

SCIENCE NEWS

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TWIN CARBON

CARBON is the latest chemical element to be shown to have a twin. Last winter two California physicists showed that oxygen, long supposed to be single, was not only double, but triple. Now Dr. Arthur S. King, of the Mount Wilson Observatory, and Dr. Raymond T. Birge, of the University of California, have found a kind of carbon that is heavier than the ordinary form. Carbon is one of the most essential elements in living matter.

These experimenters heated carbon in a vacuum in an electric furnace to a temperature around 5,000 degrees Fahrenheit. When the light that is emitted was analyzed with a spectroscope, the usual bright bands of the spectrum appeared, including a very prominent red one. Close to this, however, the photographs showed another, very faint, and previously unknown.

Ordinary carbon is of mass 12, in the scale used for measuring the mass of the atoms. Dr. King and Dr. Birge announce that the new band can be explained by the presence along with ordinary carbon of another kind, or isotope, of mass 13. They are unable to estimate the relative proportions of the two kinds, but the heavier isotope must be present in very small quantities, for the band is hundreds of times as faint as the strong one.

Isotopes, or forms of the same element having different weight atoms, were first discovered in connection with studies of radium and similar elements. A few years ago Dr. F. W. Aston, of England, proved that a number of common elements consisted of as many as six or more isotopes. Last year Dr. W. F. Giaque and H. L. Johnston, of the University of California, following up a lead given by Dr. King, showed the existence of three oxygen isotopes, weighing 17 and 18, as well as the ordinary kind, weighing 16.

EXPLORATION BY COLONEL LINDBERGH
FOR LOST MAYA CITIES

WHEN Colonel Lindbergh and Carnegie Institution archeologists fly over the jungles of northern Central America and Mexico in search of lost Maya cities, they will be adding a new method to the scientific exploration of ruins of one of the world's most interesting civilizations.

Buried beneath almost impenetrable tropical forests in the Yucatan Peninsula, Guatemala, Honduras and British Honduras, there are the remains of populous cities that flourished long before the time of Columbus. Many of these abandoned cities, rich with artistic temples and monuments, lie hidden, unseen by modern eyes. On foot, tediously hacking a path through the tangled growth, an explorer might pass within a few hundred yards and yet not find the ruins. From the air, a few hours' flying may reveal not one, but several, hitherto unmapped and possibly totally unknown Maya cities.

Such is the expectation of Colonel Charles A. Lindbergh and of Dr. Oliver Ricketson, of the Carnegie Institution, who will fly with him in a Pan-American Air-

ways airplane. Their base at Belize, British Honduras, is nearly in the center of the region that from before the time of Christ until about the year 1500 the Maya inhabited. To-day the descendants of the race that showed such accomplishments live in the same area in a primitive state, unmindful of their glorious past.

Colonel Lindbergh's aerial photographic experience obtained on recent flights over the southwest will prove useful on the projected flying over the Maya country. It is expected that he will act as photographer as well as pilot and that Dr. Ricketson will do the mapping that will allow land parties to reach and excavate the cities that are discovered.

The cooperation between the Pan-American Airways and the Carnegie Institution of Washington links two organizations that are pioneering in the rediscovery of Central America. The projected airlines of the Pan-American Airways pass near such cities as Chichen Itza, Copan and Etzna, which archeologists of the Carnegie Institution have excavated and studied.

The airplane in Middle America can duplicate the remarkable feats achieved in England, where O. G. S. Crawford, air corps observer, has discovered Roman towns and trenches by means of air photography. These trenches and streets were long since plowed over by British farmers and were presumably lost forever to the knowledge of historians, but where the ground was once disturbed, the texture of the soil has been altered, and the crops planted there are apt to be greener and more luxuriant. The air camera or the keen eye of the airplane observer can often trace the exact plan of the vanished town or fortress. By some such method the stone highways which the Maya built to connect their important cities can probably be traced.

It is only a few years ago that the existence of these smooth stone roads, 30 to 60 feet wide, was discovered. Dr. Thomas Gann, who found sections of the roads in the forest near Coba, concluded that the Mayas could not have needed such highways for traffic, since they had no wagons or beasts of burden and since they would have found dirt roads suitable for their long journeys. The roads, he believes, must have been laboriously constructed over long distances between religious centers for use by the religious processions of priests, votaries and sacrificial victims.

One highway for which search will be made is the road which Dr. Gann believes must have stretched from Coba to Cozumel Island to which the Maya made religious pilgrimages. Another may have led from Coba to Chichen Itza, famed religious city, sacred to the deity known as the Plumed Serpent.

The airplane archeologist has an opportunity to "discover" Middle America in pioneer fashion. The sixteenth century Spaniards who discovered Yucatan and the Aztec cities wrote excited, glittering accounts of gold and jewels and beautiful women, and marble palaces. But their tales were considerably discounted by sober stay-at-homes, who

reflected that the Spaniards were not calm scientific observers and were merely trying to prove the importance and worth of their voyage of conquest.

