SCIENCE NEWS

Science Service, Washington, D. C.

FOUNDATION FOR THE 200-INCH TELESCOPE

WITH 50 workmen prepared to pour the concrete for the foundation of the world's largest 200-inch telescope on Mount Palomar, California, which is 6,126 feet high, an ultra short-wave experimental radio station has been installed to facilitate instant communication on construction progress with scientists in charge at the California Institute of Technology in Pasadena, 100 miles away.

Operating on a wave-length of seven meters, the radio station, having call letters of W6XKY, is in direct communications with station W6XKX on the roof of the Astrophysical Building at Pasadena. Because of the directional effect of such short waves the antennae of both stations are focussed on each other. The stations are serving the double purpose of furnishing heads of the project with direct communication facilities and of permitting Caltech and Bell Telephone investigators to experiment with such short waves.

Wave-lengths under 10 meters have been considered of little commercial value, and these stations, in addition to furnishing communications, also are supplying data on the behavior and nature of ultra short waves, information heretofore unavailable. Operating on 7 meters, the stations are unable to tune into any others.

As a result of this radio installation, Captain C. S. McDowell, supervising engineer for the telescope, stationed in Pasadena, can get into instant touch with supervisors on the mountain regarding construction details.

In addition to construction of the 200-inch telescope foundation, workers are completing the machine shop and power equipment structure in which two generators, driven by Diesel engines, will be installed to furnish power to the village at the site.

Experts are installing the Schmidt telescope in a dome completed some time ago. Observations with this 18-inch reflector, an auxiliary "eye" to the 200-inch mirror, will furnish an index on seeing qualities by the time the giant telescope is completed and ready for use.

A 1,000,000-gallon water reservoir has been built, as have two Diesel oil storage tanks, in addition to bungalows to house workmen and scientists.

The contract for fabrication of the 200-inch telescope tube has been awarded to the Westinghouse Company in Philadelphia. This part of the telescope, including a giant yoke, will have a weight of approximately 900,000 pounds. Delivery of the tube won't start until the dome is completed. The dome itself won't be started until after a surfaced high-gear road is laid down to the site, probably next spring.

No other major construction is planned for the remainder of 1936. A skeleton crew will be maintained during the winter, laying water mains, installing transmission cables, and doing additional work on the 200-inch instrument foundation which will be separate from the foundation for the dome to reduce vibration and shock on the instrument.

SPECTROSCOPIC ANALYSIS OF HEMOGLOBIN

THE first complete analysis of the spectrum of hemoglobin, the complex blood pigment that carries life-giving oxygen from the lungs to the rest of the body, was reported to the spectroscopy conference at the Massachusetts Institute of Technology, on July 21, by Dr. David L. Drabkin, of the University of Pennsylvania.

His investigation, made with the spectroscope, reveals much unexpected information concerning the body's oxygen carrier, whose importance is realized, but about which much remains to be learned. The research is expected to afford a better understanding of the nature of the union of hemoglobin and oxygen or other gases, and of the energy changes involved in this union.

Why nature has chosen a colored pigment to carry oxygen, why hemoglobin, with its huge molecular weight of 68,000, is used to carry oxygen whose molecular weight of only 32 seems insignificant in comparison, how the globin is attached to the iron-porphyrin groups are other problems Dr. Drabkin's research may solve by its analysis of the whole living blood. On the answers may hang some of the most important and valuable discoveries medicine has made concerning the human body in recent years.

Dr. Drabkin used the spectroscope in his investigation to analyze the light given off by hemoglobin when he hurled tiny electrons into the very atoms of which the plasma is composed.

The most significant fact disclosed was the unexpected one that the tell-tale rainbows of light, by which substances are identified, were regularly spaced along the spectrum, and that the complete picture of hemoglobin represented the additive result of the individual characteristic bands, whose structure could be expressed mathematically.

This regular spacing, previously demonstrated only with relatively simple chemical substances, enabled Dr. Drabkin to derive a formula which greatly simplifies the complicated spectroscopic picture of the hemoglobin spectrum.

