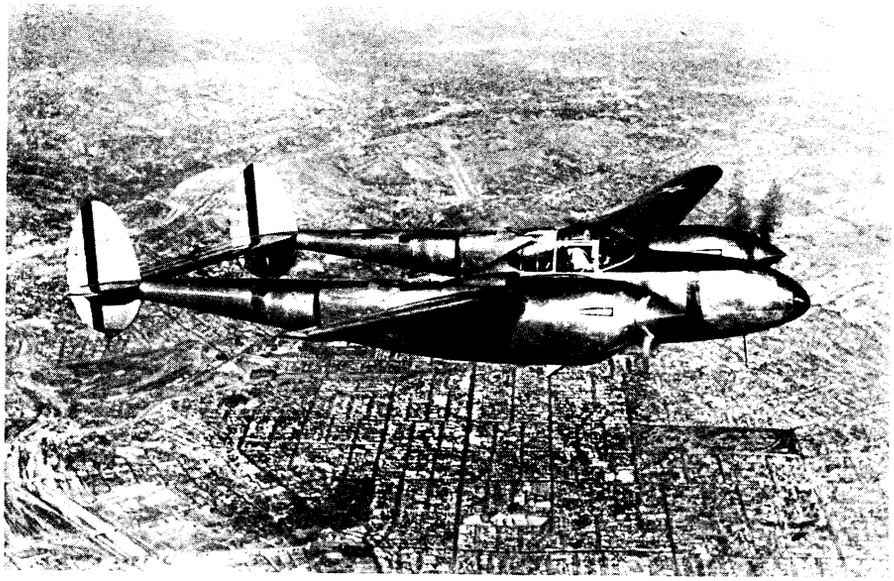

RECORD PLANE
This Lockheed P-38 interceptor-pursuit plane, the first of several hundred for the Army and the British, is the one in which a record for horizontal flight was established.

AERONAUTICS

Record For Horizontal Flight Set By "Supercharged" Pilot

Tanking Up in Advance of Flight, Test Pilot Succeeds in Exceeding the 404 Miles Per Hour Already Set

See Front Cover

A NEW speed record for horizontal flight of an airplane has been set recently by a Lockheed P-38 interceptor-pursuit plane, it was announced in Burbank, Calif. The record-breaking airplane is the first to come off the production line, to fill a U. S. Army Air Corps order for several hundred, in addition to nearly a thousand being made for Great Britain.

The exact speed which established the record has not been revealed. However, a recent issue of the British weekly, *The Aeroplane,* which gives details of all the aircraft being made in the United States for Britain, says that its maximum speed at 16,000 feet, is 404 miles per hour. Apparently this was based on a preliminary model that first flew in 1939, so the new record probably exceeds this figure.

The Aeroplane also states that it is armed with four machine guns, and a cannon in the nose. It is powered with two liquid-cooled 1090 horsepower Allison engines. For the R. A. F., the magazine indicates, it is made as a two-seater, with a turret, but the U. S. Army model is a single seater.

Milo Burcham, Lockheed test pilot who set the new record, is shown in the cover picture just after landing. He was himself "supercharged" for his ventures into the stratosphere in testing the new ship. This is done, in accordance with methods developed at the Mayo Clinic, as a safeguard against aeroembolism, a form of "bends" like that which afflicts deep sea divers when they come to the surface too quickly. In the case of fliers, it may occur when they climb above 30,000 feet too rapidly. (*See SNL, Jan. 6, 1940*)

Before he starts, the pilot dons an oxygen inhalation apparatus, with breathing mask and bag connected to the gas cylinder, and pedals a fixed bicycle for 30 minutes. This reduces by about half the nitrogen gas that is contained in the body. Thus the nitrogen bubbles that cause the bends cannot form in the blood vessels.

After taking the supercharging treatment, the pilot cannot breathe ordinary air before his flight, or his efforts are undone. Continuing to breathe oxygen from a portable tank, he enters his plane, and connects with the regular supply.

With older planes, which climbed more slowly, the pilot had started to breathe oxygen at the start of a trip to great altitudes, and by the time he got there, his body was prepared. The P-38, however, has an initial rate of climb of 2,860 feet per minute, so it can reach a dangerous level in the time it takes an average person to walk around the block.

