SCIENCE NEWS

Science Service, Washington, D. C.

LIGHT FROM SWIFTLY MOVING ELECTRONS

A STRANGE glowing light can be caused by swift-moving electrons shot into a pure liquid. This light can only be accounted for if it is assumed that the moving atomic "bullets" are traveling faster than could light rays in the same medium. This strange happening, which might seem at first glance to controvert Einstein's theory of relativity but does not, is reported by P. A. Cerenkov in the *Physical Review*.

In a rough way the new phenomena are similar to the creation of sound waves by a bullet. Most every one knows that the "zip" of a bullet comes along after the bullet has passed; that is, the speed of the bullet is greater than the speed of the sound waves which it creates.

In the Russian experiments, just reported, the "zip" of the electron bullets is not sound but light; very faint but real. The atomic electron bullets used in the experiments were obtained either from disintegrating radium as the so-called beta rays, or as the Compton recoil electrons created when gamma radiation impacted the pure liquids under study. Both kinds of electron bullets produced the light.

A strange characteristic of the new kind of light is its distribution in space. It does not come out, from the liquid being studied, equally in all directions. Rather it tends to issue forward along the line in which the electrons are traveling. In the photographic records obtained of the light, it appears to be something like a headlight beam coming out from the swift-moving, but invisible, electron beam.

A basic postulate of Einstein's theory of relativity is that in a vacuum the speed of light would be constant and the "fastest" thing in the universe. In liquids and other mediums of light propagation, however, the speed of light, as is well known, is less than the ideal postulate of Einstein. Thus it is strange, but not necessarily remarkable, that the only explanation of the new-found light which completely explains the phenomenon, consists of assuming that the electrons race through the pure liquids faster than could light rays.

THE AGE OF THE TOP OF MOUNT WHITNEY

THE top of Mount Whitney, highest peak in the United States proper, may be many millions of years older than the mountain range which it tops, is suggested by François E. Matthes, of the U. S. Geological Survey.

Mr. Matthes points out that the Sierra Nevada is not the first mountain range to occupy the region east of California's great valley. Long before the Sierra was uplifted, another mountain range, or system of ranges, stood in the same place. And that earlier system itself was a late comer in geologic history, for it rose during the age of giant reptiles, only about one hundred million years ago, after the earth had gone through a period of approximately a billion and a half years of spasmodic upheavals and sinkings.

Geologic studies of Mount Whitney have shown that it belongs to an entirely different category from the sharp, glaciated peaks that are characteristic of the High Sierra. With its gently sloping tabular summit, it obviously is not an alpine mountain form, and could not possibly have been fashioned at its present high level by the erosional processes that produced the precipitous peaks so characteristic of the range.

It is, evidently, a remnant of some ancient landscape—of one of those earlier ranges that once stood in the region now occupied by the Sierra Nevada. For nearly eighty million years these ancestral Sierras were in existence, and during that time were gradually worn down by the processes of erosion until presumably there remained only rows of hills in a lowland that sloped gently down to the sea. Then, about fifty or sixty million years ago, began the first uplifts that led to the rise of the present Sierra Nevada.

Mr. Matthes, admitting that it is a daring thought, advances the idea that the summit platform of Mount Whitney is a remnant of one of those ancient lowland hills. The ancient ancestral hill, called Whitney Hill, apparently was but 1,500 feet high some 35 or 45 million years ago. To-day, as the summit of Mount Whitney, it rises 14,494.7 feet above sea-level. Because of its hard granite summit, Mount Whitney is more resistant to erosion than the younger peaks of the range. During the ice age and all postglacial time—a period of a million years in round numbers—Mount Whitney appears to have been reduced in height by weathering only 12 or 16 feet.

THE EVOLUTION OF THE CECROPIA MOTHS

EVOLUTION at work, geologically speaking, in quite recent time, and very probably still at work, has been traced with the help of some big moths, by Dr. W. R. Sweadner, of the University of Pittsburgh.

Dr. Sweadner's subjects were the common and widely distributed cecropia moths—big, hairy, handsome fellows with crescent-shaped white spots in their wings. Although they all look rather alike to the casual observer, there are enough differences in structure and marking to separate them into eight distinct species, spread clear across North America. Each species has its own territorial range.

Examination of Ice Age history makes it highly probable that during that revolutionary epoch there were three species of these moths—eastern, central and western—each kept away from its neighbors' range by natural barriers, which operated not directly on the insects but on the food plants on which they depended.

As the Ice Age drew to its close, the trees and shrubs on which the cecropia caterpillars feed followed the retreating edge of the glaciers northward. Well up in Canada, the range of the plants spread to east and west, and the moths extended their range with them.

