

## PHYSIOLOGY

**Metal-Enzyme Compound Determines Hair Color**

► THE REASON that human hair is brown or black or that rabbit hair is white or brown, is that different metals are linked up with enzyme or chemical-transforming substances in the body under control of heredity.

This is the new theory put forth by a group of Japanese geneticists at Osaka University and published in *Science* (Jan. 14).

They started with the knowledge that pigments derived from tryptophan, a chemical in insects, are composed of metallic complex salts.

A certain relationship between coloration and the type of metal is found especially in pigments assumed to be derived from tyrosine: namely, white is associated with nickel, yellow with titanium, red with molybdenum; blackish color involving blue, green and brown is associated with copper, cobalt and iron.

Analyses show that there is much more copper and iron in the black hair of the Negro and Mongolian races than in the medium brown hair of the Caucasian race.

*Science News Letter, January 29, 1955*

## PHYSICS

**Polarized Radio Signals Tested in Auroral Zone**

► POLARIZED RADIO signals are being tested as a method of long-distance communication in the zone of the aurora, or northern lights.

Changes in the earth's electrical "roof," or ionosphere, at times seriously hamper radio transmission around the world. In the far North, however, auroral activity is an added major cause of poor radio wave reception.

Polarization of radio waves may be a solution to one or both of these problems, experts at the Thayer School of Engineering of Dartmouth College, Hanover, N. H., believe. A team headed by Dr. Millett G. Morgan, director of research at the school, has devised special equipment by which the radio engineers can maintain consistent reflections of radio waves from the ionosphere for relatively long periods of time.

Their research is supported by the U. S. Navy. The Dartmouth experts worked out their method by sending radio waves straight up to the ionosphere, then observing the echoes from the various ionospheric layers on a television-like tube.

Now they have started on a series of long-distance transmissions between Hanover and special equipment installed at McGill University Sub-Arctic Research Laboratory at Knob Lake in Labrador and at the University of Saskatchewan in Saskatoon.

The Knob Lake installation is designed to test how effectively the new-type signal may be transmitted through the aurora. Knob

Lake is 900 miles north of Hanover, thus much of the region of greatest auroral activity lies between the two points.

Polarized radio waves may also be a solution to the problem caused by "SID's," or sudden ionospheric disturbances, when the sun may hurl out a great tongue of flame from which hydrogen atoms bombard the earth about 20 hours later. Shortwave radio can then be blacked out for periods ranging from a few seconds to several hours.

Dr. Morgan and his associates are also working on equipment for adjusting the polarized radio signals automatically to changes in the ionosphere from moment to moment.

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## PHYSIOLOGY

**Lung Full of Fresh Air Can Save a Diver's Life**

► A DIVER who must surface from a depth of 100 feet or more during an emergency can save his own life with nothing more than a lung full of fresh air.

Even though the actual time needed to reach the surface may be two minutes or longer, the escapee can expect to see daylight if he starts his ascent with a full supply of air and paces himself along the way. This was reported in the *American Journal of Physics* (Jan.) by Hilbert Schenck Jr., of Pratt & Whitney Aircraft, East Hartford, Conn.

Using basic physical concepts, Mr. Schenck analyzed the requirements for surfacing from great depths when a diving unit fails or the escapee has to abandon a sunken submarine. In his study, he found that the most dangerous point of the ascent is not as the surface is approached but at a specified intermediate depth.

The scientist pointed out that the psychological state of a person surfacing is of great importance as to whether he can pace himself properly and therefore live or die.

If the fact that the danger point is at an intermediate point in the ascent is made known to the diver, stated Mr. Schenck, then "the diver who sees a great extent of water over him and experiences a serious need for fresh air might be encouraged if he knew that the tension will not increase during the entire trip to the surface."

Essentially, he reported, the diver rising to the surface is doing no more than testing his ability to hold his breath, and breath-holding ability is extremely variable among various individuals, being as short as 30 seconds and as long as three minutes.

But, he added, even though the actual time for rising may be two minutes, the physiological effect is equivalent to holding one's breath for only 40 seconds.

