SCIENCE NEWS

THE SUN'S PLACE IN THE UNIVERSE

Science Service

STATISTICS of the stars, which are becoming increasingly valuable each year as the astronomer finds new and illuminating data continually coming to hand, do not give our sun such a flattering position in the universe as we might wish. A small, yellow, dwarf star is its rating in a universe of some hundreds of millions of stars, similar in size and appearance to many million other stars; its position fifty light years above the central plane of the Milky Way and fifty thousand or more light years from its center, in the midst of a local star-cloud, not over three thousand light years in diameter, which is more or less permeated with and enveloped by vast expanses of dark nebulous matter.

It was but a few centuries ago that man looked upon the sun as an attendant of the earth which was then held to be the center of creation. Then it came about, surprisingly, that the sun was after all the ruler of its own system and the earth an attendant of the sun, a rather puny one at that compared to some members of the solar system. It was a thought to which the human race has not yet completely adjusted itself. Still man clung to the belief that the sun was the center of the universe, for the distances and distribution of the stars were unknown. It was the general idea that the stars were all equally far away, arranged in a sort of spherical shell with the sun at the center. Another unpleasant shock was still to come to the geocentrically inclined members of the human race. New and surprising facts about this sun of ours were gleaned from the life studies of many astronomers as the years passed on. The stars were not all equally distant, but were flowing to and fro in streams in or parallel to the Milky Way and the sun was moving onward through space at the rate of a million miles a day, one of the units in a star stream. The distances of the stars turned out to be tremendous, inconceivable. The nearest star was something like twenty-six trillion miles away. Its light took four and a third years to reach us though it traveled 186,000 miles every second. Other stars were found—ten, a hundred, a thousand times more distant. Each star had the comfortable elbow room of several trillion miles on the average, its distance from its nearest stellar neighbor. Old, conservative ideas of the universe were completely upset. As a last straw for the old geocentric theorists came the discovery of the present decade that we are something like fifty thousand light years from the center of the universe, or possibly *one* universe, which consists of the vast lens-shaped aggregation of hundreds of millions of stars known as the Milky Way or Galaxy with its center far away in the direction of the star clouds of Sagittarius.

Though Dr. Harlow Shapley's estimate of three hundred and fifty thousand light years for the diameter of the Milky Way has not passed unchallenged by some astronomers who consider it of the order of ten times too large, the general weight of the evidence at present seems to be in favor of this greater estimate of the size of the Milky Way. It is to the Milky Way system of stars that our own sun belongs and through it we are moving with the sun, about which we circle, at the rate of a million miles every day, six million million or six trillion miles in 15,750 years.

At that rate it would take us pretty close to eight hundred million years to reach that coveted position at the center of the universe. But the sun is old, at least several billion years old, it is suspected, and, who knows maybe we were there once in past ages and will get there again some day!—*Isabel M. Lewis.*

SWEDISH ANTHROPOLOGICAL EXCAVATIONS

Science Service

THREE skeletons of persons who died 4,500 years ago in Sweden are among the many valuable relics of the Stone Age which Swedish archeologists have unearthed this summer in their assiduous efforts to reconstruct Sweden's prehistoric past. Other objects among the new finds now being studied are weapons, tools and pottery from the Stone Age, funeral urns, bronze axes, swords, etc., from the Bronze Age, remains of workshops in the Iron Age, hoards of gold and silver treasures amassed in the Viking Age, and various relics that shed light on medieval life in Sweden.

Another interesting find, made earlier in the summer while excavating in the market-place of the ancient town of Visby, were the remains of a workshop in which bone objects had been made. Antlers of moose and deer in various states of manufacture, and various horn objects such as combs, chisels and punches, were found. These objects, it is said, belong to the latter part of the Iron Age. Relics of medieval times, when Visby was in her prime, are frequently found, the latest being a domestic aquarium, in which, according to custom, fish were preserved alive until the time when they were to be served up in a favorite dish for some merchant prince of the city. Four or five aquariums of this type have previously been found in Visby.

A curious and unique object recently found at Laholm, in the province of Halland, is a flint saw from the Stone Age. And another object of special interest in the study of Stone Age civilization in Sweden is a grindstone for sharpening stone tools and weapons, which has been found this summer near Piteaa, on the Gulf of Bothnia. Piteaa is only about sixty miles south of the Arctic Circle. The curious appearance of this grindstone has led the experts to the theory that it was once used by the Lapps as an idol—a strange elevation in service of a common object that had lost its practical utility at least 3,000 years earlier.

