

lines, must be reflected back to the earth if they are to be heard at any great distance. Tiny electrified particles in the ionosphere bounce the short waves back to earth.

The ions that compose this reflecting layer are produced mainly by the action of the ultraviolet in sunlight which splits electrons off the atoms and molecules high up in the rarefied air. Some of the electrical particles may also be produced by impact of tiny corpuscles shot off from the sun, some by cosmic rays and some by meteors.

The lower portion of the ionosphere is rich with free electrons during the day due to the action of sunlight, Dr. McNish pointed out at a General Electric Science Forum. Directly after sunset most of the electrons are gone because they become recombined with molecules.

"Yet—and herein lies the mystery—a

sufficient number of electrons persist at this lower height all through the night to reflect radio waves," Dr. McNish said.

"Judging from the rate of electron-decay just after sunset, one would not expect to find any significant number beyond midnight."

Meteors may be the agency responsible for reflecting the radio waves at night. Astronomers estimate that more than a thousand billion of these particles, smaller than grains of sand, enter the earth's atmosphere during a 24-hour period. Travelling at speeds up to 200,000 miles per hour, they would smash violently into atoms and molecules of the upper air. These meteors would tear some of the electrons from these particles to which they belong and thus maintain the radio roof throughout the night.

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explanation of how such factors aggravate or may even precipitate an arthritic process."

These studies were made on a group of 25 patients, of whom 21 had some form of arthritis. Tests showed that skin temperatures were fairly normal while joint temperatures were definitely elevated in cases of degenerative joint disease, chronic gout, and infectious arthritis.

This method is therefore of use in following the course of joint diseases and in evaluation of the effects on the joint temperature of such treatment as rest, exercise, physical therapy, drugs and X-rays.

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PSYCHOLOGY

**Brain Operation Found To Reduce Intelligence**

➤ REDUCTION of intelligence has been noted following a certain brain operation now sometimes used for epilepsy, it was reported to the American Psychological Association in Boston by Dr. Robert B. Malmö, of McGill University, Montreal, Canada, and the Allan Memorial Institute of Psychiatry.

The operation is one called gyrectomy

ENGINEERING

**More Mileage Per Gallon**

➤ TOMORROW'S AUTO engine is going to give 25% more miles per gallon and you will be filling up at the gasoline pump on such high-compression fuels as triptane, toluene, benzene and trimethylpentane as well as superleaded "gas."

The American Chemical Society was told in St. Louis by leading petroleum chemists that new fuels for more efficient engines can be ready by the time the automotive engineers can build, test and produce them commercially.

Since 1930 the efficiency of fuel utilization in passenger cars has increased by more than 30%, John M. Campbell and Dr. Lloyd L. Withrow of the General Motors Research Laboratories, Detroit, told the chemists. In addition to this improvement, high-compression ratio engines combined with high-octane gasoline of early-war aviation grade could push the efficiency 45% further.

Today's auto engine wastes 75% to 80% of the gasoline's energy and a gain of only 1% would save one to two millions of gallons of gasoline daily in the United States.

Present commercial gasolines sold at filling stations range between 70 to 90 octane and engines of newer passenger cars have compression ratios of about 7-to-1.

Sizable saving would occur with 8-to-1 engines and gasoline in the 96 to 98 octane range, a grade that the petroleum industry could produce to the extent of about 20% of its total gasoline volume.

Push the compression ratio up to 12 and 15-to-1, and new fuels chemically tailored by the newer methods of refining will be needed.

Experimental engines using these new fuels have been built and given road tests, several research groups reported.

The higher the compression ratio the better the antiknock quality of the fuel needed, R. W. Scott, G. S. Tobias and

P. L. Haines of the Standard Oil Development Co., Elizabeth, N. J., concluded.

Any upgrading of the fuel quality of auto engines should be established sufficiently ahead of the engine production so that the refiner can develop his methods of production. This was suggested by W. C. Offutt, J. E. Taylor and G. B. Swartz, Jr., of Gulf Research and Development Co., Pittsburgh.

Superfuel of 100 octane for the new engines of the immediate future can be made by adding a teaspoonful of tetraethyl lead to gasoline, Dr. H. A. Beatty and Dr. W. G. Lovell of the Ethyl Corporation, Detroit, told the chemists.

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MEDICINE

**Temperature of Joints Taken with New Method**

➤ THE TEMPERATURE OF JOINTS crippled by disease has been obtained by the use of a technique applied for the first time to man, the American Congress of Physical Medicine was told in Washington.

A needle from which the syringe is removed is inserted into the anesthetized joint. Then tiny temperature measuring units are threaded over this needle and are inserted two to three inches into the inner recesses of the joint.

This means that for the first time doctors will know what effect any treatment being used has on the crippled joint, Drs. Joseph L. Hollander and Steven M. Horvath, of the School of Medicine and Hospital of the University of Pennsylvania, pointed out.

"It appears significant," they reported, "that cold, pain, fear and even smoking produce an identical effect, i.e., the apparent constriction of the skin vessels and dilation of the vessels within the joints. Perhaps this observation may lead to an



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and involves the removal of one of the convolutions of the frontal lobes of the brain.

Seven cases in which bilateral frontal gyrectomy was performed were studied as well as eight other cases in which another brain operation, lobotomy, was used. In lobotomy, the nerve connections between certain parts of the brain are cut.

A consistent drop in general intelligence, as measured by a standard mental test, the Wechsler-Bellevue Intelligence Scale, was found following the operations. There was a significant drop in ability to define words.

These cases, Dr. Malmo said, offered an excellent opportunity to study the effects on intelligence of these types of brain operation, because the patients had not

reached a state of personality deterioration before the operation.

