

BIOLOGY

New Hemoglobin Discovered in Hindu

➤ A NEW TYPE of hemoglobin has been found in the blood of a human being.

The discovery was made when the blood of a Punjabi Hindu was examined in a London hospital and was reported by Dr. J. A. M. Ager of St. Thomas' Hospital and Dr. H. Lehmann of St. Bartholomew's Hospital, London, England.

Hemoglobin is the substance that makes blood red and gives it the necessary ability to carry oxygen from the lungs to the rest of the body. It is a complex protein that attracts oxygen molecules and holds them in a loose bond until they are carried to the tissues.

Without it human life could not go on, and when the amount of hemoglobin is low, or when there are too few red blood cells containing it, anemia develops.

Eleven types of hemoglobin are recognized now and these are distinguished by a test which measures their movements in an electric field. When the test was run on the Hindu, his blood was found to contain two types, one was hemoglobin A, a type already known, and the other was an unknown which will probably be named hemoglobin L.

The Hindu was born of the Khashtri caste in Pakistan and had a normal blood picture except for the new hemoglobin.

Types of hemoglobin now existing are A, C, D, E, F, G, H, I, J, K, and S.

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SOIL SCIENCE

Soil Phosphorus Measures Organic Waste

➤ THE VANISHED houses of prehistoric people have left traces in the soil on which they were built, Dr. Eugene F. Dietz of Madison, Wis., reports in *American Antiquity* (April).

Even when no visible evidence of the ancient habitation remains, Dr. Dietz reports, soil analysis can show that men once lived there. The reason lies in man's ancient habit of discarding the waste from the dinner table close to his tent or house.

This waste was composed largely of animal and bird bones, fish remains and other such organic material rich in phosphorus.

Modern soil science has shown repeatedly, Dr. Dietz notes, that where soluble phosphate is applied to the soils within the humid regions and where the soil is on the acid side, such soluble phosphate is quickly fixed by aluminum, iron and calcium ions. With time, the phosphorus is slowly leached into the subsoil. The indications are, however, that there is relatively little lateral movement of the phosphorus.

But, once the dissolved phosphates have become fixed in the soil, further dissolving by rain water is a very slow process. It would probably take thousands of years to dissipate the phosphorus.

Dr. Dietz, with the help of a nephew who

is studying soil science at the University of Wisconsin, made a careful soil analysis of a site where arrowheads and scattered chips of chert indicated that prehistoric Indians may have lived.

The tract was marked off in five-foot squares and a soil sample was taken from the center of each square. It was discovered that some of the very low values for phosphorus were found next to squares with high values.

It is possible that the low values show where the ancient dwelling was located and the high values where the refuse was heaped.

Another possible use for the soil sampling method is suggested by Dr. Dietz. High phosphorus values could indicate where to dig in mounds so that burials could be located without tearing up the whole mound.

Soil phosphorus could also pin-point where a large animal such as a mammoth or mastodon had died.

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ENTOMOLOGY

Aphid From Europe Has Foresters Worried

➤ CHERMES, AN UNWELCOME aphid from Europe, is on the loose in Washington's Gifford Pinchot National Forest. What to do about it is a multi-million dollar problem for which there is as yet no answer, Homer Hixon, forest supervisor at Vancouver, Wash., has reported.

Chermes landed—no one knows how—in the rich green carpet at the base of Mt. St. Helens about 1953 and it has been acting the part of the proverbial "bug in the rug" ever since.

The aphid has fanned out in a broad arc around the southern and western base of the mountain, destroying as it goes. Some 47,000 acres of prime forest containing many million board feet of timber are infested. And the foresters do not know how to keep it from going as far as it pleases. Chermes has no natural enemy in this country.

The only bright spot is that the insect so far has left Douglas fir trees pretty much alone, concentrating on white and silver fir. This infestation has reached epidemic proportions, Mr. Hixon said, and has extended to state and private lands as well as national forest domain.

Chermes at work looks like a scale—a type of pest familiar to many orchardists. It attacks the cambium layer of needles and smaller limbs, and within two or three years the tree is dead.

Action against it is proceeding on two fronts. A sub-group under the Pacific Northwest forest pest action committee has been set up to study ways of combatting the pest, including the possibility of finding and importing a natural enemy from Europe. Private, state and national foresters are represented on the committee.