This brought the hitherto separated species into contact. Interbreeding occurred, and played a very important part in the development of several additional

species. Indeed, one of the species now recognized is considered by Dr. Sweader to be merely a complex of hybrid intergrades between two overlapping elder species, and not a distinct group at all. Dr. Sweader demonstrated the possibility of producing definite new forms by cross-breeding the various species in the laboratory.—FRANK THONE.

THE CONTROL OF CROWS ON DUCK-BREEDING GROUNDS

A SURVEY by E. R. Kalmbach, of the U. S. Biological Survey, shows that crows are major enemies of wild ducks in at least a part of the great wild duck breeding grounds in Canada. Of 512 duck nests studied, 31 per cent. (156 nests) had been ravaged by crows. Other causes of destruction accounted for another 20 per cent. of loss, so that of all the nests that started the season with hopeful batches of eggs, only 49 per cent. turned out live ducklings.

It is possible, however, Mr. Kalmbach notes, that part of the egg destruction by crows might have been wreaked after the parent ducks had abandoned the nests for other causes. Furthermore, this survey was made in a part of the nesting area where the crow concentration is unusually high, and where a large duck population offers unusually great temptation to raid for eggs. The overlap of crow range and duck-nesting area does not represent more than about a sixth of the whole productive waterfowl nesting area in Alaska and Canada. So crows can not be counted universal enemies of ducks.

Mr. Kalmbach recommends that, for practical control purposes, "Crow-control operations on duck-breeding grounds should by all means be entrusted only to those who fully recognize the hazards associated with human intrusion on waterfowl nesting grounds. The work should not be carried out haphazard or by mass action devoid of careful supervision. There should, in fact, be solicitude for the privacy of every nesting duck. At winter crow roosts, where control is possible at a lower cost per bird, the benefits with respect to waterfowl are, in turn, less direct, since only a part of the birds present at these roosts (number at present unknown) actually enter the problem of crow-waterfowl relationships on the breeding grounds. For the present, and probably for years to come, such control may wisely be restricted to those federal, state, or privately managed areas to which crows have been attracted in unduly large numbers by the presence of nesting waterfowl and on which consequently the delicate problem of control may be kept in experienced hands."

FLIGHT RECORDERS FOR COMMERCIAL TRANSPORT PLANES

SIXTY "flight analyzers," to make automatically a record of almost everything going on in an airplane between taking-off and landing, have been installed on the planes of the United Air Lines and are expected shortly to become standard commercial aviation equipment.

The analyzer, which consists essentially of a barograph to register altitude, a device to record when the automatic pilot is in use, a clock and a recording device, will tell rate of climb, rate of descent of the plane and the comparative smoothness of the flight. A small chart, three inches by five inches in size, constitutes the recording device of the "analyzer," which is placed in the tail of the ship prior to take-off and removed immediately upon landing. The number of radio telephone reports from the plane to ground stations and the time each was made is also noted automatically.

Immediate analysis of the record made by the device is provided for in the air line's operation, it was stated. From the chart markings, it is possible for the pilot himself, the dispatchers and chief pilots to reconstruct completely the story of the plane's flight. The device is expected to improve efficiency of operation, particularly of the operation of the automatic pilot, now used between 85 and 90 per cent. of the time the plane is in the air, exclusive of taking off and landing. Company officials will also be able to check on whether safety regulations with regard to altitudes at which the planes fly have been carefully observed. A check is also provided on the airways' traffic control scheme enforced in major airline services. Eastbound planes fly at "odd' altitudes, while westbound planes cruise at "even" altitudes.

The device, including the barograph and the electrical instruments, that note radio telephone use and operation of the automatic pilot, is housed in a duralumin casing weighing but three pounds and measuring but five and a half inches by eight and a quarter inches. A new analyzer is placed in the plane at each stop. The device can operate for eight hours, much longer than any scheduled non-stop flight. The analyzer will also aid future safety work by providing a permanent record of what went on in the plane before any accident that might occur. Analysis of accident causes has frequently been hampered in the past by the fact that little was known of the plane's behavior immediately before disaster overtook it.

A NEW SHIP STABILIZER

OIL has been poured on raging seas to calm turbulent waves which threaten shipwreck. Now comes Edward R. Carroll, of Brooklyn, N. Y., with an invention which is intended to do the same thing, but keeps the oil in the ship's tanks. The invention provides an ingenious control of the swishing of the oil inside the tanks which counteracts pitching and rolling of the ship. Used on battleships, it would keep the ship steady so that the aim of its guns wouldn't be spoiled.

Carroll's invention, described in a patent recently granted to him, is designed for ships with engines that burn oil for fuel, such as Diesel engines. The ships would be provided with a double bottom and wing tanks built in the sides, in which the oil is stored. Unlike the conventional storage tanks, these tanks and the double bottom are divided up into long cells by iron plate-like partitions. Valves in the partitions can be controlled from a central station. By opening and closing the valves, flow of oil from one cell to the other is controlled. Whenever the ship begins to roll, the valves distribute the flow of oil so as to act as a counterweight to the roll. Thus, when the ship tips to starboard, all the oil can not move instantly toward that side. It is held on the port side

and, acting like a person on a see-saw, helps to right the ship.