RHYTHM AND THYROID FEEDING

DR. N. KLEITMAN and Dr. S. Titelbaum, of the University of Chicago, taught their dogs to show they had a sense of rhythm by lifting the same foot every time they heard a metronome beating one hundred times a minute. Each time the metronome was operated at this speed the dogs, placed in a small wooden enclosure for the duration of the lesson, received a small electric shock in one hind leg, until finally they learned to avoid the shock by raising the leg as soon as the metronome signal was heard. Since their legs were not shocked when the metronome was run at other than the one-hundred-a-minute beat, the dogs learned to respond only to this. When their training was complete they underwent a three-day final examination. The metronome was run at the correct rate several times during each day, to be sure that the dogs

would respond properly. Five experimenters, each working independently with his own dog, carried on the work.

Now the dogs were tested with the metronome running at various speeds, the one to which they had been trained to respond, and others as close to this as they could distinguish. Careful records of just how accurate was each dog's sense of rhythm were kept.

Then the dogs were fed thyroid gland material. They showed they had a better sense of rhythm on this medication by not responding as often as before to beats close to the one-hundred-a-minute one to which they had been trained. Furthermore, they moved their legs more energetically in response to the correct beat while on thyroid.

Two of the animals had a superior rhythm sense, and made especially good grades in their tests even when not given any thyroid. These showed no improvement on administration of thyroid. Normal animals grew fatigued toward the end of each experimental period of 5 to 10 days and got poorer grades at the close of each one. But the thyroid dogs appeared only to hit their strides as each trial progressed, and made better showings towards its end than at the beginning.

The object of the study was not to find out about dogs' rhythm but to learn whether or not thyroid affects conditioned reflexes, such as that set up in the dogs, and differentiating ability, such as enabled the dogs to distinguish between the different rhythms.

The study just reported is part of a study of sleep. It is hoped to learn what part conditioned reflexes and differentiation may play in producing "internal inhibition" and sleep. For a substance is needed which will control differentiation, increasing or decreasing it at will, and thyroid extract appeared as a possibility.

INJURIES TO ATHLETES

DR. MARCUS H. HOBART, who, for twelve years, has been handling athletic injuries at Northwestern University, finds that on athletic fields more injuries occur to the knee than to any other part of the player's anatomy. He presents in the *Journal* of the American Medical Association a review of his experiences, with detailed statistics on the injuries that have occurred in that university in the last five years.

Football, as might be expected, has the longest casualty list of any sport. Dr. Hobart thinks this only natural for "probably five or six times as many students play football as any other sport." Next to football in frequency of injuries comes wrestling, and after that basketball, baseball, track, swimming, water polo and boxing. Other sports are too safe to merit consideration.

The knee takes the brunt of the punishment for several reasons. Its position is exposed, it can be affected by both direct and indirect force, and since the ankles are well protected and do not give way, the strain is transmitted to the knee. Dr. Hobart thinks it might be better not to strap players' ankles so tightly.

Next in frequency to knee injuries come those to the fingers and toes, ankles, shoulders, nose, face, elbows, back and legs and feet.

Athletic injuries are either in a class by themselves or in a class with war injuries, the idea being to return athlete or soldier to team or trenches quickly and fully recovered. So that a student may be returned to practice or play only when it will do him no damage, Dr. Hobart states that a physician should be in full charge of the physical side of the team, as the head coach is in charge of the athletic side.

Fractured bones, in Dr. Hobart's athlete cases, are almost always put in a cast rather than a splint, as the cast can not be easily removed. The general rule, he says, is to use a cast for fractures in children, athletes, idiots and doctors. Sprains are the most common injuries in athletics, followed by contusions and concussions, fractures, cartilage injuries, lacerations and dislocations.

CHILDHOOD ACCIDENTS

MORE than twice as many children under fifteen years are killed by accidents as by three common communicable diseases, measles, scarlet fever and diphtheria. This fact emerges in a study of fatal childhood accidents which has been undertaken by the U. S. Public Health Service. The first section of the study, relating to automobile accidents, has been reported by William M. Gafafer, senior statistician of the Federal Health Service.

