SCIENCE NEWS

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WIND TUNNEL AND SEAPLANE BASIN AT LANGLEY FIELD

Two new and unique research aids to better airplanes are under construction at the Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics.

One will be the largest wind tunnel in the world, in which a whole airplane can be tested. The other will be the world's largest testing basin, a covered body of water nearly half a mile long, 25 feet wide and 12 feet deep.

The governmental aeronautical research laboratory already has the largest wind tunnel in the world, the propeller research tunnel, with a testing diameter of 20 feet. In a wind tunnel the stream of air flows past an airplane part, or test specimen, that is held stationary, and this is exactly the same as though an airplane were moving through still air. The engineers can therefore tell just what happens to an airplane in the air without the risk and inconvenience of actual flying. Precise scales and instruments attached to the airplane under test give data that allow better design and financial savings by airplane designers. Airplane speed has been increased 10 to 12 miles per hour by the National Advisory Committee for Aeronautics cowling developed in the 20-foot tunnel.

The wind tunnel now under construction will have a rectangular mouth 30 by 60 feet. An airplane can be taken from the flying field to the wind tunnel and put under test without any change whatever. A large building covering an area 434 by 222 feet will house the new giant tunnel. Two large propellers, each 35½ feet in diameter and powered by 4,000 horse-power electric motors, will furnish the air stream that will be equivalent to the rush of an airplane through the air in actual flight.

The seaplane testing basin, also under construction, is 2,060 feet long and will probably be in operation late this year. In it flying boats will be given test runs at speeds up to 60 miles an hour. Both Navy and commercial users of planes that land on water are eager to have adequate test information as to how floats and other water landing gear can best be built. At present floats and pontoons on seaplanes and amphibians are built more or less by rule of thumb because of lack of knowledge of the way they carry their loads. The testing basin is expected to furnish information that will allow better, more efficient and cheaper construction.

HYDRAULIC LABORATORY OF THE BUREAU OF STANDARDS

PRESIDENT HOOVER has signed the bill authorizing the construction of a National Hydraulic Laboratory at the U. S. Bureau of Standards at a cost of $350,000.

Funds will probably be made available by Congress for use on July 1 so the laboratory can be completed and its work begun during the coming year. Plans being prepared under the direction of H. N. Eaton, of the Bureau of Standards, are expected to be completed next fall.

Enough projects to keep the laboratory busy for a long time are ready to be submitted by the U. S. Reclamation Bureau, the Bureau of Public Roads and the Geological Survey. The laboratory will doubtless be completed in time to conduct some tests for Boulder Dam and the chief of engineers of the U. S. Army may request experiments in connection with Mississippi flood control. It is intended primarily for fundamental studies in hydraulics.

The erection of the laboratory comes as an indirect result of the efforts of a well-known hydraulic engineer, John R. Freeman, to make research in river hydraulics in this country comparable with that in Europe. Surprised at advances abroad in the solution of river problems by model tests and anxious to bring this information to America and establish these methods in this country, Mr. Freeman provided scholarships to enable young American hydraulic engineers to study in Europe. These returning students and a book by Mr. Freeman describing European laboratories and methods have largely caused the adoption of more modern practices and the establishing of up-to-date laboratories in this country.

PLANT GROWTH STUDIED WITH THE INTERFEROMETER

THE growth of plants can be seen with a new form of interferometer devised by Professor K. W. Meissner, of Frankfort, Germany.

The instrument is a modification of the interferometer invented by Professor A. A. Michelson, of the University of Chicago, and used by him in his epoch-making experiments with light.

The interferometer is literally a device which permits the measurement of very tiny distances, far beyond the reach of the most powerful microscopes, by means of light-waves. A beam of light from a lamp is separated into two rays at a lightly silvered glass plate, and each of the two beams is reflected from a mirror, the two being reflected back to the plate, where they reunite and fall into an observing telescope. When two such beams are properly superposed, they are capable of "interfering," and we have the curious situation of light added to light giving darkness at certain points, for what one sees in the telescope is not a uniformly illuminated field, but a series of alternating bright and dark bands, or "interference fringes."

If, now, one of the mirrors be slightly displaced, the fringe pattern moves to one side, and the distance it moves is a measure of the motion of the mirror. So sensitive is the method that it is readily possible to measure a displacement of the mirror of a millionth of an inch.

Professor Meissner mounted the entire instrument vertically, thus bringing a whole new range of measurable phenomena within its scope. The movable mirror

is carried by one arm of a trip-scales arrangement which permits a vertical motion of the mirror. The scales are very nearly balanced, and the mirror arm is allowed to rest very lightly on the stem of the plant whose rate of growth is to be measured. As the plant grows, it pushes up the movable mirror, and the interference bands in the telescope are seen to wander across the field. Simply counting the number which pass a given mark in a certain time gives the rate of growth, which is of the order of one hundred thousandth of an inch per second for most plants, so that a single line would move more than its own width in a second.