Ninety years ago, an adventurous American, John L. Stephens, went into the Yucatan jungle and proceeded to discover the Indian cities again for the world at large. His verdict on the bas-reliefs and paintings which adorned the official buildings of the ruined cities was that "in justice of proportion and symmetry they have approached the Greek models."

After Stephens came a long series of archeologists, all of whom have been kept busy discovering the Mayas and the Aztecs. There are 1,200 sites in Mexico alone which are pronounced of archeological importance, and no one can guess how many more lie buried in inaccessible corners of the region.

The airplane offers a rapid method of discovering this much discovered country. More than that, it offers the possibility of revealing plans and explaining mysteries which could not be solved otherwise.

LIBERIAN RUBBER CLEARINGS

BOTANIZING over thousands of acres of tropical African treetops, a privilege unique in the history of plant collecting, is reported by G. Proctor Cooper, of Yale University, who has returned from the new Firestone rubber plantations in Liberia.

In order to make room for the great stretches of rubber seedlings, vast stretches of virgin jungle timber had to be felled. This laid the tops of the trees, where the best tropical botanizing is always to be had, literally at the collector's feet; and he has brought back one of the richest assemblages of tropical forest specimens that ever entered this country.

A principal object of Mr. Cooper's collecting was the timber itself. He has obtained logs of 130 species of trees, ranging all the way from the light and punky corkwood to the flinty red ironbark. These woods will be tested for strength and other properties in the Yale Forest School laboratory. In addition to the logs there are boards sawed out by hand, in the primitive native sawpits, and these will be tried out for their carpentry and furniture value.

So little is known in America about the flora of West Africa that arrangements have been made by Professor Samuel J. Record, who has charge of the tropical work at Yale University, to have the trees and other plants identified at the Royal Botanic Gardens at Kew, England. Duplicate sets of specimens have also been shipped to the Natural History Museum in London and the Imperial Institute at Oxford.

Collections were also made of birds and forest insects, mostly butterflies and beetles. Dried bark, leaves and fruits of 75 tree species used by native wizards and medicine-men will be studied by pharmaceutical chemists. Some of these plants, used as poisons by the natives, have properties still unknown to white men.

ORIGIN OF TROPICAL HURRICANES

TROPICAL hurricanes are long-distance travelers, for many of them originate a thousand miles east of the

West Indies. The vicinity of the Cape Verde Islands, off the west coast of Africa, is one of their favorite breeding grounds, especially at this time of year.

These hurricanes all originate somewhere over the Atlantic Ocean in the tropics north of the equator. Calm air, high temperature and humidity are the most favorable conditions for the formation of a hurricane. Such conditions are most likely to be fulfilled in the "doldrums" of the North Atlantic in the late summer or early fall. Hurricanes may, however, occur at any time of year, or in other places. They also occur in the Pacific and Indian Oceans. Those of the southern hemisphere differ from those of the West Indies in one important way. The winds of the northern hurricanes spin in a direction opposite to the hands of a clock, while those in the southern ones spin clockwise.

As a result of the counter-clockwise spin of West Indian hurricanes, and the fact that they move westwards, their advent is always preceded by northerly winds, and followed by winds from the south.

Usually the Atlantic hurricanes travel northwesterly from their birthplace until they reach the region of the American coast, then they curve northwards, sometimes missing land completely, but menacing shipping along the north Atlantic coast.

One of the most famous of all tropical hurricanes was the one that devastated Galveston, Texas, in September, 1900. In September, 1926, Miami, Florida, was severely damaged. The hurricane that struck Palm Beach a year ago, causing the loss of hundreds of lives and \$25,000,000 property damage, was of a similar type.

Though the autumnal equinox occurred on Monday, September 23, it is a mere coincidence that a number of these storms occur during September. The sun "crossing the line" does not make conditions any more favorable for them.

A NEW ANESTHETIC

A NEW anesthetic which puts patients to sleep so pleasantly and easily that they ask for more has been reported by Dr. J. S. Lundy, of the Mayo Clinic, and Dr. R. M. Isenberger, professor of pharmacology of the University of Kansas. Fewer unpleasant after-effects and far less danger than many of the local anesthetics are claimed for this new aid to surgery, which has the name of iso-amylethyl barbituric acid.

The work grew out of the old problem of how to offset the bad effects of some local anesthetics. Many investigators have sought means of avoiding the occasional cases of poisoning by cocaine. Accordingly, procaine, a synthetic product, was developed as a substitute for cocaine. However, bad reactions occasionally follow even the use of procaine. Drs. Isenberger and Lundy, following along the line of some previous workers, found that certain substitution products of barbituric acid gave protection against convulsions from procaine. They reported their work with iso-amylethyl barbituric acid about a year ago.