Science News Letter, March 1, 1941

CHEMISTRY

Production of Toluol Aided by New Formulas

TOLUOL, basis of TNT, which is trinitrotoluol, and other chemicals important in preparing for American defense, will be aided with new formulas announced at the meeting of the American Institute of Mining and Metallurgical Engineers in New York. They were developed by Dr. H. H. Lowry, director of the Coal Research Laboratory of the Carnegie Institute of Technology, aided by H. G. Landau and Leah L. Naugle.

These formulas make it possible to determine accurately in advance the properties and amounts of coke and by-products obtained from the carbonization of coal. The chief by-products are tar, gas, ammonium sulphate and light oil. The latter is the raw material from which toluol is obtained, but all the others are important also in defense industries.

In addition to giving scientific control, which assures more accurate planning in the production of the coking by-products, Dr. Lowry's work also makes possible greatly increased economy, by eliminating expensive oven tests. One steel company alone, he stated, has been able to save many thousands of dollars in the single item of eliminating the sulphur analysis of coke.

Carrying Dr. Lowry's work a step further, M. A. Mayers and H. G. Landau, also of Carnegie Tech's Coal Research Laboratory, announced before the meeting, a method for controlling the properties of pig iron and the economy of production in blast furnace operation.

This method ascertains the particular qualities in the coke necessary to produce certain qualities and quantities of pig iron under specific conditions of operation and ore analysis.

Formulas were developed in this research whereby for the first time blast

furnace operators may calculate the quality, economy, and rate of production of pig iron from the properties of the coke used. For these calculations preliminary data, defined in the paper, must be collected on each specific blast furnace operation.

Science News Letter, March 1, 1941

ANTHROPOLOGY

Wool Measuring Device Now Used To Study Human Hair

Cross Sectioning Shows Differences Between Races; Negro's Most Elliptical, Dutch Smallest and Light

A GOVERNMENT scientist's device for measuring sheep's wool has given anthropologists a new idea for measuring tiny breadth of human hairs with such speed that in ten minutes they can gain facts about hair size that used to require two days' tedious work.

Speeding study of racial traits with the new technique, Dr. Morris Steggerda and Mrs. Ruth Eckhardt of the Carnegie Institution of Washington have already set tentative standards of hair sizes for races, they have reported.

Even varied sizes of hair on an individual's head can be charted to show his own limits of hair size in microns, or thousandths of a millimeter. Hair size variation in individuals and races is found to be very great.

First studies, made with hair of America's Mayan and Navajo Indians, Negroes, and Dutch, because adequate hair samples were available, have just been announced.

"It is evident," says Dr. Steggerda, "that the Maya have the largest hair in cross-section, and the Dutch the smallest, with the Navajo and the Negro approaching the Maya very closely."

For the first time, explains the anthropologist, it is possible to analyze also the hair shapes of different races statistically. Negro hair is the most elliptical in shape he has studied. Mayan hair is roundest.

The method adopted for investigating differences in hair was originated for wool research by Dr. J. I. Hardy of the U. S. Department of Agriculture.

Hairs are prepared for testing by washing in carbon tetrachloride and drying, and are made into tiny samples by inserting them in packs of 150 to 200 in a slot in metal, in which the hair tips can be coated with thin solution of celluloid. Once hardened, the tiny hair specimens are cut off with a razor blade, ready to be measured by aid of a microscope.

Science News Letter, March 1, 1941

GEOLOGY

Walls of Salt May Serve As Shelter for Detroit

PILLARS of salt may serve to protect the entire population of Detroit from aerial attack in case of war. Officials have recently been studying the great man-made caves of old salt mines under the far southwestern part of the city.

Eleven hundred feet deep, these caves were left where millions of tons of salt have been removed. Great salt pillars, left by the miners, support the ceilings. The caves cover 160 acres, of which about 112 are available floor space. With more than 25 miles of passageways 22 feet high and 50 feet wide, there is believed to be enough room to accommodate, if needed, all the 1,618,549 people which the 1940 census showed to be Detroit's population.

The mine is dry and healthful. It is completely air-conditioned by pumps which force fresh air from the surface. The temperature is constant at 58 degrees. So deep is it that those seeking air raid shelter there could not hear an intense bombing raid going on overhead. The heaviest bombs penetrate no more than 50 feet in ordinary soil.

In addition to serving as a shelter, Army officials say the mines might be used for essential industries, as a hospital, or as an ammunition dump.

Science News Letter, March 1, 1941

HAIR ON END

Hair samples prepared by a method which quickly sets them in order for measuring. Shown here are magnified cross-sections of (left to right) Dutch, Maya, Navajo and Negro hair.