Anticipating sudden air failure deep underwater in the open sea, Navy underwater swimmers are trained in emergency ascents from depths as great as 100 feet with no external storage reservoir, the scientist stated.

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**IN SCIENCE**

## MEDICINE

**Cancer Patients Lack "Q" Stuff in Blood**

► DISCOVERY THAT cancer patients have too little of a blood substance called "Q" was announced by the American Cancer Society.

Possibility of "Q" blood tests to aid cancer detection and even of "Q" in treatment of cancer was hinted, though it will take much more testing before this possibility becomes even probable.

"Q," not otherwise identified in the society's announcement, is reported to act "as a brake on the transport of stored energy from one part of the body to another."

Because cancer patients have a deficiency of "Q," "vital energy is transported at reckless rates and spent lavishly on the building and operation of useless cancer cells."

The "Q" findings were made in cancer-society-supported research by Dr. Allen F. Reid, biophysicist, and his associates at Southwestern Medical School of the University of Texas.

Some of the tests were made by incubating red blood cells in blood extracts which contained "Q." The more "Q" added to the medium, the less the red cells picked up phosphate energy. Normal blood extracts showed much more "Q" activity than did cancer blood extracts.

Pending further extensive test tube and animal studies, it will not be known whether blood determinations of "Q" offer any promise as an aid in the detection of cancer. It has not been possible yet to isolate enough "Q" to learn whether it would have any effect as treatment for cancer.

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## AERONAUTICS

**Rocket Engines Make Noise Like Jets**

► ROCKET ENGINES, the kind used on missiles, make the same sort of noise as jets, experiments by the National Advisory Committee for Aeronautics showed.

The three solid fuel rocket engines tested produced all kinds of noises but the peak was found to be in the lower audible range. Thus they rumble more than they screech. Measurements were made with sound pressure instruments and a tape recorder. The greatest noise pressure was recorded within a 45-degree angle downstream of the rocket exhaust. This angle is somewhat smaller, about 30 degrees, in a subsonic jet.

The work was reported by Leslie W. Lassiter and Robert H. Heitkotter, NACA scientists at Langley Air Force Base, Va.

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# CE FIELDS

## PSYCHIATRY

### New Drug Softens Electroshock Treatment

► ELECTROSHOCK TREATMENT of the mentally ill can be "softened" and patients thereby protected from broken bones by a new drug, succinyl-choline chloride, Dr. T. R. Robie of East Orange, N. J., reported in the *American Journal of Psychiatry* (Jan.).

When the patient is given this drug, the muscular force of the convulsion induced by the electroshock is reduced so that it can barely be seen, Dr. Robie stated.

After this convulsion, the patient has a period of transient arrest of breathing impulse which is overcome in 30 to 120 seconds by an oxygen resuscitator, Dr. Robie said. Then in five to 10 minutes the patient awakens with no recollection of the treatment.

The drug is given by injection into the veins together with the sleeping medicine sodium pentothal and atropine sulfate. The drug is trade-named Anectine by its manufacturers, Burroughs Wellcome and Co.

It has been used to "soften" electroshock treatment in an "extensive series" of cases at Bellevue Hospital, New York, by Dr. David Impastato. Dr. Robie called it an advance which "marks one of the most significant milestones in psychiatry" and said it assures greater safety to the patient than any previous development since electroconvulsive treatment was discovered.

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## GENERAL SCIENCE

### Only A-Danger Solution Is Avoid War — Russell

► THE WORLD has "only one way out" of its present situation and that is "to avoid war," Bertrand Russell, British scientist and philosopher, declared in a statement written for the *Bulletin of the Atomic Scientists* (Jan.).

"I cannot but think that, if the arguments against war are made sufficiently clear," Lord Russell said, "they may through the instrumentality of neutrals, convince the men in the Kremlin and in Peking."

"War cannot be avoided by an obvious and overwhelming preponderance of force on one side," he said. "The two sides are so evenly balanced that each, from patriotic bias, is likely to feel confident of victory. Confidence in victory is, on both sides, absurd. If war breaks out, there will be no victory but only universal defeat."

