, in hunting for a lost slipper in her trunk, came upon her bathing suit.

She pulled it out and shook it. Then she went to the top of the narrow flight of stairs.

"Oh, grandmother! Is there any place where one could go swimming?"

After a moment, her grandmother's voice came back doubtfully, "Why, I don't know. There's a pool down at the bend that the boys used to use. Kind of shallow now, I suppose."

Barry saw her go by his gate and guessed her destination from a pair of gay red rubber bathing shoes protruding from her coat pocket. He started up, then sat back again and slowly refilled his pipe. For some time he sat smoking and thinking.

If only Marcia had been just an ordinary girl with no maternal relatives in Back Bay, no Radcliffe diploma, no Cambridge accent, he would have felt more like going to her and saying, "Darling, I'm a poor devil of a writer who threw up a job as reporter to go off by myself and write a book. I was born in Pawtucket and I don't know the Common from Copps Hill burying ground. But I love you and will work my fool head off to keep the wolf from the door!"

Grabbing his hat and apology for a proper walking stick—an old length of what had once been a gate rail—he set forth along the dusty gravel road that skirted the river.

At the turn of the road the pool made by the widening of the river became visible, but in its depths no bright head was visible.

Suddenly his face blanched.

"Help! Help!"

He broke into a run. Yes, the cry had come from Marcia. Half way down the bank at the spot where it was steepest she could be seen in a condition that to any but a lover might have been unrecognizable. Petitcodiac mud coated her from head to foot.

Barry could see where she had tobogganed down by long slide marks. Halfway, she had sunk into the brown ooze and her struggles had only served to submerge her still more. Terrified, she had cried for help.

Gingerly, lest he make matters worse, by inviting a similar predicament for himself, Barry stepped to the edge, then down a foot or two, and extended his stick.

"Grab it!" he ordered. "Now hold it while I pull." The whole bank quivered and Barry went in halfway to his knees. Splashes of mud went over him. Then the smeared and trembling Marcia was hauled to safety beside him.

"Poor child!" he said, kindly. "But how did it happen?"

Marcia gulped. "I—I did it on purpose," she said sheepishly.

Barry just looked at her. Marcia Makepeace of Boston sliding down into primeval ooze for the fun of it!

"Oh, my dear, my dear!" was all he could say for a moment. Then, taking her in his arms, mud and all, he enlarged upon that theme until Marcia had indeed promised to become his dear.

Peasant Motifs Add Smartness to Linens

The peasant note spells smartness in linens today. These figures in simple stitches will add color to accessories and offer pleasant hours in their embroidering. Pattern 1743 contains a transfer pattern of 4 motifs 7¼ by 9¼ inches, 4 motifs 3 by 3¾ inches, 4 motifs 2 by 2¼ inches; illustrations of stitches; materials required; color schemes.

Send 15 cents in stamps or coins (coins preferred) for this pattern to The Sewing Circle, Needlecraft Dept., 82 Eighth Ave., New York, N. Y.

Favorite Recipe of the Week

HONEY WHITE CAKE

½ cup shortening
1 cup sugar
½ cup honey
3 cups sifted cake flour
3 teaspoons baking powder
¼ teaspoon salt
1 cup milk
4 egg whites

Cream shortening, honey and sugar thoroughly. Add sifted dry ingredients, alternately with milk, starting and ending with dry ones. Fold in stiffly beaten egg whites. Bake in two 9-inch layer pans in a 350 degree oven for 30 minutes.

Seven Minute Honey Frosting.

Put two unbeaten egg whites, ½ cup white corn syrup and ½ cup honey in double boiler top. Have water in bottom boiling. Beat with rotary beater for seven minutes or until the mixture is stiff enough to stand in peaks. Remove from heat. Add ½ teaspoon vanilla, and a pinch of salt. Spread on cake. Then cover with moist coconut.

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