Similarly any synchronism between waves and motion of the ship which leads to violent rolling would be broken up. Such synchronism increases the roll to the point where it endangers the ship. It is brought about by the same principle involved in swinging. Just as a slight push at the proper moment sends the person in the swing higher into the air, so waves in synchronism with the roll of the ship, can cause it to roll and pitch more and more steeply.

THE TREATMENT OF ACNE

FOR acne, local skin cleanliness brings the best results. Medical research workers believe that improperly functioning endocrine glands are probably responsible for acne. But no glandular substance found is enough better than local treatment to justify the expense and effort of its administration.

Twenty-nine students at the University of Iowa have recently been treated for acne as a part of a scientific experiment. Dr. Grace E. Williams, medical adviser to women, and Dr. Ruben Nomland, professor of dermatology at the university, report their observations on these students in the *Journal* of the American Medical Association.

With evidence pointing to a deficiency of sex hormone in acne patients, twenty-eight women students and eleven men, the average age being nineteen years, were examined. Of these eleven had severe, twenty moderately severe and eight mild acne. All thirty-nine students were asked to give meticulous attention to details in the care and treatment of their skin. In addition, twenty of them were treated with sex hormones, while the remaining nineteen were also given injections but the injections were merely sterile water. The students did not know which were getting hormone substance and which were getting water.

Treatment went on for from four to six months with 85 per cent. of those given the hormone substance showing moderate to marked improvement and 78 per cent. of the control group given sterile water showing the same degree of improvement. At the end of the experiment it was concluded that a deficiency of the pituitary-like hormone is not an important factor in causing acne and that the local treatment is still the best for its control.

Here are the instructions that were given to most of the students: Stop all picking and squeezing. Discontinue the use of all cosmetic creams. Wash with soap and water twice daily, keeping the skin non greasy almost to the point of scaling. Eat a diet low in carbohydrates. Eat no candy. Remove blackheads by placing hot towels on the face for five minutes, then applying a thin coating of 3 per cent. resorcinol in cold cream to the face and again applying hot towels for five minutes. The blackheads are then squeezed out with a comedone remover, the face rinsed with cold water and hamamelis water applied. Apply a prescribed lotion two or three times a day. Avoid iodized salt. Shampoo the hair twice a week.

ITEMS

BEFORE geologists and soil scientists at the Denver meeting of the American Association for the Advancement of Science, Vern O. Stebbins, of the U. S. Soil Conservation Service, showed how soil ailments are diagnosed in order to prescribe treatment. There are five general types of soil surface in the soil conservationist's diagnosis chart, ranging from virgin soil areas showing no apparent erosion down to sheet erosion that has eaten away all the topsoil and the best part of the subsoil. There are also three stages of severity in gullying, and four types of land slope. By combining these three kinds of classification on one map, it becomes possible to see at a glance what ails a particular field or group of fields, and to suggest treatment that will lead to restoration of soil health.

BATS play the rôle of bees in pollinating certain kinds of bananas, according to Dr. L. van der Pijl, biologist of the Netherlands East Indies. Certain species of these flying mammals have very long tongues, equipped to collect pollen for food. They move from flower to flower, and in so doing transfer enough of the pollen surplus to effect fertilization. The banana flowers visited by the bats have an odor quite disagreeable to human nostrils, which is said to be like that of the bats themselves, and hence presumably attractive to them.

PLANT foods raised on "artificial" fertilizer are not inferior to foods raised on "natural" fertilizer, despite recent declarations to the contrary, it has been demonstrated by experiments in the laboratory of Professor Arthur Scheunert, of the University of Leipzig. Professor Scheunert used two groups of rats, six males and twelve females in each. He kept one group on a diet composed entirely of plant foods raised with "artificial" fertilizers, the other on foods raised with "natural" fertilizers. At the end of two and a half years, the animals in both groups were approximately equal in body weight and general health. However, the artificial-fertilizer group had considerably surpassed the others in the number of offspring.

CARL ZEISS, INC., under date of August 10, has written to Science Service as follows: The map projector MULTIPLEX has been developed by CARL ZEISS, JENA. Numerous instruments of this type have been sold and many are in use also in the United States. The Army Air Corps uses 18 Zeiss Multiplex projectors and the Geological Survey has a whole battery of them in use on the Tennessee Valley project. We regret that the name of the firm which alone and completely developed this method and the Multiplex projector is omitted from this article. Bausch and Lomb Optical Company are only just beginning to manufacture Multiplex projectors having received a license from Carl Zeiss to manufacture them. On account of the law making it obligatory for the Army to buy domestic products, an order for such Multiplex projectors was placed by the Army with the Bausch and Lomb Optical Company.