

this cause is greater than the entire amount so far spent in sealing abandoned mines to prevent the hazard.

An additional benefit can be secured if all surface water is led immediately to streams and not allowed to enter the old, no-longer-used mines.

Uses for Lodestones

One of the first scientific observations of the ancients was the discovery of the lodestone, a rock that had the baffling ability to attract other similar stones and transfer their magnetic properties to certain other materials. From this simple fact originated the magnetic compass and the resulting exploration that gave the Americas to the then-known world.

Lodestones are special examples of the mineral called magnetite. Magnetite's unusual properties have long made it a plaything of science and engineering; hardly a plaything though, for it finds valuable, practical uses both as a raw material and as an industrial mineral.

At the New York meeting, magnetite had its own special session and a wider usefulness of the strange red mineral was discussed.

Because it is largely iron, magnetite's widest use is in the production of steel, and H. M. Roche, New Jersey engineer, told how magnetite ore from the east might be mixed with the much more widely known iron ore from the Great Lakes region to yield a superior iron concentrate. Freedom from importation of foreign iron ores would be only one advantage of a greater development of the billion and a half tons of magnetite reserves estimated to exist in New Jersey and New York alone.

From the U.S. Bureau of Mines in Washington came R. S. Dean and C. W. Davis to suggest new uses for this

long-known mineral other than its raw material utilization.

Because of its red color and inert properties it could be employed in paints in quite the same way that red lead is used today, they suggested. The difficulty of grinding magnetite finely without having it cluster by agglomeration has previously prevented this use but the Bureau of Mines scientists have found that a continuous shaking of the magnetite by an alternating magnetic field circumvents this handicap.

Because of its high density, they pointed out, magnetite has been employed where a very heavy concrete is desired as in the counterweights of lift bridges and in anchorages.

Heat Value

A new experimental method by which scientists can look at a piece of coal and tell how much heat it will generate was announced at the meeting.

But don't rush down to your own coal pile and hope to tell whether the present delivery is better than the last one. The new method is relatively simple, but not that simple.

Two midwestern geologists, L. C. McCabe of the Illinois Geological Survey, and Prof. T. T. Quirke of the University of Illinois, described the secrets of coal analysis in their technical paper, "Angle of Polarization as an Index of Coal Rank."

Tiny cubes of coal are polished and brightly illuminated with a small lamp. The light reflected from the polished surface becomes polarized and is studied with Nicol prisms to determine the angle of polarization. By a fundamental rule of optics known as Brewster's Law, the angle of polarization of the reflected light can be related to what scientists call the index of refraction. This last is the degree of bending which a material

will cause as light passes through it.

Final and significant step in the research was the discovery that the amount of heat in B.T.U. (British Thermal Units) which a unit amount of coal can produce is related by a simple straight-line relationship with its index of refraction as measured in the apparatus.

Using the wide range of different kinds of coal found in Illinois, from woody lignite to soft bituminous and so on to harder bituminous, it was found that as the heating qualities of the coals increased, so too, did their index of refraction.

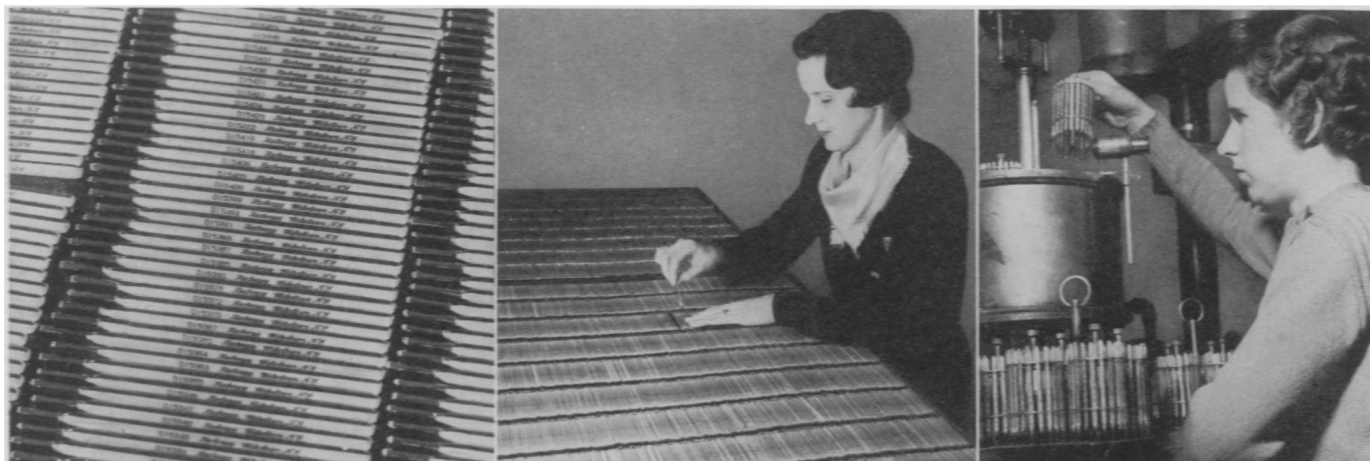
The method, pointed out Mr. McCabe and Prof. Quirke, is still in the experimental stage and the accuracy of the technique could be increased ten or one hundred times with better equipment.