Contrasted with Dr. Malmo's findings on the effects of the brain operations was the report by Dr. Lucille B. Kessler, of Traverse City State Hospital, Mich., on the effects of electric shock therapy on the intelligence of patients with the mental disease schizophrenia.

The 20 patients studied by Dr. Kessler were actually much more intelligent after the treatment than they were when they first entered the hospital.

The reduction in bizarre and incongruent thinking, the better attention of the patients to the test and their increased social awareness were, Dr. Kessler believes, important in producing the much better mental test scores.

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## GENERAL SCIENCE

## A.M.A. Says Health Plan Is Not Satisfactory

► THE American Medical Association's answer to the Federal Security Administration's ten-year program for the nation's health is that the "prescription" written by President Truman and F. S. Administrator Oscar Ewing would, if taken by the United States, prove more nauseating than curative (*See SNL*, Sept. 11).

Calling the statistics on which the 10-year plan is based "the same old figures that the proponents of government medicine have been launching at periodic intervals for the last 20 or 30 years," the editor of the *JOURNAL OF THE A.M.A.* (Sept. 25) states, in part, as follows:

"The amount of medical care that is given to most people of the world under their compulsory sickness insurance plans would never satisfy the people of the United States. The inevitable faults of these systems, which have been emphasized to the American physicians and to the American people for a good many years, are now coming vividly to light. Great Britain embarked in its new National Health Act on July 5. People in England may now go to the doctor without calculating the cost of the service. They may be supplied with spectacles and teeth without additional costs. They may have consultants and beds in hospitals without reference to individual payments for services rendered. That is what the National Health Act of Great Britain promised them. Do you think that they get it? No, indeed! They queue up to see the doctors formerly they could have seen by appointment. The doctors write formulas and prescriptions and reports many hours in advance of the time when they see the patients because otherwise they would never have time to see the patients. Many a physician is already satisfied that he cannot work under the Act. The unfortunate public have no way of knowing whether or not what they get is good medical service or something to make them think that they are being given attention.

"The greatest folly in the world is the manner in which Great Britain embarked on a nationwide health service without hospitals, doctors, nurses, drugs or money to supply what they promised, and an even greater folly would be the attempt to offer a similar service in the United States and to gulp the entire medical problem of the nation in a single swallow. Should the United States accept the prescription by President Truman and his consultant, Mr. Ewing, it would likely discover that the prescription had little of curative value and a great deal of the ultimate effect of ipecac or apomorphine (these, Mr. Ewing, are classified by the books on drugs as emetics)."

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## DENTISTRY

## Overeating Harms Teeth

► **OVEREATING** is harmful to your teeth as well as to your figure, Dr. John H. Greene of Philadelphia warned the American Dental Association meeting in Chicago.

The perpetual muncher, who must have a midnight snack, or candy all day long, will usually have the most dental troubles, he pointed out.

Sweet desserts are also bad for you unless they are fruit or raw food, he said, because they reawaken your appetite. Raw foods, on the other hand, are good for you because they clean the surface of your teeth.

We know what is good for us, Dr. Greene asserted, but we continue eating only what we like. "We are too indolent to change or add to our good list unless sickness makes it imperative," he declared.

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## Caries Despite Vitamins

► **THE POPULAR BELIEF** that a deficiency of minerals and vitamins in the diet will lead to tooth decay was debunked at the same meeting by Dr. Hamilton B. G. Robinson, of the Ohio State University College of Dentistry.

"It can be agreed that certain minerals

are important for formation of sound teeth but there is no clearcut scientific evidence that those minerals are necessary to prevent disease in mature teeth," he declared.

He termed misleading those studies that tried to show that decay is hastened by certain diseases or deficiencies. The investigators overlooked the fact that individuals who are of comparable age, race, region of residence and social status have the same tooth decay problems, he charged.

Dr. Robinson admitted the value of vitamin treatment in deficiency diseases such as scurvy and rickets, but vitamins as a weapon against dental disease he termed a case of firing "broadside at an unseen target."

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## ASTRONOMY

## Comet Ashbrook Probably Old Periodic Comet

► **FAINT COMET ASHBROOK**, 12th magnitude when found August 26 in the constellation of Aquarius, the water carrier, is probably an old periodic comet following a new path. (*See SNL*, Sept. 18).

It passed quite close to the planet Jupiter—within about 28,000,000 miles of it—in 1945, preliminary calculations by Dr. Leiland E. Cunningham of Students' Observatory, University of California, show. At that time its orbit must have been considerably changed, he points out, which would account for failure to discover it earlier.

Further observations are needed before this comet can be definitely identified with Barnard's, Holmes' or other lost periodic comets.

"If the present orbit is approximately correct," Dr. Cunningham stated, "and if the comet does not fade unusually fast, it should be visible throughout its orbit."

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Plastic Coasters and Tiles

### EMBED REAL FLOWERS in NEW Magic PLASTIC

Now create many lovely and unusual things like the distinctive pansy coaster shown—made by embedding real pansies in Castolite—the "magic" liquid casting plastic. Comes crystal clear, or may be dyed to produce gorgeous color effects. Make really different jewelry, book ends, picture frames, candle sticks, figurines. Embed real flowers, butterflies, coins, medals, photos, for novel plaques, paper weights, tiles, other art objects. Use only home utensils. Follow simple step by step method. New pleasure, fine profits are possible. Send 25c for exciting new Home Project Manual showing how to get started. Write today. The Castolite Company, Dept. L-34 Box 391, Woodstock, Illinois.

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