"The first step toward peace is to have this understood on both sides of the Iron Curtain. At present it seems that powerful

men on both sides have failed to appreciate the facts. In the West, even the most powerful men can be influenced by public opinion, and it is the duty of sane men to try to produce a sane public opinion. In Communist countries, it is only governments that count, and it is governments that must be convinced."

Lord Russell said that if it were possible to make both sides simultaneously acknowledge that their ends cannot be achieved by war, a genuine settlement would become possible. But he emphasized that it would have to be a settlement not representing victory for either side.

"Those who think of either communism or anti-communism as a Holy Cause to be pursued in a crusading spirit are out-of-date," he warned. "In a world of nuclear weapons each side must accept the existence of the other, or both sides, equally, must perish."

It is folly to imagine that it would be useful to prohibit the A-bomb and the H-bomb, he declared. No paper prohibition would prevent their employment after war has begun.

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## AGRICULTURE

### New Burley Tobacco Resistant to Wildfire

► THE FIRST burley tobacco with a marked resistance to the wildfire disease will be available to growers for 1955 planting, the U. S. Department of Agriculture has announced.

Tagged Burley 21, the new tobacco variety is also resistant to two other destructive diseases of burley tobacco, tobacco mosaic and black root rot.

Developed by the Department's Agricultural Research Service and the Tennessee Agricultural Experiment Station, Burley 21 eliminates the need for using chemical treatments to control wildfire. Immunity to wildfire, a bacterial wilt that is particularly harmful to tobacco leaves, was first transferred to plants of the burley type from a wild tobacco species.

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## ASTRONOMY

### Comet Discovered In Southwestern Sky

► A NEW comet has been found in the southwest sky by Guillermo Haro and Enrique Chavira of the Observatorio Astronomico Nacional, Tonanzintla, Puebla, Mexico, Harvard College Observatory, Cambridge, Mass., reported.

Magnitude of the diffuse object is 16, too faint to be seen without a large telescope. It was originally discovered on Dec. 18, but was not identified as a comet until now. (See SNL, Jan. 8, p. 21.) Since December, it has moved into the constellation of Eridanus, which is visible low in the southwestern sky in the evening.

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## ENGINEERING

### Aluminum Coating May Double Engine Life

► AUTOMOBILE ENGINE life may be increased, perhaps even doubled, by aluminum-coating some steel parts.

The coating protects the parts from oxidation and corrosion, four General Motors Corporation engineers told a meeting of the Society of Automotive Engineers in Detroit.

An even coat of the aluminum is achieved with a new process by spraying the metal on the steel part, then heating it in a flux bath until the coating melts.

The technique is particularly well suited to the treating of automobile engine valves which so far has been the major experimental application, Dr. R. F. Thomson, D. K. Hanink, E. B. Etchells and K. B. Valentine said.

In road tests, valves coated with aluminum lasted more than twice as long as uncoated valves made of the same steel.

The use of the Aldip aluminum coating on lift, or poppet, valves was the first application of the process to moving parts of an engine.

It was pointed out, however, that the technique has now progressed beyond the experimental stage and some production installations have been set up.

Success with the poppet valves, the engineers said, points the way to possible application of the principle in turbine engine parts and other high temperature motors where there is a tendency toward oxidation and corrosion.

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## MEDICINE

### Common Mechanism For Cancer-Formers

► CHEMICALS THAT cause cancer may all do it by attaching their molecules to protein molecules of the animal and human cells that then become cancerous.

Studies showing that this may be the mechanism which all cancer-causing chemicals have in common were reported by Dr. Charles Heidelberger of the University of Wisconsin, Madison, Wis., at the American Association for the Advancement of Science meeting in Berkeley, Calif.

In his own studies, Dr. Heidelberger worked with the highly active cancer-causing chemical, dibenzanthracene. The chemical was tagged with radioactive carbon in order to observe what happened to it in the animal body.

In studies of similar cancer-causing substances, Dr. Heidelberger found that the degree of cancer-causing activity was closely related to the degree of interaction between the cell protein and the chemicals. Protein-binding has been discovered for two other completely dissimilar types of cancer-causing substances by Drs. J. A. and E. C. Miller of the University of Wisconsin.

Science News Letter, January 29, 1955