

ENGINEERING

Gas to Prevent Smoke

Gas made from bituminous coal was declared the ideal household fuel of the future in a report by Prof. S. W. Parr of the University of Illinois to the first national fuels meeting held recently in St. Louis under the auspices of the American Society of Mechanical Engineers.

Charging that the average home and apartment heating plant is guilty of producing most of the smoke nuisance of cities today, Prof. Parr predicted that raw coal would eventually become obsolete as a fuel and that instead the soft coal would be processed to produce a solid smokeless fuel more desirable than anthracite, gas of high quality and tar from which drugs, dyes and many other chemicals can be obtained. Smokeless combustion, high efficiency, cleanliness and convenience give gas a status unapproached by any other fuel, Prof. Parr declared.

Why smoke practically always results from the burning of bituminous coal in ordinary furnaces was explained. When coal is heated it gives off gases, among them marsh gas and ethylene. Before marsh gas will burn it must be heated to a bright cherry red heat, about 1200 to 1300 degrees Fahrenheit, and ethylene requires a temperature half as great. If such gaseous products of coal strike a cool surface that lowers their temperatures below their ignition points, or if there is not enough oxygen to allow them to completely combust, they become smoke producers instead of giving off heat.

"In the large steam-generating plant the production of great volumes of smoke is an unnecessary extravagance, inefficient, wasteful, unsanitary and avoidable," Prof. Parr said. "Proper combustion can be controlled in a very effective manner

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ZOOLOGY

Whales Champion Divers

Whales make the stoutest submarines look exceedingly tame when it comes to diving. According to R. W. Gray, a British naturalist, they reach depths of 700 to 800 fathoms, or from 4200 to 4800 feet, when they are attacked. They do not make a gradual, sloping descent, either, but stand on their noses and go right straight down. This behavior is known to whalers as "sounding."

In the old days, when whales were

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BOTANY



JOHN MERLE COULTER

Dean of American Botanists

In the spring of 1872, the personnel of the first scientific expedition into the then almost unknown Yellowstone National Park was encamped at Ogden, Utah, waiting for its chief to come on from the East. The youngest geologist in the party, a youth just out of college, spent his spare time collecting the plants of the region and trying, without much success, to classify them out of a manual of botany designed for the eastern United States.

When Dr. Hayden appeared and found the incipient herbarium which young John Coulter had got together, he created a new position of botanist to the expedition and put him into it. Thus did a great geologist rob his own profession to give American botany one of the foremost men in its whole history.

Twenty-four years later, President Harper was going about the country seeking whom he might devour for his new university. He found Dr. Coulter filling the posts of president and professor of botany at Indiana University, and offered him the headship of the department at Chicago. For a solid generation thereafter, until his retirement in 1925, Dr. Coulter wrote large pages in the history of American botany. He manned his department with his own graduate students; the record of their teaching and research activities justifies the use of that slightly overworked term, impressive. He made Chicago the source of an army of competent botanists; there are a few leading botany departments in this

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ENTOMOLOGY

Poisons May Check Beetles

While admitting that the Japanese beetle was about as abundant as ever in its plant devastations in the East this past summer, government entomologists believe orchardists and gardeners at last have reached the point where they can spray the foe into consistent rout.

The fact has vast economic importance, because the destroyer feeds freely on no less than 200 plants, including those bearing the peach, apple, pear and grape, besides numerous vegetables and shade trees.

Ever since the insect's discovery in New Jersey many years ago, and its alarmingly rapid spread throughout the East, the government has been unable to devise a really first-rate means of control. In New Jersey and portions of Pennsylvania, Delaware, New York and Connecticut, quarantines have been enforced, with varying success. Present indications point strongly to quarantine extension throughout Maryland and the District of Columbia which would place restrictions on interstate movements of most kinds of farm and garden products.

The early discovery that the beetles and grubs form a portion of the diet of several species of birds, at first was thought to be scientifically important. But the diet was found not to be regular enough to seriously check the insect's multiplication.

Use of insecticides proved somewhat more encouraging. Yet the difficulty was that the Japanese

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PHYSICS

Light Speeds Factory Work

Far less waste in human energy and health in thousands of factories throughout the country may result from a series of novel lighting experiments just completed by C. E. Ferree and Gertrude Rand of Bryn Mawr College. A paper emphasizing the high lights of the experiments was read before the joint session of the annual conventions of the National Committee for the Prevention of Blindness and the Illuminating Engineering Society in Chicago.

