AERONAUTICS

Jet Intruder Bomber

Has rotary bomb door which permits dropping of bombs at flying speeds greater than those of any other plane. Can be modified to speed key officers or diplomats in time of crisis.

See Front Cover

➤ WITH THE Martin B57B night intruder jet bomber about to join the U. S. Air Force in force, there are plans for modifying it to provide a tanker, freighter or a transport that can keep up in speed, maneuverability and altitude with the best jet fighers.

In the equivalent bomb space of the B57B would be squeezed eight seats so that VIPs and, more practically, generals and their staffs could get from here to there as needed by fast-moving war. In training, such a version of the American revision of Britain's famous Canberra bomber would allow the military passengers to crawl into dual-controlled co-pilot seat and practice their jet piloting.

In peaceful time of crisis such a ship might be used to get a key diplomat to a key meeting much faster than the present best of propeller transports. Continents and oceans could be spanned non-stop in times hours less than now.

Tanks of fuel put in the bomb or passenger space would allow such a ship to refuel fighter jets in combat, something not possible now. Urgently needed material might be carried as freight if a situation demanded it.

Martin Aircraft engineers are showing a mock-up model of the suggested new versions of the B57B, one of the new key flying U. S. weapons.

In a demonstration to the Air Force personnel who will soon be using it, Martin's director of flight, O. E. (Pat) Tibbs put the latest kind of B57 through its paces. It takes off from and lands on any runway suitable for modern transports, it is as fast as the best of jet fighters and it can reach probably the 63,000 foot altitude set by its world-record progenitor the Canberra.

It is 64 feet in wingspan, 1½ feet longer than this wingspan and two Wright J65 engines total 14,000 pounds thrust. It has a rotary bomb door that allows dropping bombs at greater flying speeds than any other plane. It can fly circles over the average airport and do an Immelmann turn with great ease.

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HIGH VISIBILITY—This close-up of the new B-57B shows the clear visibility provided for the pilot and also the second crewman who is seated behind him and slightly higher. It also shows half of the wallop packed in napalm tanks and high velocity rockets.

METEOROLOGY

50-Year Hurricane Tally

➤ FIFTY-FIVE FULL-FLEDGED hurricanes have roared up the Atlantic from the Cape Hatteras area in the general direction of New England during the first 50 years of this century.

Eleven moved inland, near Chesapeake Bay or over New Jersey, before reaching the New England region.

Forty-four took the sea route, I. R. Tannehill of the U. S. Weather Bureau in Washington told Science Service. He has been making a study of old Weather Bureau records to throw light on the questions brought up by hurricanes Carol and Edna.

Of the 44 that took the sea route toward New England, 41 of them turned eastward. Only three turned toward the west and hit the New England region in full force.

Two of them were real killers—1938 and 1944—the other one, in 1934, weakened on the way.

Mr. Tannehill's study shows some rather alarming facts. Of the 44 that moved into or to the eastward of New England, the average forward speed was about 20 miles an hour. This means that about 15 hours after the center passes Cape Hatteras, strong gales are likely to start hitting New England.

Hurricanes have winds of gale strength about 200 miles or so in front of the storm's calm eye. It is approximately 500 miles as the hurricane moves from Cape Hatteras to New England.

When a hurricane center is at Cape Hatteras, the weather forecaster has to decide whether the storm is going to go inland, with onshore gales and high tides, or out to sea east of Nantucket, with offshore winds on the land.

"A study of hurricane Carol and all preceding big New England storms—1944, 1938, 1867, 1821 and 1815—shows rather conclusively that those which are forced to the westward move much faster than the others, going forward at 40 to 50 miles an hour," Mr. Tannehill said.

"In this sense, Carol was not a freak."

Such fast forward motion means that when the storm's center is at Cape Hatteras, it can reach New England in 10 hours. The gales in advance of the center may start to blow on the coast within about six hours.

"The general circulation of the atmosphere is probably responsible for the exceptional speed of hurricanes that smash into New England," Mr. Tannehill said. "Much more research is needed, however, before we can be sure of this.

"These old records show that, on the average of once a year, a full-fledged hurricane is centered near Hatteras.

"If that happens in the evening hours or at night," Mr. Tannehill warned, "everyone should be immediately on the alert."

The chances are 18 to one, he has calculated, that the hurricane will turn to the eastward. A difference of only about ten degrees in heading, however, is involved for the forecaster trying to decide between Nantucket and the Connecticut Valley.

"This difference is much too precise for present knowledge," Mr. Tannehill said. "So the forecasters have to wait a little to be more certain."

Mr. Tannehill said that he hoped it would be "many years" before another hurricane Carol, but that "everybody, including the Weather Bureau, will have to keep it in mind when there is a hurricane at Cape Hatteras."

Many hurricanes have come inland south of Hatteras and have taken the overland route, but none of them has been very destructive in New England.

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PHYSICS

Mixing Fresh Water With Sea Produces Electricity

➤ ELECTRICITY HAS been produced in small amounts by mixing fresh water and sea water. Demonstrated by R. E. Pattle at the British Department of Scientific and Industrial Research's Chemical Research Laboratory, it is declared the first mention of "an untapped source of power."

The osmotic pressure of sea water is about 20 atmospheres, it is explained. When a river mixes with the sea, free energy equal to that obtainable from a waterfall 680 feet high is lost.

The British experiment put the osmotic pressure to work by separating alternate layers of salt and fresh water by alternate basic and acidic membrances. The membranes are connected in series and yield electricity.

