

## SCIENCE NEWS

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## THE MERRILL AIRPLANE

A NEW airplane that differs radically from previous models, that completely eliminates the possibility of stalling—the constant fear of the pilot of the ordinary plane—and that is as easy to control as an automobile, is one of the first products of the newly-organized Daniel Guggenheim School of Aeronautics at the California Institute of Technology. It is being demonstrated at the air meet now in progress at Los Angeles, and has there proved a sensation.

The new plane was the original idea of Albert A. Merrill, who is not a professional airplane builder, although he has been connected with experimental aeronautics since his original association with Octave Chanute in 1891. Though he was told long ago that his idea was worthless, he persevered for more than 15 years, finally to prove its validity.

What first strikes one who sees the plane for the first time is its short, stubby tail, which extends only for about four feet back of the rear cockpit. There is no stabilizer, though there is a large vertical rudder. The wings are staggered, that is, the front of the lower wing is under the middle of the top one. There is a four-degree positive decalage, as the aeronautic engineer calls it. This simply means that if the lower wing is horizontal, the upper one slants forward and upward at an angle of four degrees.

But most novel about the wings is the fact that they are not rigidly fastened to the fuselage. The two wings are fastened rigidly together, and pivoted to the fuselage about the rear spar of the upper wing. The result of this design is that the wings are stable in themselves, and not dependent upon the tail surfaces, as in the ordinary plane.

The angle of the wings with the fuselage is controlled by a crank handle by the pilot's side, connected to the wings by a sprocket and chain. This takes the place of the elevator of the ordinary plane. When the pilot wishes to ascend, he merely sets the wings at an angle and forgets about them until he is high enough, then he sets them level, and continues horizontally. If the engine stops, or if the pilot deliberately shuts off the power, the ship glides down along a slant line, but is always horizontal. Under such circumstances the ordinary airplane might stall and go into a tailspin, probably with disastrous results.

Associated with Mr. Merrill in the building of the plane was Dr. A. L. Klein, who did most of the fitting design, and Dr. Clark Millikan, who was responsible for the aerodynamic and primary structure design.

"The ordinary airplane is like an automobile that couldn't be steered if it were running slowly," said Dr. Millikan. "With the Merrill plane, however, longitudinal, or up and down, control is possible even at the lowest speeds. The control of the angle of attack, which is the angle at which the wings meet the wind, is inde-

pendent of the air speed. As the pilot can always tell the angle of the wings, he can tell at once whether he is ascending or descending. A sudden gust of air, which would throw the ordinary plane out of line and require a quick manipulation of the elevator to prevent trouble, merely lifts the entire plane without disturbing its horizontal position. Even with a heavy load in back, the stability of the ship is unaffected. These advantages might be summarized by saying that the pilot only has to control his movement in two directions—to one side or the other—instead of in three, which includes up and down as well. Only in the smoothest air, which is an exceptional condition, can this be said of the ordinary plane.

"The Merrill design also permits landing in a much shorter space than ordinarily, perhaps as short as 40 feet, as compared with the usual 200 feet or so. The take-off, however, requires as long a run as the usual type.

"For the previous model of the Merrill plane a glider was used, to which a small engine was later added. Then we built the present plane. At first this had a 80 horse-power engine, with which it was flown by an experienced pilot, who pronounced it far easier to handle than any plane he had ever flown. We have just installed a 100 horse-power engine for use in the demonstration at Los Angeles."

## THE FIRST INHABITANTS OF AMERICA

THE real discovery of America, by primitive men who long ago crossed the icy waters of Bering Strait from Siberia, was probably not looked upon as any great adventure at all. It was almost as simple and natural a step as crossing New York harbor might be, Dr. Aleš Hrdlička, anthropologist of the Smithsonian Institution, told the International Congress of Americanists, meeting in New York on September 18.

This problem of why and how the first human beings came into America has long been a great point of controversy, but Dr. Hrdlička stated that new evidence has accumulated in such quantities that conclusions can at last be drawn with reasonable certainty. An official report on many hundreds of skulls, a large part of which were collected personally by Dr. Hrdlička in western and Arctic Alaska recently, will soon be issued.

"There could have been, it is now certain, no great single wave of the immigrants that became the first Americans," he said. "Instead, there was a steady and natural passing over of small groups of people, and this process lasted until recent times. Siberia is an inhospitable region, where famine and cold always threaten. Less than thirty miles across, the people who wandered or were forced by others into northeast Siberia could see signs of a more pleasing shore, freer of snow and ice. The winds from that direction were warmer. Driftwood floated from that side. There were islands which served

as stepping stones, and it was easy in suitable weather for skin boats to carry groups of these Asiatics safely across the northwest passage.