A number of factory workers were tested for the quickness with which they could see details in terms of black and white. It was found that whether the object is white against a black background, or vice versa, there is a rapid increase of speed as

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Poisons May Check Beetles

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beetle is to the insect world what the gray wolf of the western plains was to the animal world—a killer extraordinary with exceptional cunning. Sensitive to such foreign materials on its tasty foods as the common arsenical poisons, it refused often to taste them, with the result that instead of curling up and dying it was wont to sneak away to other plants free from contamination for a safe feast.

However, several new sprays and lures have been devised this year. Geraniol, an oil found in geranium and certain other plants, has proved especially effective. When applied to trees in the open the "drink" often attracts beetles from as far away as half a mile. Traps used in this connection likewise have been useful. They consist of simply made contrivances accessible to the beetles from the outside into which they find themselves entrapped after maneuvers around a geraniol bait.

The beetle's grub, a particular nuisance in grass lands and golf putting greens, has been controlled by thorough saturation of the soil with carbon disulfide emulsion and applications of arsenate of lead.

Another tried beetle destroyer is a mixture of lead arsenate with a small amount of lead oleate soap.

Next summer, by establishing for the first time in history a contact man to induce civic bodies and others to systematically control the insect by intelligent spraying, the U. S. Bureau of Entomology will set a long hoped-for precedent.

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the amount of light is increased, up to 15 or 20 foot-candles. One foot candle means the light a man gets on his work when it is one foot from a standard candle.

The significance of the tests is that the application of three to four times the usual amount of light multiplies the speed of the work virtually by a corresponding amount. Furthermore, the prevailing opinion on factory lighting is that four to five foot-candles are adequate for general purposes. In other words, while there is no way of measuring a man's eye strain, the tests prove conclusively that eye strain may be lessened greatly by increasing the light to the point where the eye will work at its optimum speed.

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Dean of American Botanists

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country that do not have a Chicago graduate on their staffs. He founded and edited the Botanical Gazette, one of the foremost scientific journals in the world. He wrote and collaborated in writing a very solid array of books. He took an active part in organizing a number of botanical and other scientific societies.

Finally, at an age when most men are content to rest on their honors, he interested his friend William Boyce Thompson in the construction and endowment of a great institute for plant research at Yonkers, N. Y., where a new technology, which may properly be called plant engineering, is being developed. It is as head of the Boyce Thompson Institute for Plant Research that Dr. Coulter spends the days of his very active "retirement."

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Foresters estimate that more timber has been burned up in forest fires than has been cut down.

The mummy of Tutankhamen was adorned with 143 pieces of jewelry of religious significance.

BINDER COVERS

FOR

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Gas to Prevent Smoke

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by such devices as slow and evenly distributed additions of coal or by special setting of the boiler, hence the modern mechanical stoker and the elevated or elongated boiler settings to provide both space and time for the combustion of gases before cold surfaces are encountered.

"The case, however, with the average household or apartment heating unit is entirely different. Here the high heats do not prevail. The mechanical stokers as well as the spacious combustion spaces are absent. Moreover, the man of the house or the janitor has other duties to perform, whereupon he fills the combustion chamber to the limit and sets the dampers for a prolonged period of automatic control, during the major part of which period the so-called heater is simply a device for stewing off tars and vapors of inconceivable variety as to composition, odor and filth for the effective work of polluting the atmosphere. In the very nature of the case, such conditions must exist and continue to prevail in any household appliance where raw coal is fed into the furnace. No matter by what name the furnace or the coal is known, by any other name they would smoke just the same, and the worst part of the picture is not fully presented until mention is made of the fact that as a result of exhaustive studies made in many congested centers, it is demonstrated that the major part of the smoke nuisance has its origin in the domestic chimney and in the larger units of flat and apartment buildings where combustion conditions in the furnace are substantially as described above.

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Whales Champion Divers

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hunted with hand harpoons or with gun harpoons of a type that did not kill them quickly, the huge sea beasts frequently died at the limit of their dive, and getting them back to the surface was a long and arduous task. Sometimes in shallow water they crashed into the bottom and thus killed themselves.

Mr. Gray is of the opinion that the thickness of the whale's blubber, or protective layer of fat, may have something to do with its "sounding" ability. He notes that the Greenland whale, which has very thick blubber, can reach much greater depths than its relative the narwhal.

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