SCIENCE NEWS

THE MARTIAN POLAR CAPS

Science Service

THE famous polar caps of Mars, often attributed to snow or ice that melts seasonally, are largely due to clouds, haze or other atmospheric phenomena. This is the conclusion of Professor W. H. Wright, astronomer of the Lick Observatory, who took advantage of the recent nearness of this planet to the earth and photographed it by light of different colors.

It is a comparatively dense atmosphere that envelops the ruddy planet, Professor Wright has also discovered. Heretofore the general opinion has been that the atmosphere on Mars is very thin.

Using the great Crossley reflecting telescope, these discoveries have been accomplished through the employment of color screens and photographic plates of special sensitivity, the two being used in conjunction with each other in such a way as to isolate, for the purposes of the photograph, light of a number of parts of the spectrum. The range in color is from the near infra-red, 7,600 Ängstrom units, to the ultra-violet, 3,600 Angstrom units.

"It is found that as the color used in the observations approaches the violet end of the spectrum the surface markings of the planet, excepting the polar cap, fade from the image, and in fact disappear completely with the employment of blue and violet light; the polar cap, for its part, becomes, with these changes, progressively more marked. If, for example, we take light from opposite extremities of the visible spectrum, the infra-red and violet, we find that the one renders a picture rich in detail and high in contrast, while the other supplies an image barren of both, except that the polar cap and a few impermanent features stand out in greater strength. There is another difference between the images recorded by light of these two colors which relates to size. The violet light image is the larger of the two.

"This difference in aspect of the planet when viewed by light of the two ends of the spectrum is interpreted as resulting from the presence of a Martian atmosphere of considerable density that, like the atmosphere of the earth, scatters and absorbs light of short wave-length, such as blue and violet light, but readily transmits the long-waved infra-red light. The infra-red photographs obviously represent the planet's surface, since they record the familiar permanent markings which are seen in the telescope and are known to be part of the planet; while, considered in the light of the foregoing hypothesis, the violet images are photographs of the planet's atmospheric shell, made with the light that it scatters. The fact that the polar caps are exceptionally strong in the supposed photographs of the atmosphere, leads necessarily to the conclusion that they are, to a great extent, atmospheric phenomena, possibly clouds or banks of haze. These may overlie solid caps of smaller dimensions on the surface of the planet.

"The difference in size between the violet and infra-red images serves as the basis of a rough estimate of the thickness of the atmosphere, for the diameter of the atmospheric shell must exceed that of the planet proper by twice this quantity. The thickness, or height of the atmosphere derived in this way is somewhat more than 100 miles, but the result is regarded as only roughly approximate, and of value principally in indicating that the extent of atmosphere is measurable."

The significance of the observations is regarded as lying in their indication that the atmosphere of Mars is comparatively dense, optically at least, and of considerable extent. That the planet has an atmosphere has long been assumed, for one seems necessary to account for the waxing and waning of the polar caps.

PSYCHOLOGICAL TESTS OF AUTOMOBILE DRIVERS

Science Service

WHEN it comes to stopping an automobile quickly, race, sex, color or education do not count. But scientific tests for chauffeurs devised by H. H. Allen, automotive expert of the National Bureau of Standards, and Professor Fred A. Moss, psychologist of the Public Personnel Administration of thhe Institute for Government Research, show that experience and natural quickness do affect the amount of time required for the automobile driver to get his feet into action upon the brakes.

They have devised an apparatus that allows the accurate measurement of the time elapsing between the signal to stop and the application of the brakes. The mechanism is very simple. An automobile of the standard gear-shift type has been equipped with a tachometer, an instrument much more accurate than a speedometer because it records every revolution of the wheels. Two pistols, muzzles downward, are fastened to the running board of the car. The bullet in the cartridge has been removed and red litharge inserted so that when the pistol is fired a red mark is left on the pavement.

When the tachometer registers a certain speed the examiner fires the first pistol. At this signal the person being tested, immediately removes his foot from the accelerator to the brake, automatically discharging the second pistol. The distance between the red marks on the pavement is measured. This distance divided by the speed of driving will show to a thousandth of a second the time required for the response of the driver.

Professor Moss and Mr. Allen have tried the experiment with a group of men and women students from George Washington University, a group from Howard University and a number of taxi drivers.

In the group from George Washington there was very little difference in the reaction of the men and the women, each showing an average reaction of about one half of a second. The individuals in the group varied very widely, one individual having a reaction time less than three times as short as other members of the group tested.

In the group chosen from Howard University the re-

action compared favorably with the ones from George Washington, showing that there was no difference in the races so far as this reaction is concerned.