For children under one year of age mechanical suffocation leads the list of fatal accidents. At one and two years burns caused most fatal accidents. Automobile accidents and burns lead at three years. At four years and from then up to fifteen years, automobile accidents rank first as cause of accidental deaths and also outnumber deaths from the three diseases, measles, scarlet fever and diphtheria. The study was limited to the year 1930, the most recent year for which accurate population enumerations exist.

Mr. Gafafer divided the country into three geographic regions, Northeastern, North Central, Southeastern and Western, and reviewed the fatality figures region by region.

The Northeastern region had most childhood automobile deaths per hundred thousand children. Next greatest number was found in the Western region. Then followed the North Central and finally the Southeastern with fewest deaths per hundred thousand children. This order was changed when the regions were rated according to deaths per hundred thousand registered automobiles or per 50 million gallons of gasoline consumed. Using these measures of mortality, the Northeastern region still led with most deaths, followed by the Southeastern, the North Central and finally the Western regions. The reason for the change in order, Mr. Gafafer explains, is that the Western region has more automobiles in relation to the number of children.

ITEMS

THE Crop Reporting Board of the Bureau of Agricultural Economics released a report on August 10, according to which corn production is estimated to be only 46.8 per cent. normal and the crop is the worst since 1881. Spring wheat is only 32.8 per cent. normal and with the exception of 1934 is the worst on record. Oats are 55 per cent. normal and of all the edible grains only rice, at 86 per cent., is anything like normal yield. The potato crop, at 59.8 per cent. normal, is the worst on record since

1863. Cotton, unlike most crops, has had favorable weather during July, and the yields are expected to be above average in all states except in Virginia and the Carolinas.

SUCCESSFUL observation of the Perseid meteors on the nights of August 11 and 12 and August 12 and 13 has been reported by Professor C. P. Olivier, of the Flower Observatory of the University of Pennsylvania. Observing at Shadwell, Va., he reports that cloudiness and moonlight on the first night of the Perseid shower made the meteor watch difficult. Forty-seven meteors were seen, however. Thirty-four of these were in the Perseid group. The next night observing conditions were much better and a total of 72 meteor streaks was seen. Fifty of these were Perseid in origin. One especially fine sporadic meteor crossed nearly half the sky, disappearing and reappearing as it neared the end of its path. One brilliant Perseid meteor left a flaming train which lasted 10 seconds. Other bright Perseids, mostly red in color, left sparks as well as trains. The average Perseid meteor was yellow in color, as usual, and nearly all had trains of brief duration.

REPORTS received by the U. S. Public Health Service show an increase in infantile paralysis cases, the total number for the country reaching 142 during the week of August 1. The increase is chiefly due to sporadic cases in various parts of the country, rather than to an increase of the outbreak in the Southern states. These cases are seen as part of the usual seasonal rise and are not considered a result of the earlier outbreak in the South. Of the Southern states chiefly affected, Tennessee had an increase, with 26 cases for the week, but Alabama with 29, and Mississippi with 5, showed decreases over the previous week. California reported 16 cases, Illinois 12 and New York 6, with from 3 to 6 each reported in Minnesota, North Dakota and Nebraska.

DETAILS of a mild case of bubonic plague occurring in an eleven-year-old lad living in Monterey County, Calif., have been received at the U. S. Public Health Service from Dr. Harlin L. Wynns, of the California State Health Department. This is the third human case of plague reported in the United States thus far this year, one of the others also occurring in California, while the third was near Beaver, Utah. Plague has been ever-present in the rodent population in California since an outbreak of human plague occurred in San Francisco early in this century. The disease is transmitted from rats or other rodents by fleas. Plague-infected ground-squirrels have been found as far east as Montana and Utah and these animals are a potential source of danger.

LITTLE mentioned among the drought hazards to cattle is the possibility of the animals eating the hardy Sudan grass, cane or any kind of grain sorghum which, although stunted in growth by the dry weather, will stay green long after the normal feed grasses have withered. The Department of Agriculture reports that in eating these plants live stock may consume a deadly dose of hydrocyanic or prussic acid, present in the plants.