Ether fumes are wafted over the plant, almost immediately the growth ceases; a mercury lamp, rich in ultraviolet rays, is switched on, and the rate of growth increases many fold. It is such investigations as these which Professor Laibach is carrying out with the new instrument.

Professor Meissner, in demonstrating his device before the Congress of Physicists and Mathematicians in Prague, pointed out among other uses of the instrument the measurement of crystal growth and the analysis of musical tones and vibrations.

VITAMIN A IN CORN

S. M. HAUGE and J. F. Trost, of the Purdue University Agricultural Experiment Station, have found that vitamin A is present in corn which has kernels that are yellow all the way through. The fact that yellow corn contains more vitamin A than white was observed by Dr. H. Steenbock, of the University of Wisconsin, but not until the work of the Purdue investigators was it known whether the yellowness associated with the vitamin was present in the outer coat or in some other part of the seed. Now it appears that it is the yellowness of the starch storage tissue called endosperm, and not the yellowness of the outer coat of the grain, that indicates the presence of vitamin A.

This discovery adds one more requisite to the list of qualities expected in a successful new variety of corn. Heretofore yield and resistance to disease have been the main factors considered. Now the color of the endosperm must be taken into account, because it is of course desirable to have as many nutritive items as possible in the same food.

Professors Hauge and Trost have found that the vitamin A content of corn is inherited in a simple definite way, just as yellow color is. This will prove of great assistance to the plant breeders in the production of new varieties for they will know when and when not to expect the vitamin in making certain crosses.

Vitamin A is the one which prevents the eye disease known as xerophthalmia and is also necessary for growth. It is of vital importance in the nutrition of all the higher animals including man. It occurs rather abundantly in green leaves, in certain roots, in butter and in egg yolk. In edible plant tissue it seems to be usually associated with yellow color. Thus yellow carrots contain more than white, yellow turnips more than white, and so on as far as tests have been made.

THE NEW COMET

THE new comet recently discovered by the German observers Schwassmann and Wachmann may become visible to the naked eye on June 1, and will certainly be discernible with the aid of a small telescope or a pair of good field glasses. The last few nights of May and the first few nights of June will be great times for the army of amateur telescope fans, who make and use their own reflecting telescopes. With instruments of this type, the new comet can easily be seen, if one knows where to find it.

The orbit of the new comet has been calculated by F. L. Whipple and Phyllis Hayford, of the Students' Observatory of the University of California, under the direction of Professor R. T. Crawford. Their preliminary results indicate that the comet will reach its maximum brightness on June 1, when it will be only eight million miles away. This is very close for another celestial body to approach the earth, much closer than any comet has been for many years.

The comet will be between sixth and seventh magnitude in brightness on the night of June 1. For most persons with ordinarily good eyes, sixth magnitude stars are the faintest that can be seen; so that the celestial visitor may just barely cross the borderline into naked-eye visibility.

It is a small comet, without any tail. At that, however, it is the nearest thing we have had to a visible comet for many years. Although the solar system is visited by anywhere from two or three to a dozen comets each year, most of them are too small or stay too far away to be seen except with the big telescopes of astronomical observatories. The last really good look the lay world has had at comets was in 1910, when two big comets, one of them the returning Halley's comet and the other known simply as the "Comet of 1910," blazed in the sky at the same time. Both of these were huge affairs, with magnificent tails sweeping across a large fraction of the heavens. The present visitor is much less pretentious.

The astronomical position of the Schwassmann-Wachmann comet on June 1, corresponding to earthly latitude and longitude, will be approximately 21 hours right ascension and plus ten degrees declination. This is a spot a little to the southeast of the constellation of the Dolphin, a small group of bright stars that lies almost directly south of Cygnus, or the Northern Cross, well down toward the horizon. At nine in the evening the Dolphin is low in the east; it reaches its highest point in the sky about three in the morning.

If the new comet becomes visible to the naked eye it will appear simply as a very faint star. With the aid of a telescope or strong field glasses it will be distinguishable as a somewhat fuzzy nucleus of light, contrasting with the stars, that show up as sharp little pin-pricks.

On June 13 the comet will reach perihelion, or its nearest approach to the sun. At that time it will be about ninety million miles from the sun, or approximately the distance of the earth's own orbit. After the middle of

June it will rapidly recede and dwindle in size, until even the astronomers will see it no more.