At Laholm were also found interesting relics of the Bronze Age, dating back to 1,500–1,000 B. C. The finds include a beautiful bronze sword nearly two feet long,

and two exquisitely shaped burial urns, of which one was about one foot in diameter. Bronze Age antiquities of great value will probably be unearthed at Sohoeg, between Trelleborg and Falsterbo, on the most southerly tip of Sweden. Bronze axes were found on this site half a century ago, and excavations now begun in earnest have already yielded hundreds of objects. The finds date back to about 1,500 B. C. The prehistoric burial grounds at Sohoeg are believed to be haunted, and it figures in a great number of ghost stories and weird legends that are a part of the folk lore of this region.

Contrasting with the severe and gloomy character of the preceding ages in the civilization of Sweden is the picturesque and romantic Viking Age. The Viking relics found this summer include ornaments and coins of silver and gold that testify to the far-flung adventure and commerce of the daring seafarers of the ninth and tenth centuries A. D. Thus at Igeloesa, in Skaane, a farmer recently came across a buried treasure of silver money, 2,037 coins in all. He has just delivered the treasure to the government, and, according to law, has received the value of the silver in weight, or about $86.00, plus one eighth for the "antiquity value." Most of these coins are English, dated during the reign of Aethelred II, 978 to 916 A. D., and are doubtless part of the tribute money which the Viking raiders of that day exacted from England. The other coins are Irish, German and Arabic. A lot of Arabic coins of this period have also just been found in Ytterenhoerna, in the province of Soedermanland. Between twenty and thirty thousand Arabic coins in all have been found in Sweden and testify to the close commercial relations which the Vikings had with the Near East, as well as with Western Europe.

DO TRANSPLANTED EYES SEE?

Science Service

Do transplanted eyes see? Can the eye of an animal, taken out of its socket and transplanted into the head of another animal, or into the opposite side of the same head it was taken from resume its normal function?

Scientists of two continents are in dispute over the experiments of Dr. Theodore Koppanyi, at the University of Chicago. Obviously, if Dr. Koppanyi's experiments are successful, they may eventually be of immense importance in surgery. But Professor Joseph Imre, Jr., Dr. Koppanyi's countryman, claims that successful transplantation has not been accomplished, while Professor A. J. Carlson, in charge of the Chicago laboratory where Dr. Koppanyi is working, states that the experiments have had at least partial success.

Numerous newspaper reports relative to the possibility of transplanting the eye aroused the controversy among scientists which comes to light in the *Journal* of the American Medical Association.

Professor Joseph Imre, Jr., head of the department of diseases of the eye in the State University of Pecs in Budapest, points out that he considers it his moral duty to relate the results of investigation in this connection. His investigations have shown him that Dr. Koppanyi, a biologist, performed experiments on rats and rabbits in attempts to find out whether or not an animal with a transplanted eye could see. According to Professor Imre, Dr. Koppanyi cut the muscles and cut tissues around the eyeball and left the eye in place, and there was no proof that the optic nerve was cut through. He says, furthermore, that in every case in which the operation was witnessed by physicians and the eyeball was removed from its place, there never was any other result but complete destruction of the eye.

Professor Imre believes that even if the optic nerve could grow again, a condition which has never been established, and even if there were a possibility of transplanting a complete eye from one man to another, the question could not have any practical importance, because no physician should be allowed to, and no physician with any conscience would remove an eye with good vision for making a rather uncertain experiment.

Following the publication of Professor Imre's article, Professor A. J. Carlson, of the department of physiology in the University of Chicago, replied on behalf of the scientific status of Dr. Koppanyi's work. Professor Carlson points out that Dr. Koppanyi has been on the research staff of his laboratory in the University of Chicago since January, and that such newspaper stories as have appeared have not been authorized either by Dr. Koppanyi or by the laboratory. Experiments have been made on spotted rats, and the transplanted eyes have undergone varying degrees of change from complete destruction to mere cloudiness of the tissues. The cause for failure in most cases is believed to be secondary infection.

In the most successful experiments, the transplanted eye appears normal in size; the cloudiness clears up, and, so far as has been determined there may be some return of vision. Professor Carlson has controlled Dr. Koppanyi's work and believes that it demonstrates definitely that transplantation can be carried out with at least partial success on the spotted rat. He points out that it remains to be seen whether such results can be duplicated in the dog and the monkey, and if this is achieved, there still remains a very high percentage of complete or partial failure which must be converted into success before any one would be justified in attempting any such operation on man.

Supplementing the letter of Professor Carlson, Dr. Koppanyi declares that the charges of Professor Imre that he gave unwarranted publicity to his work, stating that the return of vision is possible, and admitting that the optic nerve was not cut in his eye transplantation experiments, are not true.

INVESTIGATION OF THE WHITE INDIANS

Science Service

THE White Indians of the Darien region of Panama have been given a preliminary inspection by a committee of scientists consisting of Dr. Aleš Hrdlička, anthropologist of the Smithsonian Institution, as chairman; Dr. Charles B. Davenport, of the Station for Experimental Evolution, Cold Spring Harbor, L. I., and Dr. C. W.

