SCIENCE NEWS

Science Service, Washington, D. C.

HIGH-SPEED ELECTRONS

HIGH-SPEED "bullets" from the "atom gun" at the University of Notre Dame are being used to study a strange bluish-white light which is found in liquids when they are bombarded with swift-traveling electrons.

This strange light, known as Cerenkov radiation, after the Russian scientist, P. A. Cerenkov, who discovered it in 1934, is produced when the electrons are traveling through a liquid with a speed greater than the speed of light in that liquid. The original discovery was made with beta-ray electrons given off by radium. These electrons come off with all sorts of speeds. While they were useful in creating the faint blue-white light in a liquid they could not be used for a quantitative study of the phenomenon.

According to a report in *The Physical Review*, Professor George B. Collins and Victor G. Reiling, therefore, took up the light's study, using electrons whose speed and energy were definitely controllable. Electrons having energies of 2,000,000 electron-volts from an electrostatic generator were used. These swift electrons were shot into a vessel containing a liquid and a small sheet of mica or Cellophane. The light produced was caught and analyzed by a spectrograph placed at right angles. Alcohol, benzene and water were the three liquids used.

It was found that the radiation was continuous and extended from the long-wave sensitivity of the spectrum plate into the region of the ultra-violet where absorption occurs in the particular liquid used. The intensity of the Cerenkov rays was found to be greater in the shorter wave-lengths than are rays produced by a tungsten lamp in the same region.

The theory of the origin of the rays had previously been worked out by I. Frank and Ig. Tamm, of Soviet Russia, from Cerenkov's original work. This theory was confirmed by the work at Notre Dame.

THE REBUILDING OF FORESTS IN NEW ENGLAND

REBUILDING of the hurricane-ruined forests to their former estate as a prime natural resource is the task now being undertaken by New England as the people turn to the task of reconstructing their battered communities. Representing New England's forestry interests, Ward Shepard, director of the Harvard Forest, has been in consultation with the U. S. Forest Service, the Civilian Conservation Corps, the Works Progress Administration and other government agencies, discussing Federal participation in meeting the present emergency and in setting up a long-time reconstruction program.

At present, about half of southern New England's trees are down. What once were forests and farm woodlots are tangled heaps of splintered trunks and limbs piled like giant match sticks and waiting for sparks to turn a literal inferno loose. The second tropical disturbance, which on Friday and Saturday poured heavy rains on the ruins, was a cause of thanksgiving to the anxious watchers, for it gave insurance against forest fires for a week or two.

In the meantime it is hoped to get the emergency fire-prevention program into operation. First step will be the recruiting of officers and personnel. U. S. Forest Service experts are already on the ground, and companies of the CCC and WPA are being moved up to the front. As far as practicable, emergency worker corps from adjacent states will also be moved into the area of action, and the knots of official red tape will be cut to the limit.

A five-fold scheme of attack has been laid out: (1) Forty-foot strips will be cleared of down timber along all highways. (2) Roads and fire-lanes will be reopened through the forested areas as fast as axes and saws can be plied. (3) Extra men will be put on fire patrol. (4) Fire lookout towers (they are all down now) will be rebuilt. (5) Down timber will be removed.

The last of these five jobs is of course the biggest and the most difficult to carry out. Yet it must be completed, with saw and axe where possible and with controlled burning where necessary, for the tangled heaps of dead trees are not only an immediate fire hazard, but they will in time come to harbor terrific concentrations of insect and fungus pests that will menace trees left standing and the new growths of timber that will soon spring up.

Not only that, but these blown-down masses contain a great deal of cash value if it can be salvaged. The wind took New England's biggest and best trees, which were in many cases the farmers' savings accounts. Government labor will salvage as many of these valuable trunks as possible, and government-backed credit will help the owners to market them gradually instead of dumping them in distress sales.

For the long pull, the U. S. Forest Service has been asked to aid in planning an entirely new set of woods for the devastated regions. All of southern New England's timberlands are privately owned; the only national forests are in northern Vermont, New Hampshire and Maine. This means that woodlands are predominantly in small parcels, and that the timber is of high importance to the farmer-owners. Credit and tax setups must be arranged with these conditions in mind.

One thing was emphasized by Mr. Shepard: In New England's new forests, growing conditions closer to those of nature will be sought than has been the practice in past years. The custom of growing evenly ranked masses of trees, all of the same species and all of the same age, which the world copied from nineteenth-century Germany, will be abandoned in favor of more naturalistic forests of mixed species and all ages.

Such forests, the hurricane showed, can stand against a high wind much more successfully than the uniform, even-aged cultivated timber stands. They are also more resistant to fire and to forest insect pests and fungus

diseases. Finally, they are better homes for game animals and wild birds, and pleasanter places for human recreation.