In the course of a year's further work, Dr. Lundy has used iso-amylethyl barbituric acid, experimentally, and for the benefit of patients, over a thousand times. He has given it by mouth before administering local anes-

thetia and the apprehension from which some patients suffer before an operation has been lessened in this way. Moreover, convulsions, that occasionally come on from the use of procaine, have not appeared in any cases in which iso-amylethyl barbituric acid has been used.

Also, following the work of Zerfas, Lundy has used this product, by injection into a vein, to produce all or part of the general anesthesia in 273 major operations. Surgeons who have employed it in this way have found that patients wish to have it again if, for any reason, they need to have another operation. It quiets patients before operation and adds to their comfort after operation by producing a semi-conscious state for some hours after they have returned to bed. Nausea and vomiting are greatly lessened or entirely eliminated.

More work must be done on this subject before the product will, or should be used as commonly as morphine, ether and nitrous oxide now are used in general anesthesia. For some time, as with any new procedure in medicine, cases in which the substance is to be used must continue to be carefully selected to eliminate risk. However, with the interest that has been aroused by this work, by the use of carbon dioxide at the end of inhalation anesthesia as advocated by Dr. Yandell Henderson, of Yale, and by the report on the use of cyclo-propane that was given recently by Dr. G. H. W. Lucas, of Philadelphia, and Dr. V. E. Henderson, of Toronto, at the Thirteenth International Physiological Congress, patients who must undergo operations may, in the near future, be freed from the dread that some of them have of being put to sleep.

ITEMS

MEAT and meat products are responsible for most food poisoning outbreaks, members of the American Public Health Association were told at their meeting in Minneapolis by Drs. Thomas G. Hull and Lloyd Arnold, of the Illinois State Department of Health and the University of Illinois College of Medicine. When much meat is eaten, the bacteria normally found in the small intestine, where meat is chiefly digested, are disturbed. The germ-killing action normally occurring in the small intestine is interfered with for six hours after a meat meal. Thus when germs are taken into the system with a meat meal, they have a good chance to develop and cause illness. Material containing a germ frequently implicated in food poisonings will produce irritations of stomach and intestines when it has been added to fresh meat, but no poisonous effect can be seen when the same material is added to a bread and milk diet.

TULAREMIA, newly discovered disease of rabbits, rodents and men, may also affect cats, muskrats, pigeons, ring-necked pheasants, grouse and quail, it appears from studies reported to the American Public Health Association by Dr. R. G. Green and E. M. Wade, of the University of Minnesota and the State Department of Health. This new disease which has caused much concern in public health circles, is acquired by men who handle infected animals. The fact that many more kinds of animals may

have the disease greatly increases the danger to human beings by increasing the possible sources of infection.

RUSTPROOF steel is easily welded by the acetylene-oxygen process and is even more rustproof after welding than before due to loss of carbon, silicon and manganese during melting. These findings by W. Hoffman, German metallurgist, have just been announced by the National Advisory Committee for Aeronautics at Washington. The physical characteristics of rustproof-steel welds are better than those of soft-steel welds but the hardness of the metal due to welding must be removed by heat treatment. The rustproof steels most used contain large percentages of chromium or chromium and nickel.

PARIS GREEN, foe of potato beetles and other insect pests, promises victory in the war which California is waging against termites, sometimes called "white ants," destroyers of millions of dollars' worth of wood-built structures annually. The effectiveness of the Paris green dust depends first on the cleanliness of the termites. They are forever licking themselves clean, and thus swallow the deadly powder. After they have died or are very notably weakened, a second termite habit comes into play. The insects are cannibals through thrift; they eat up their deceased relatives. It does not matter if the dead termite met its end through poison; it gets eaten anyway. Thus the same dose of Paris green may do away with several termites in succession.

PEACEFUL passenger ships and fast cargo vessels now mount on their decks rangefinders such as heretofore have been seen only on ships of war. At the Shipping, Engineering and Machinery Exhibition at Olympia there were exhibited these new additions to navigation equipment capable of accurately determining the range of objects 500 to 25,000 yards distant. Modeled after the same type of instrument that has been used for army and navy purposes for the past forty years, the rangefinder on shipboard allows the navigator to locate immediately any ship, lighthouse or other object. An instrument with a base of 4 feet 9 inches will measure distance to within 76 feet at 2 sea miles and 608 feet at 6 sea miles.

MOVIES taken of sleepers indicate that the greatest possible relaxation occurs when the individual coils himself like a kitten and when he sprawls out like a swimmer. This new evidence on sleep is announced by Professor S. R. Hathaway, of Ohio University, and Dr. H. M. Johnson, of the Mellon Institute, who are conducting an investigation of sleep at the institute. Sleepers who took part in the experiment were blindfolded to avoid disturbance from light and were photographed in various poses by a motion picture camera. A typical subject took nine different poses in the course of about eight hours' sleep and shifted from one position to another 33 times. All the preferred positions required some supporting strain, and the experimenters discovered that about half the time is spent in postures which are mirror-images of others, thus resting the muscles that have been strained in previous poses.