Stiles, of the U. S. Public Health Service. The committee, in a communication to R. O. Marsh, the explorer who discovered the White Indians, recommends a thorough study of the newly found people in their own land by an expedition of scientists. The committee's letter follows:

"The committee of Drs. Hrdlička, Davenport and Stiles, which you desired to take charge of the study of the 'White Indians' of Panama whom you brought to Washington for the purposes of investigation, held a meeting after these Indians were examined last Friday at which the whole matter was discussed and the following conclusions arrived at:

"The problem of the 'White Indians' is one of much scientific interest, but its satisfactory solution is only possible by a detailed and all-sided study of these people and their families in their own country.

"The committee is of the opinion that these investigations should be conducted simultaneously by anthropology, genetics and pathology.

"In order that the results may be satisfactory, it is requisite that the research should be carried on by experienced and reliable men, whose findings will be accepted with confidence by their colleagues.

"The first condition for a successful carrying on of the work should be, in the opinion of the committee, the training during the remainder of the year of two or three of the persons now in your party in the English language and such terms as it may be necessary to use with the Indians. Considerable questioning will have to be done, particularly by the anthropologist and geneticist, which would be quite impossible without well-qualified interpreters. Two of the men of your party, the fathers of Margaret and Alfred, would seem particularly promising in this direction. It is felt tnat the two and one third months remaining of this year would be sufficient to form these men into invaluable interpreters for the scientific party.

"The committee would appreciate a statement from you as to whether or not you desire it to take charge of whatever further work is to be done on these Indians."

Mr. Marsh stated recently that he intended to cooperate in every possible way to facilitate carrying out the recommendations of the committee.

TESTS OF AEROPLANES

Science Service

WHEN an aeroplane reaches a speed of three hundred miles an hour or more, or a great bomber climbs to the clouds carrying a couple of tons, back of the daring pilot are the engineer and the physicist who give him a perfected machine that will respond to the demands he makes on it. Professor Joseph S. Ames, of the Johns Hopkins University, chairman of the executive committee of the National Advisory Committee for Aeronautics, tells in the "Annual Report" of the Smithsonian Institution, shortly to come off the press, of the work of the scientists in the laboratories that makes possible the record-breaking flights.

Two principal methods, according to Dr. Ames, are used in testing improved models of wings and other airplane parts. One, the free-air method, consists in carrying the part to be tested beneath an airplane in flight, with instruments attached to measure its behavior. The other method consists in placing the test parts, built in the designed shape but on a smaller scale than in service models, in a specially constructed tunnel, and driving against them a current of air moving at the airplane speed.

For testing models of high speed airplanes a special type of wind tunnel is necessary, so as to simulate the conditions the planes meet in actual flight. This tunnel is built inside a tank, in which the air can be raised to as much as twenty-five atmospheres, or 375 pounds per square inch.

Research in aeronautics most needed at present, says Dr. Ames, is included under the following heads:

1. Investigation of the properties of propellers operating at a considerable angle to the line of flight. Information must be gained on this point before successful helicopters or machines rising vertically can be built.

2. A greater range of speed for any one airplane, so that it may attain a great flying speed and yet have a slow landing speed.

3. Reduction of the "drag," or resistance of aircraft. Much experimentation in the distribution of weight, arrangement of engine and propeller, position of fuselage, etc., must be carried on to approach a solution of this problem.

4. Greater refinements of wing form, in the interests of greater efficiency and economy.

ITEMS

Science Service

THE Highway Research Board of the National Research Council, of which Charles M. Upham is director, is about to begin an intensive inspection of reinforced concrete roads throughout the United States which have been in service for at least five years, with reference to all sorts of climatic and traffic conditions. From this survey an effort will be made to determine the influence of steel reinforcement on the resistance of the slab to traffic, subgrade and climatic conditions; the conditions under which steel reinforcement is especially beneficial to concrete slabs; the effect of a slab design on the efficiency of the reinforcement; the relative initial cost and annual maintenance and renewal charges of plain and reinforced concrete roads.

IT seems probable that the British Parliament will forbid the use of formaldehyde in any article of food or internal medicine. A departmental committee appointed to investigate the matter has strongly condemned it as a food preservative. Formaldehyde or formalin solutions are highly efficient as general external antiseptics and disinfectants, but are commonly thought to be too poisonous to be taken internally with safety. The action of the drug is cumulative, so that several small doses taken at intervals may have the same effect as a larger quantity swallowed at once. In the United States, the Federal Pure Food and Drug Act absolutely prohibits the use of formaldehyde in the preparation of any food or drug to be taken internally.