FRANK THONE

POWDERED METAL COINS

IF the governments of the world wanted to save a lot of money they would make their coins, especially those containing precious metal, out of metallic powders.

No, the coins wouldn't fall apart into metal dust. Powerful presses would squeeze their powders together so tightly that the specks would cling together with all the strength of solid metal itself.

This suggestion of making powdered metal coins was advanced at the meeting in Providence on October 7 of the American Society of Mechanical Engineers by Gregory J. Comstock, of the firm of Handy and Harman, Bridgeport, Conn.

Cutting round objects out of flat sheets of alloy metal is a costly process, said Mr. Comstock, because there is so much scrap metal which must be sent back and remelted and then rolled out again into another flat sheet.

"Coinage alloys that include a precious metal require an extremely exact composition control, which adds materially to the cost of melting," Mr. Comstock told Science Service.

"Also when the weight of the coin depends solely upon the thickness of the sheet from which it is blanked, increased costs are involved in maintaining the necessarily exact gauges of the sheet from which the coin blanks are punched," he added.

Experiments have shown, he indicated, that over-sized machines like those which make aspirin and other medicinal tablets are admirably adapted to produce powdered metal "preforms" with surprising uniform weight at high speed.

"Alloyable mixed metal powders preformed in this manner and sintered in furnaces having controlled atmospheres," he pointed out, "could be coined to high density without involving the production of any scrap by the necessary removal of excess material."

The standards of exactitude for coins are no greater than are the requirements of accuracy now demanded for bearings which are, even now, being fabricated out of powdered metals in a similar fashion.

THE INCREASING USE OF RUBBER

THE much wider use of rubber as an engineering material in itself, and not in connection with other materials as it is now applied, was predicted at Providence, R. I., on October 5 by Dr. William C. Geer, research chemist, of Ithaca, N. Y., before the opening meeting of the American Society of Mechanical Engineers.

The use of rubber in the mountings of automobile engines and in mountings which prevent serious vibration in heavy machinery are applications pointing to the future fertility of the field of rubber's engineering uses, rather than indicating a fully developed science, said Dr. Geer.

Major advance in rubber technology, from the engineering point of view, is that the product is becoming very uniform for many different methods of treatment, Dr. Geer indicated. It is now time to make extensive study on the larger engineering scale of practical research.

There is no such thing as a true synthetic rubber, declared Dr. E. R. Bridgwater, of the E. I. du Pont de Nemours and Company.

Synthetic rubber is a misnomer when applied to the many synthetic rubber-like substitutes which now are finding valuable uses for their special properties.

The man-made rubber-like materials are synthetic, it is true, he pointed out, but they do not duplicate the chemical structure of natural rubber in the same way that synthetic camphor duplicates, chemically, native camphor.

The rubber-like materials, Dr. Bridgwater indicated, differ widely in their chemical composition. In fact, he said, there is a wider difference between some of them than there is between certain of them and natural rubber.

STERN DESIGN FOR FAST SHIPS

A RADICALLY new type of stern construction, consisting of a pair of bulbous blisters, one on each side of the hull down by the keel, that both cuts down vibration and increases speed has been developed by the designer of the French liner Normandie, Vladimir Yourkevitch, it was learned here.

Capable of increasing the speed of a vessel by as much as a knot without altering the power plant, the new type stern achieves its greater efficiency by creating two "tunnels" that direct the flow of water to the propellers.

Vibration from the propeller, a representative of Mr. Yourkevitch, A. Chernow, declared, is reduced because of the greater stiffness of the bulbous construction as compared with the more conventional overhanging and cruiser sterns.

The new type of construction is being embodied in vessels designed by Mr. Yourkevitch and now under construction, it was learned. The naval architect is at present in Paris.

The new type stern is adaptable to the extent that it may be built into existing vessels, Mr. Chernow explained. It is covered by U. S. Patent No. 2,127,475.

Vibration due to the propeller is an extremely serious matter in high speed vessels, such as super-luxury liners and destroyers. One general solution to the problem is stiffening of the stern. The blisters developed by the Russian-born naval architect is one method of achieving that reinforcement. It is superior to the use of additional trusses or girders as much less weight is added to the stern and in addition greater speed is attained, or, as the case may be, a specified speed is reached with less power.

Blisters beneath the water line at the bow are also a development with which Mr. Yourkevitch has been identified. The Normandie, among other vessels, features them. Justification for the design is found by many naval architects in the fact that the Normandie is very little slower than the Queen Mary, even though the latter's engines develop 25 per cent. more power than the Normandie's power plant.

The Yourkevitch stern blisters have been tested in testing tanks abroad, Mr. Chernow asserted.

Use of the blisters also makes possible an enclosed rudder, thus cutting down the likelihood of damage to the steering mechanism, he pointed out.