Meanwhile the Gifford Pinchot foresters are salvaging as much as possible. Harvesting dead trees began in 1956 as some infested areas were opened to loggers.

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IN SCIENCE

ANIMAL PSYCHOLOGY

Grasshopper Hears Higher Frequencies Best

➤ A GRASSHOPPER is much less sensitive than you are to the low sound frequencies where the human voice is pitched, but when it comes to hearing the sound made by another grasshopper, the grasshopper's hearing becomes more sensitive while man's drops off.

This was revealed when Dr. Ernest Glen Wever and Jack A. Vernon, psychologists of Princeton University, amplified the nerve currents from an Atlantic grasshopper's hearing nerve and listened to them in a telephone receiver.

A grasshopper has no ear with which to hear. The purpose of an eardrum is served by a tympanic membrane, visible through an opening in the chest of the insect. It was from the tympanal nerve, serving this membrane, that the scientists listened in on the grasshopper's hearing.

The grasshopper is relatively insensitive at the low frequencies, 100 cycles per second or the deepest notes of a bass voice. But its sensitivity improves at a fairly regular rate of six to seven decibels per octave. At 15,000 cycles, which is the pitch of some kinds of grasshopper's chirp and close to the limit of human hearing, the grasshoppers tested still had less acute hearing than man, but the rate of improvement was such that it seems likely that at still higher frequencies the insect's hearing would surpass human ears.

The "voice" of a grasshopper does not come from a throat. Instead, the insect uses one hind leg as a kind of violin bow to produce the chirp by rubbing it against the other leg or against the wing case.

This "song" can apparently be heard better by another grasshopper than by man.

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AGRICULTURE

Chemicals Promote Lettuce Seed Sprouting

➤ A GROUP of chemicals that stimulate the germination of lettuce seeds has been reported by scientists at the University of Texas, Austin. Further tests are being made to determine if the chemicals have other plant growth promoting value.

Solutions of the new compounds in water caused 30% to 75% of the lettuce seeds tested to germinate in 48 hours. Only about seven percent of the seeds exposed to water alone germinated in the same time.

The growth promoting chemicals, 6-(substituted)-aminopurines, were prepared by Drs. Charles G. Skinner, Pete D. Gardner and William Shive, who report their findings to the *Journal of the American Chemical Society* (June 5).

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CE FIELDS

CHEMISTRY

Cobalt 60 Radiation Aids Chemical Reaction

► THE RADIATION from cobalt 60 can speed up the chemical combination of hydrogen and carbon monoxide into hydrocarbons by as much as 60%, two scientists have found.

The 60% increased yield continues for as long as 180 operating hours, R. W. Clarke and E. J. Gibson of the Fuel Research Station, London, England, report. It was discovered in studies aimed at finding a radiation effect that would work "for reactions of practical interest," they state in *Nature* (July 20).

Most radiation effects in solids disappear during quite short periods at room temperatures or higher, but the one they found lasts for a maximum of 300 hours at temperatures of more than 500 degrees Fahrenheit.

The synthesis of hydrocarbons from hydrogen and carbon monoxide, known as the Fischer-Tropsch process, takes place at high temperatures in the presence of cobalt or iron catalysts, which are materials that make chemical reactions "go" without being affected themselves. No radiation effects were found with the cobalt catalysts but unreduced iron ones increased yields from 10% to 60% for periods as long as 300 hours.

Besides this long lasting effect, the size of the particles irradiated by the gamma rays from cobalt 60 was found to be critical. Only those smaller than two millimeters, or about eight-hundredths of an inch, gave the increased yield.

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ACOUSTICS

Future Hearing Aid Will Stretch Words Apart

► A REVOLUTIONARY TYPE of hearing aid that not only amplifies speech sounds but also slows down their speed has been perfected in the laboratory but still must be made small enough for a person to wear.

This was reported by Dr. William G. Hardy, director of the Johns Hopkins Hearing and Speech Center, Baltimore, Md., to sales representatives of Zenith Radio Corporation meeting in Chicago.

One of the problems of present-day hearing aids is that they do not completely help people who have nerve losses. In rapid conversation these people miss many words because their hearing mechanism cannot respond as quickly as it does in normal people, Dr. Hardy told SCIENCE SERVICE.

A "sound-spacer" to solve the problem would be able to record the conversation

and then play it back in such a way as to stretch the words apart.