The reaction of the taxi drivers was more prompt than that of the non-professional drivers, indicating either that drivers can be trained to respond more quickly or that those with a quick reaction seek and are selected for such positions as taxi drivers. One of the men, who had been driving for fifteen years without an accident, showed a reaction of one third of a second.

These tests were carried on in four speeds: 10, 15, 20 and 30 miles an hour. At a speed of 20 miles an hour with a reaction of one half second the car would go only fifteen feet before it began to stop. With the reaction one and one half seconds the car would be run 45 feet before it began to stop. The rate of speed does not affect the response in any way.

To eliminate drivers with a very slow reaction is the object of these tests. It is expected that they will be used in hiring drivers for the government service, and in the cities requiring a driving test for a license. This is one of a number of tests which are being prepared for selecting chauffeurs.

CAVERNS IN THE GUADALUPE MOUNTAINS

Science Service

AN underworld wonderland surpassing in size, sublimity and beauty anything of the kind hitherto known, such is the report of Dr. Willis T. Lee who has just returned to Washington after a summer spent in surveying and mapping a portion of the caverns which run under the Guadalupe Mountains near Carlsbad, New Mexico.

Dr. Lee and his associates, working under the auspices of the National Geographic Society, traced the ramifications of the main cavern, an underground avenue about a half mile wide, for two miles under the mountains. How much further it extends is unknown. A great number of smaller avenues branch off. No attempt was made to follow these.

There is every indication, Dr. Lee said, that the discovery of the Carlsbad Cavern is just a start of the wonders which further exploration of the Guadalupe mountain region in southeastern New Mexico and western Texas will disclose. Texas has already taken steps to set aside her section as a state park. It is probable that the mountains are honeycombed with subterranean recesses, Dr. Lee said.

The most striking feature of the Carlsbad Cavern is the extreme delicacy of the architecture of the stalactites and stalagmites in the mammoth chambers. All sorts of fantastic, beautiful designs are worked into the onyx marble.

Dr. Lee found the caverns of Guadalupe Mountains the home of a prehistoric civilization. Two skeletons have been sent to the Smithsonian Institution for identification. Other skeletons, buried in baskets, were found on shelves in the walls. The people who inhabited the caves are believed to have been close relatives of the basket-weaving people further west. The caverns are a geological and biological treasure house. There are literally millions of bats, blind crickets and worms and spiders of hitherto unknown species.

Entrance to the cavern now is very difficult. It is necessary to climb 1,000 feet up a mountainside and then go down through a hole in the roof in a guano bucket for 170 feet. A walk of about two miles is then necessary over very difficult flooring before the end of the main cavern is reached. The avenue leads downward through great chamber after chamber until one is 800 feet below the surface of the earth outside. At this point the avenue drops off abruptly 90 feet. This has to be negotiated with a wire ladder. Mr. Lee explored a series of basement chambers never before seen by human eye. The cavern is in dense darkness. The temperature remains all the time at 56 degrees Fahrenheit.

ITEMS

(Science Service)

LAND near the recently discovered Indian rock sculptures or petroglyphs has been offered to the Dominion government by W. F. Islip as a free gift. It is hoped that this gift will serve as a stimulus toward the acquisition of the near-by lands on which the old sculptures are situated, and that all can be consolidated into a new national park for the pleasure of tourists and the preservation of the old carvings.

ELEVEN varieties of chestnuts, secured from the Yunnan Province of southwestern China, are now under cultivation by the Bureau of Plant Industry of the Department of Agriculture. It is hoped to secure from these at least one type that will resist the blight which has ruined so much of the native chestnut crop. The trees as yet are only in the seedling stage. Among them is one which, in Yunnan, produces nuts nearly twice the size of the common American variety. This tree is described as suitable for orchard culture. It grows wild at an altitude of about 8,000 feet.

NEW sources of wealth for the American farmer may be found in the millions of tons of corn cobs now wasted annually in the middle west. Department of Agriculture chemists during the past six years have discovered new values in this neglected material and means for extracting them. Here are some of the new possibilities: Adhesive material, obtained by cooking cobs for a few minutes under pressure in superheated water, can be used for any purpose where a high-grade paste is not essential. A special use proposed for them is in the manufacture of coal briquettes from the finer sizes of anthracite. Furfural, an aromatic liquid about one sixth heavier than water, which can be made to replace formaldehyde in many fields, can be obtained from the cobs by digesting them for about two hours with steam and a very little sulphuric acid under a pressure of 135 pounds per square inch. Other products that can be obtained from corn cobs are oxalic acid, acetic acid, wood alcohol, charcoal, pitch, tar, incense and oils.