An additional advantage is that the blisters provide greater buoyancy at the stern, thus cutting down on the amount of "squat." Squat is a tendency on the part of the stern of a ship in motion to settle deeper than the bow, "thus causing a partial up-ending of the hull which, in case of an exaggerated squatting, increases its resistance to passage through the water," in the words of the patent.—LEONARD H. ENGEL.

COAL MINE DUST EXPLOSIONS

CLOUDS of inert rock dust form an effective way of preventing and limiting disastrous coal mine dust explosions, it is announced by the U. S. Bureau of Mines in Washington.

Coal miners may shortly see strange paper bags on little platforms near the ceilings of mines, if the new method, just investigated by the Bureau, is widely adopted.

The paper bags contain limestone treated so that it does not absorb water. When the first shock wave of an explosion sweeps down a coal mine and blows coal dust with it, the vibration makes these bags fall off their teetering platforms. A wire through the bag rips it open and down falls a dusty shower of inert rock powder.

This dust barrier wall, as it is called, has two functions. If it falls into coal dust so heated that it is about to explode, the rock dust will absorb heat and act to lower the temperature below the ignition point of the coal dust and thus help to prevent further explosion. Also the presence of a sizable mass of inert rock powder in the air helps dilute the coal dust and makes the explosion less severe.

In tests at the Bureau's experimental mine near Pittsburgh, Pa., it was found that the small bags of rock dust do not interfere with ventilation problems in a mine where the headroom is five feet. It was also shown that there is no injury to a person standing directly under the bags if they are made to fall accidentally. If the bags are accidentally broken in a ventilating shaft of a mine the rock dust thus blown throughout the mine is insufficient to cause interference with mine operation.

The tests show the bag barrier arrangement of dust is considerably cheaper than other, more elaborate, rock dust traps which the Bureau has tested. A mine operator will have to weigh a slightly lower efficiency against the lowered cost of installation.

ITEMS

THE chugging steam tugboat, familiar sight in every harbor in the world, has a new rival—a Diesel-electric powered tug with a drive similar to that employed on many streamline trains. The first of two new tow-boats, the *Thomas E. Moran*, equipped with geared Diesel-electric drive, has been launched at the Defoe Boat and Motor Works, Bay City, Mich., for a New York City transportation firm. Two eight-cylinder Diesel engines develop 1,350 horsepower and drive a generator that supplies current to a motor which, through reduction gears, transmits power to the propeller.

POWER output, fuel consumption and other relevant information can be obtained quickly by running the vehicle on the treadmill-like rollers, L. L. Fawcett, of the Auto Electric Company in Ponca City, Okla., told the Society of Automotive Engineers. A device that makes a record of how an auto or truck engine and chassis perform as the car rolls up miles of "travel" even though it stands still was suggested as a ready means of quick-check-up for trucks and automobiles. The device is the chassis dynamometer, a pair of rollers with suitable braking and recording devices. The vehicle is driven onto it so that the rear wheels rest in the "valley" between the rollers. It has the further advantage that the hood of the engine may be left up or a man may crawl beneath the vehicle to watch what happens when the car is running at different speeds and under different conditions.

SULFANILAMIDE, new and widely used chemical remedy for a number of serious ailments, speeds recovery from lymphogranuloma inguinale, sometimes called the fourth venereal disease. Sulfanilamide treatment of this disease was initiated at Fort Benning, Ga., by Colonel Guy L. Qualls, Medical Corps, U. S. Army, in the belief that the chemical would prove as effective for lymphogranuloma inguinale in humans as it had in the treatment of choriomeningitis in mice, both being virus-caused diseases. Encouraging results of this treatment were reported before the clinical staff at the station hospital by Lieutenant Gladen R. Hamilton, Medical Corps, U. S. Army. The first two cases which had been under ordinary methods of treatment in the hospital for 51 and 49 days, respectively, were returned to duty within a few days. To date 35 cases have been treated. The duration of the disease and the disability therefrom has been reduced from months to days. A detailed report will be made to the medical profession in a forthcoming issue of *The Military Surgeon*.

A SYSTEMATIC study of the normal, healthy student, in a search for the forces that make for a well, successful individual, has been undertaken at Harvard University. The research is a new attack on problems of health, and is expected to prove an important supplement to the traditional medical approach through study and care of illness. Collaborating in the investigation will be eight specialists in medicine, psychiatry, psychology, physiology, anthropology and social work, under the supervision of Dr. Arlie V. Bock, head of the department of hygiene. The study will be continued for at least five years and is financed by the William T. Grand Foundation. Students regarded by the staff as "normal" will be asked to volunteer as subjects. The total personality and constitution of each individual will be investigated, including such elements as heredity, family background and school life.