There are approximately 4,500,000 hearing aid users in the country and probably a third of them have the kind of neural loss that could be helped by a sound spacer.

The difficulty of words running together becomes more common with advancing age, especially in regard to women's voices.

Laboratory devices to accomplish speech stretching have used tape machines for recording and playback. This is so far the easiest way to do the spacing, Dr. Hardy said, but it is completely impractical for the average person.

It would require "a knapsack" of equipment to be carried around by the hard-of-hearing person. The main problem now is to develop a tiny electronic device to do the same job.

Other future improvements in hearing aids are expected to include binaural hearing devices that give an increased sense of the direction from which sound comes, and new hearing aids that can completely fit inside the ear.

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CHEMISTRY

Study of Simple Flames Can Improve Jet Engines

► CHEMISTS can create superior fuels and engineers can develop better jet engines by studying simple flames such as that of a kitchen gas range or an ordinary laboratory Bunsen burner.

That is the conclusion of three American chemists who presented preliminary results of research on the mechanisms of gas flames to the 16th International Congress of Pure and Applied Chemistry, meeting in Paris, France.

Drs. William H. Avery, group supervisor, A. A. Westenberg, project supervisor, combustion research section, and Robert M. Fristrom, Johns Hopkins University Applied Physics Laboratory, Silver Spring, Md., reported that data from studies of simple flames can be used in predicting the behavior of complex flames and reactions such as are produced in jet engines. Dr. Fristrom presented the paper.

Dr. Westenberg told SCIENCE SERVICE that nearly all chemical reactions, especially those involving high speed changes such as in flames, but also even some non-flame reactions, involve the same principles and mechanisms in getting from the starting materials to the final product.

"This means," Dr. Westenberg said, "that if we can learn exactly how a simple flame operates we could apply that knowledge to fuels and engines and even extend it to other chemical reactions that do not necessarily involve flames."

"Essentially, we are able to study a jet engine reaction without being confused by the many side reactions and combustion products of complex jet fuels," Dr. Westenberg explained.

He said the Johns Hopkins group, working under a Navy contract, chose propane, often used as a bottled cooking gas, for the initial study because of its simplicity.

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RADIO

Around-the-World Radio Reception Reported

► AN UNUSUAL record of around-the-world radio reception at very high frequencies is reported by G. W. Luscombe of the Radio Research Station, Ditton Park, Slough, Bucks, England.

Further studies of the mysterious method by which the signals are propagated are underway, since there is at present no satisfactory explanation for why the ionosphere would reflect radio waves of 37 megacycles by this roundabout path.

The reception in Great Britain of the delayed signals from Gibraltar was strongest between 9:00 a.m. and 10:30 a.m., Universal Time, Mr. Luscombe reports in *Nature* (June 20).

He believes the reason for this is that the great circle path on which the radio waves would have traveled is close to the twilight zone during these hours. The great circle path is longer than the direct one, accounting for the delay.

The delayed signals are heard about 140-thousandths of a second after the direct transmission. They were discovered in studies of very high frequency forward scatter propagation, which is a recently developed method of long-distance communications.

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PHYSIOLOGY

Acid-Balance Mechanism Of Stomach Discovered

► A DELICATELY balanced mechanism which helps maintain proper acid levels in the stomach has been discovered by a doctor at the University of California at Los Angeles Medical School.

Dr. Edward R. Woodward has found that the flow of hormones which stimulate acid secretion in the stomach is immediately "shut off" when the acid-alkaline balance of the stomach reaches a certain point.

These hormones are secreted by an area adjacent to the stomach's exit, known as the antrum. (This mechanism of acid control is in addition to that of the vagus nerves.)

A 10-year study by Dr. Woodward has helped detail the role of the antrum, which comprises about 20% of the stomach. The function of this non-acid-producing stomach area had long been a puzzle to medical science.

The presence of food in the stomach, and its resultant expansion, stimulates antrum hormone production, which in turn results in acid secretion. An upset in the hormonal mechanism may be one cause for the formation of gastric ulcers, Dr. Woodward says.

Surgical procedures for correction of duodenal ulcers have changed radically in recent years as a result of a better understanding of the antrum's function, Dr. Woodward points out.

A report of Dr. Woodward's findings appears in a recent issue of *Gastroenterology*.

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