"They did not necessarily stop in Alaska, or stop for a long time, but mostly in all probability, kept on down the coast, looking for warmer and pleasanter places ahead, and so the new world was gradually populated.

"Northeasternmost parts of Asia presented the only feasible route into America for the original inhabitants in their state of culture. The Asiatic ancestry of the Indian and Eskimo is demonstrated by much evidence obtained recently from old burials."

There are now more than thirteen thousand skulls in the Smithsonian collection, most of them American. Study of this vast material shows that the Eskimo and Indian are related, like two fingers that extend from one hand, Dr. Hrdlička said, and he pointed out that many typical Indian as well as Eskimo faces bear a striking resemblance to Mongoloid tribesmen of the Siberian wilderness to-day.

"The population of America has been established in the course of only a few thousand years, probably no more than 5,000," he concluded. "It would be a fine thing for anthropologists to find evidence of ancient man in this country, but no human bones indicating such antiquity have ever been discovered. Considering the large number of skilled observers who have been searching for clues to prehistoric life in this country it would seem likely that some ancient skeletal remains or other indisputable evidence of ancient man would have appeared by this time if there were any here.

"Another important point which now can be demonstrated through collections made during the last few years is that the people coming over the Bering Straits and Sea were not crude barbarians, but were bringing with them a rich and highly developed culture, exceeding that of the Eskimo or Alaska Indian of the present time. This suggests strongly that the origin of the native cultures on this continent, just as the diversification of languages, may not have been wholly evolved on American soil, as was hitherto believed."

### MEXICAN POTTERY

MENTAL traits of prehistoric Indian races of Mexico, as revealed by their pottery remains, were described at the session of the International Congress of Americanists, by Eduardo Noguera, of the Direction of Archeology of the Mexican Ministry of Education.

Mr. Noguera has made a statistical study of nearly 6,000 pottery samples in Mexican museums, including the art of the potters of the Zapotec, Mixtec, Tarascan, Toltec and Aztec races. This is the first study of its kind made on these civilizations.

The Indians were an intensely religious people, and their art of pottery making, which they carried to a high point of perfection, reflects their mental traits, the archeologist said. The comparative frequency of human, animal, plant, objective and geometrical motives shows the relative importance to the ancient race of the various creatures or things they represent, Mr. Noguera believes.

The pottery of the Zapotecs, of Oaxaca, a race that apparently had certain connections with the Mayas farther south and the Mexican races to the north, shows that the human figure was more important to them than any other form used as a decorative motive, suggesting that the race had left behind the totemic stage of culture and enjoyed the philosophic consolation of believing that the human being was the most important creature on earth.

In the cases of the pottery of the other races here studied, geometrical motives were more important than human ones in determining the shapes and decorations of their pots and idols and other clay objects. Human motives were much more common than animal, while plant motives were rare. Many of the geometrical symbols used on the pottery may, however, be conventionalizations of original natural forms that have lost all semblance to what they once were, he explained. This is true in the conventionalized snakes so well known in Mexican art, whose evolution can be traced from a realistic representation to a purely geometrical form.

### ITEMS

A SHARP earthquake, severe enough to be recorded on seismographs throughout North America, occurred at 7:36 A. M., eastern standard time, on Tuesday, September 11, in the Pacific Ocean about 370 miles off the coast of southern Oregon. This announcement was made by the U. S. Coast and Geodetic Survey as a result of the study of data gathered by Science Service. The exact location of the quake, said the experts of the survey, was at 42.0 degrees north latitude and 131.9 degrees west longitude. Reports of the quake were received from seismograph stations at Georgetown University, Washington; the U. S. Bureau of Standards, Washington; Loyola University, New Orleans; Regis College, Denver; University of Michigan, Ann Arbor, Mich.; the Coast and Geodetic Survey at Chicago, and Tucson, Ariz., and the Meteorological Observatory at Victoria, B. C.

LIME in salty water will prevent the corrosion of iron or steel structures that may be exposed to it, H. O. Forrest, J. K. Roberts and B. E. Roetheli, of the Massachusetts Institute of Technology, have found. Where there are bicarbonates, or salts containing the metal calcium, in the water, the lime causes a layer of protective scales of calcium carbonate on the iron. Where there is magnesium in the water, soda ash must also be added. The formation of the protective scale is hastened if the water is made somewhat acid.

PLANTS no less than people can get a browned epidermis by exposure to ultra-violet rays. The effects of these invisible rays on plants have been investigated by a committee of British botanists, which has reported through its secretary, Dr. E. M. Delf. Exposure to the glare of a quartz mercury vapor arc, Dr. Delf stated, caused browning on the plants' skin, which on microscopic examination was found to be associated with a breakdown of the outer layers of cells. The investigations are being continued this year.