TOOLS OF THE OLD STONE AGE IN CHINA

OLD STONE AGE implements have been found in the eastern part of Shensi province along the upper courses of the Yellow River, proving that man existed there during the ice age, according to a report made before the annual meeting of the Geological Society of China held in Peking.

The discovery was announced by Père Teilhard de Chardin, the Jesuit priest who, with Père Licent, found traces of a similar culture on the borders of the Ordos Desert in 1923. Père Teilhard is president of the Geological Society of France and ranks high among the world's paleontologists.

Among the specimens exhibited to the meeting were some typical Paleolithic scratchers and a boulder of very hard quartzite which appeared to have been broken by heavy blows and probably was used for smashing up other pieces of stone into convenient sizes. Similar implements were found in many places along the northern section of the Yellow River, mostly in gravel terraces, and also along the line of the Great Wall.

"Here we have proof that in Pleistocene times man was living not only on the edge of small lakes in the Ordos Desert but also along this part of the Yellow River," Père Teilhard declared. "This culture is exactly the same as the one of which we found traces in 1923 and might be compared with the Mousterian culture associated with Neanderthal man in Europe."

Careful search may reveal a still more extended stone culture of that time in the fertile valley of the Yellow River. The fact that the implements were found in the base of the loess is interpreted to mean that the land surface in which these early people dwelt was shortly afterwards overwhelmed by terrific dust storms which deposited millions of tons of windblown débris from the Gobi Desert.

From then on, it is thought, all sign of human culture vanished from the stage, man having been driven out and not returning till his reappearance with a fully developed polished stone culture corresponding more or less to the Neolithic culture of the post-glacial time in Europe.

ITEMS

THE plant patents bill, which if enacted will make it possible for plant breeders to obtain patent protection on new varieties that can be propagated by cuttings, grafts and similar means, has been passed by the House of Representatives and is now on the Senate Calendar awaiting action. It may be passed by the Senate, also, before adjournment. If it is left unenacted in the jam of closing business, it will remain on the Senate Calendar and can be acted on early during the next session of Congress.

INSULIN and liver extract, the one a cure for diabetes and the other for pernicious anemia, may be placed in the next edition of the U. S. Pharmacopoeia, standard for drugs and chemicals. These two are among the new drugs, discovered since the last revision in 1920, to be considered by the committee on revision which was elected by the U. S. Pharmacopoeial Convention recently in session. This convention is held once in ten years, and the committee it selects decides on the contents of the next Pharmacopoeia. Other drugs which doctors and pharmacists have asked to have included are ephedrine, which brings relief to asthma sufferers; irradiated ergosterol and viosterol, potent sources of vitamin D which prevents rickets; diphtheria toxin-antitoxin for testing, which determines whether a child or adult will get diphtheria if exposed to it; ethylene, a new anesthetic, and two new germicides, mercurochrome and hexylresorcinol.

REPORTS of icebergs on the transatlantic ship lane have been received by the U. S. Navy's Hydrographic Office from the Coast Guard Cutter *Mojave*. Although this is early for ice to appear in the path of shipping, with the *Mojave* patrolling the threatened area and reporting the locations of the bergs the situation is not considered dangerous and a change of the path to a more southerly route will not be recommended, the Hydrographic Office says. More bergs have been observed north of the mid-Atlantic turning point, the only place at which vessels change the direction of their 2,000-mile voyage between Europe and America. This ice may move down on the lane or be swept aside and melted by changing ocean currents and winds. The positions of the bergs can be estimated only a few days in advance.

THE different sugars of germ cells are probably among the most important chemical substances concerned with the vital processes of the cells, Professor Treat B. Johnson, of Yale University, reported to the National Tuberculosis Association, meeting at Memphis. In the Yale laboratories, tuberculosis germs by the pound have been analyzed chemically and found to contain among other things poisonous sugars. The sugars of the bacterial cells exist in very complex forms. The existence of these complex, highly poisonous sugars appears to be characteristic of germ cells in general, and are not necessarily characteristic of the tuberculosis germs alone. When considering the question of immunity to diseases, the proteins of the cells have been given chief attention. Professor Johnson suggested that the sugar of the cell must now be taken into consideration as well.

COTTON plants are strangled to death by hard, dry clay in a new disease of cotton which has been discovered by J. J. Taubenhaus, W. N. Ezekiel and H. E. Rea, of the Agricultural Experimental Station, College Station, Texas. "Root strangulation," as the disease has been named, occurs only in flat, poorly-drained, heavy clay soils, which are compacted by continuous rain or irrigation. The affected plants wilt and die suddenly. When the dead plants are pulled they seem to have no roots. However, a careful investigation shows that the plants do have a well-developed root system, but that the hard soil literally strangles the plants to death by constricting the roots and preventing the passage of moisture from the soil to the top of the plant.