"This investigation," they declared, however, "with improvised equipment, imperfect in many particulars, has discovered what appears to be a physical criterion for rank identification (of coal)."

Science News Letter, February 27, 1937

GOT A FEVER?

With flu, grippe and colds going the rounds, the clinical thermometer is pressed into service as a medical aid. The best, or "certified," of these instruments are sent to scientists at the National Bureau of Standards in Washington where each one is checked to insure its merit. By the thousands they come, numbered in series, for their test. They are arranged according to number (center) and then are placed in convenient holders in small groups. Helen Tyler (right) places a thermometer unit in a controlled water bath where they are automatically rotated to insure an even temperature for checking readings.





CHEMISTRY

Newsprint Mill Planned To Use Southern Pine

East Texas Pine Will Supply New Dallas Mill Which Will Cost Five Million Dollars to Build

DEFINITE plans for building a \$5,000,000 newsprint paper mill to use East Texas pine in its manufacture were made in Dallas in a meeting attended by East Texas capitalists, bankers and owners of timber land. An organization committee has been appointed to organize the company.

It is proposed to erect at once a mill with initial capacity of 150 tons of newsprint daily. The name of the corporation will be the Southland Paper Mills, Inc., and the first unit to be put in operation as Texas Mill No. 1.

Location of the first unit has not been definitely established. Surveys now are being made by engineers who will report on availability of pine timber, water for engines and for plant operation, fuel, transportation facilities, etc., and the location will be announced when these surveys are completed. Organization of the technical staff for operating the mill is in charge of Perkins-Goodwin Company, New York.

Chief advocate of paper mills in the South to use pine timber from cut-over pine timber land has been Dr. Charles H. Herty, research chemist of Savannah, Ga. He interested the Chemical Foundation, Inc., of New York, in the proposition and W. W. Buffum, manager of the Foundation, has devoted much time to the problem. R. W. Wortham, Jr.,

and Albert Newcombe, both of Perkins-Goodwin Company, New York, also contributed much of their time to promoting the mill.

Dr. Herty has made extensive research and has developed a process, in cooperation with the other research agencies, through which pine timber of ten to twenty years' growth can be used in making a grade of newsprint that by test has met all requirements of newspaper publishers.

The entire East Texas territory adjacent to the great East Texas oil field which can furnish oil and gas fuel in unlimited quantity, is recognized as the best pine growing land in the entire South. It has been demonstrated that loblolly pine, excellently adapted for newsprint paper manufacture, can be grown into marketable timber in ten years. Texas had hundreds of thousands of acres of pine land suitable for growing timber for newsprint paper manufacture. The three varieties of Texas pine recognized as having greatest possibilities in this new paper industry are the loblolly, slash and shortleaf. All three varieties grow in abundance, are easily tended and grow to size suitable for pulpwood within ten to twenty years. By reforesting cut-over areas Texas can be made to produce a never-ending supply of pulpwood adequate to

INSURE ACCURACY

Mounted on a special holder, the fever thermometers are read under a low-powered microscope by Mrs. J. S. Timko (left). The thermometers are read to an accuracy of two-hundredths of one degree Fahrenheit and then, just to be cautious, they are certified only to two-tenths of a degree. Shaking down, so tedious a process when done by hand, is accomplished by machine (center). But for really accurate work the government's laboratory has an electrical thermometer seldom seen by laymen which measures temperature to one thousandth of a degree. Esther C. Vaughn looks at the recording scale of the Wheatstone bridge mechanism which checks the scientist's own standards by determining their accuracy compared to known temperature points such as steam, ice and molten sulphur.

all demands of the entire Southwest for newsprint paper.

Science News Letter, February 27, 1937

PHYSICS

Deep Sea Thermometers Tested by Uncle Sam

See Front Cover

BY checking the accuracy of deep-sea thermometers Miss Grace Gowens of the Bureau of Standards aids the scientist to determine accurately the temperature of the sea at great depths. The freezing point of the thermometer is determined with the apparatus shown in the picture on the front cover of this week's SCIENCE NEWS LETTER. The thermometer is placed in the ice for half an hour and then turned quickly, or "flipped." The "flipping" causes the mercury column to break at a constriction and registers the temperature until disturbed. Melting ice has a temperature of 0° C. (32° F.) and is, therefore, a good standard.

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