A hydroelectric pile of 47 pairs of membranes each three inches square yielded a maximum of 15 milliwatts, not counting the internal resistance overcome.

At low temperatures, the report to the British journal, *Nature* (Oct. 2), states, the internal resistance is higher and the power output is lower. The pile is therefore likely to be more economic in a warm and equable climate. Whether the process will work economically probably depends upon the time it will run before the membranes need replacing and the interior needs cleaning. The membranes incorporate ion exchange resins. When such a membrane separates two salt solutions of different strengths, a potential difference appears across the membrane.

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POMOLOGY

Wild Avocados to Our Aid

➤ SEEDS AND budwood from giant wild Mexican avocado trees, that sometimes grow to heights of 80 feet, may help to solve disease and production problems in the California avocado industry.

These plant materials were collected by Dr. C. A. Schroeder of the University of California at Los Angeles subtropical horticulture department recently.

The wild avocado trees grow in Oaxaco, southern Mexico. They are the predominant species in tropical cloud forests on southern slopes of mountains in that region.

The wild avocados were not necessarily selected for edibility or size. Many of the fruits were small, no larger than an olive. The material will be primarily used in testing for disease resistance and budding and grafting affinity.

Some will be utilized, however, as breeding parents in the fruit improvement program and in development of rootstocks resistant to unfavorable soil conditions.

Dr. Schroeder was accompanied on the tour by Carlos R. La Madrid Faura of Peru's Ministry of Agriculture. The latter has been making a special avocado study for the past several months on the Los Angeles and Riverside campuses of the University.

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CHEMISTRY

Strychnine Synthesized

Process involving 30 steps is more complicated than building up to quinine and cortisone. Strychnine molecule is intricate web of 21 carbon atoms with others.

➤ POISONOUS STRYCHNINE can be made synthetically, but this achievement of organic chemistry will not result in this alkaloid being made in the laboratory instead of being extracted from seeds of plants.

The total synthesis of strychnine in 30 steps was accomplished by a team of Harvard University chemists led by Prof. R. B. Woodward, and it is more complicated than his earlier building-up of quinine and cortisone from fundamental materials.

The strychnine molecule is an intricate web of 21 carbon atoms, 22 hydrogen atoms, and two each of nitrogen and oxygen.

Strychnine, one of the first alkaloid substances to be isolated in pure state by Pelletier and Caventou in 1818, has long presented a challenging problem to chemists.

Strychnine is a white, crystalline, bitter and poisonous alkaloid. It occurs in the seeds of a West Indian plant, *Strychnos nux vomica,* and in the bean of the Philippine plant, *Strychnos ignatii.* Taken internally, it produces excessive irritability of the spinal cord resulting in convulsions.

It has limited medical use, and the medical demand for strychnine is easily met from the natural product. The laboratory process gives uneconomically low yield of the substance in terms of the expenditure of time and money.

Working with Dr. Woodward, during three years of research, were Michael Cava, A. Hunger, W. D. Ollis, H. U. Daeniker and K. Schenker, all of whom were or are post-doctoral fellows of Harvard's Converse Memorial Laboratory.

They report their work in the *Journal of the American Chemical Society* (Sept. 20).

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Tapioca comes mostly from Brazil.

South Africa some day will be one of the world's largest *uranium* producers; its gold mines contain large uranium reserves.

MEDICINE

Bandage Absorbs Without Sticking

➤ A PLASTIC and a fabric have been combined to make a surgical dressing that absorbs without sticking. Tried on over 900 major and minor wounds at Augustana Hospital, Chicago, and the Sterling Community Hospital, Ill., the bandage was reported satisfactory in all but eight cases.

The new dressing is now being distributed to doctors and hospitals by the Curity laboratories of Bauer and Black, Chicago, who have tradenamed it Telfa.

Telfa has on one side a plastic, nonwettable film of Mylar, Du Pont's polyester plastic. This shiny perforated side, which goes onto the wound, is bonded to a nonwoven cotton fabric of Kendall Mills called Webril. Webril, according to W. O. Elson, head of medical research for Bauer and Black, has the exact absorbing qualities needed for the new dressing.

The tiny perforations in the plastic side let blood, pus and other fluid drain into the absorbent side. This keeps the wound dry, which is important for healing. The perforations, however, are sized so that new-forming skin cells cannot get itno them. Consequently they are not pulled off when the bandage is removed.

The bandage, therefore, comes off painlessly, without causing bleeding and without pulling off scabs or healing tissue.

The cases in which Telfa was not entirely satisfactory were those in which there was heavy, thick pus. It also is of doubtful value in burn cases.

Added feature of the new dressing is its shape. Since wounds are rarely square, the manufacturers are making Telfa in strips of different sizes instead of in squares.

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DENTISTRY

Average Man Loses Four-Tenths of Tooth Per Year

➤ THE AVERAGE American loses four-tenths of a tooth per year between the ages of 15 and 65, U. S. Public Health Service scientists report in the *Journal of American Dental Association* (Oct.).

The findings are from a study by Dr. Walter J. Pelton, public health analyst Elliott H. Pennell and statistician Anton Druzina. They are from reports of nearly a quarter of a million dental examinations of merchant seamen, men in the Coast Guard and Public Health Service officers, all of whom receive care in Public Health Service facilities. But the experience with this group is similar to that reported for private dental patients and for male employees of a large life insurance company.

For those under age 35, the scientists report, the primary cause of tooth loss is decay, or caries. For those over that age, the controlling factor in tooth loss is disease of the gums and other tissues supporting the teeth.

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