

from punched cards. A total of 24,000 digits a minute can be recorded in printed form, 16,000 digits a minute can be noted as punched holes on cards.

The computing speeds of the latest IBM mechanical brain are as follows: It can add or subtract each second 3,500

numbers of 19 digits each; it can multiply each second 50 numbers of 14 digits each or divide 20 numbers of 14 digits.

The machine contains 12,500 electronic tubes, 21,400 relays and 40,000 pluggable connections.

Science News Letter, February 7, 1948

NUCLEAR PHYSICS

Is Test C To Be Secret?

➤ WILL "Test Charlie" be made a part of the top-secret atom-bomb experiments scheduled for the new mid-Pacific proving ground centered on Eniwetok atoll?

If this deep-water explosion, scheduled as part of the tests at Bikini but "postponed indefinitely," is restored to the program, it is highly improbable that the world will be told about it, as it was about tests A and B ("Able" and "Baker") in July of 1946. As a matter of permanent policy, all press and radio observers are excluded from the Eniwetok area.

It is possible, however, to form a reasonable conjecture of what such a test might be like, based partly on past experience, partly on present conditions and future possibilities.

Deep Water Test

Test C (or "Charlie") was originally planned to be held in deep water off Bikini, using such ships as were left after the first two tests, which were held within the lagoon. It was intended primarily to get a picture of the crushing effect on ships' hulls of an atom-bomb explosion in really deep water—a mile or more down. Since water is incompressible it was expected that this shock would be effective for a considerable distance; but existing physical and engineering tables do not suffice for a safe prediction of just what distance.

"Baker" test at Bikini was a submerged explosion, but a shallow one, for the depth of the lagoon at the center of the target array was only about 300 feet. All atoll lagoons are shallow, so if "Charlie" test is held in the Eniwetok area it will have to take place well out at sea—30 or 40 miles from the nearest island. If surface craft are tested, they will probably be held together with chains or cables. A practicable way to insure correct placing and depth of the bomb would be to suspend it on a mile or so of cable secured to one of the ships.

Value of a test against surface craft, however, would seem questionable at

present. The only surface navy of any size, outside of our own, is the British; and Britain, her great Continental rival gone and her overseas commitments much reduced, is now content to let supremacy rest with the U. S. Navy. In view of that fact, and of the additional fact that the survivor-ships at Bikini have all been taken either to Pearl Harbor or to the mainland Pacific coast, the expense and labor of setting up a target array of surface ships hardly seems worth while.

Naval tacticians might, however, want to try the weapon at depth against recent-type submarines. At the close of the war, Germany had developed a new U-boat design, said to be proof alike against radar detection and even the heaviest depth charges. It is rumored that the USSR has up to 300 of these craft, either taken over in the capture of German naval bases or completed since the war with the assistance of German technicians. Obviously, if the present "cold war" between the USA and the USSR should reach the shooting stage, these submarines would be the principal menace to our surface fleets and our merchant marine.

German Submarines Handy

We have a number of the late-type German submarines, as well as quantities of German plans and blueprints. A crushing test against such subs, with an atom-bomb as a super-depth-charge, might seem to be in order.

It would not be easy to arrange submerged U-boats for the test, but it probably could be managed. One of the biggest difficulties would be the salvaging of data from them if they were sunk in the test. A stove-in submarine would be highly interesting from a technical point of view, but on the bottom a couple of miles straight down would be rather inconvenient to board. It seems likely, therefore, that means would have to be devised to hold the damaged craft near the surface—possibly suspended from unsinkable floats—and perhaps haul

them up and put them into floating dry-docks after the explosion.

A test of this kind could probably be conducted in as nearly complete secrecy as is possible in this leaky world of ours. If surface ships of the Bikini target array should one day be missing from their berths, interested eyes might readily note their absence. But submarines are normally invisible and silent; they could proceed to the designated target spot under their own power and there be abandoned by their crews.

It is unlikely, too, that a mile-deep atom-bomb explosion would give news of its own occurrence. Probably no great amount of radioactive debris would reach the surface, and what the surrounding water would absorb would soon be so diffused in the vastness of the ocean that it would leave no trace.

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PHYSICS

Calculate Various Levels Of Temperature Above Earth

➤ IT'S 50 degrees hotter than boiling water 100 miles over your head. At 45 miles above the earth the temperature is 150 degrees Fahrenheit below zero. And it is the comfortable temperature of 70 degrees at 35 miles altitude, while in the atmospheric layer eight to 20 miles above the earth the average temperature is 75 degrees below zero.

One of the largest explosions in history, the destruction of Germany's Helgoland naval base with 5,000 tons of TNT on April 18 of last year, allowed Dr. Everett F. Cox of the Naval Ordnance Laboratory, Washington, to determine these temperatures. He announced them to the joint meeting of the American Physical Society and the Institute of Aeronautical Sciences, New York.

Noise from a great explosion does not reach distances of several hundred miles away until later than times calculated, assuming the sound travelled directly along the earth's surface. Around an explosion there are alternate zones of noise and silence.

Dr. Cox said that the best explanation of these skip-distances is that the sound waves travel upward until they hit a hotter layer of air high above the earth, where they are bent sufficiently to be reflected back to earth to form a noise ring. This sound is reflected by the earth and then goes up and down again to form another noise ring.

Using the observations of a special U. S. Navy expedition that observed the Helgoland blast at various points,

farthest of which was 620 miles away at Gorizia, Italy, Dr. Cox was able to calculate the temperatures at various altitudes. Sound at that distance had too low a frequency to be heard audibly.

The atmosphere 20 to 40 miles aloft is hotter than the air below because it has a larger amount of ozone, which absorbs the ultraviolet rays of the sun and heats the layer to a maximum of about 100 degrees Fahrenheit, depending upon the time of day, season and part of the earth. This ozone layer shields us from severe cases of sunburn.

A thin atmosphere layer 50 miles above the earth is colder than the ozone-sphere but still higher the temperature rises again. V-2 rocket flights made during the past year confirm the upper air temperature records.

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BOTANY

Seed of Metasequoias Will Be Planted in U. S.

► TREES from earth's earlier ages, supposed to have become extinct with the last of the dinosaurs, will soon be growing in American botanic gardens. Seed collected from survivors found in a hidden valley of central China have been brought to the Arnold Arboretum of Harvard University, and will be planted there and in nine other tree collections in this country, as well as two in England.

The tree, which is a fairly close relative of the redwoods or sequoias of California, has long been known from its fossil remains, for it had world-wide distribution millions of years ago. Metasequoia was the name given to it by botanists on the basis of these fossils. Now living metasequoias have been found.

The discovery was first announced about two years ago, by Chinese botanists who at first thought the tree was a peculiar kind of fir. As soon as identification of their specimens showed what a rare botanic treasure they had found, Prof. E. D. Merrill, long director of the Arnold Arboretum, arranged for an expedition to collect seed for planting in as many places as possible, to insure continued survival of the species.

According to the Chinese descriptions, metasequoia trees grow over 100 feet high and have trunks seven and one-half feet in diameter. Unlike the American sequoias, but like the American larch or tamarack and the swamp cypress, they shed their foliage in winter.

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MEDICINE

Drug Relieves Allergies

"Decapryn," new antihistaminic agent, has completely relieved 80% of hay fever patients and over 85% of patients with hives. Unpredictable in bronchial asthma.

► A NEW histamine antagonist called "Decapryn" has been developed which is a valuable addition to the antihistaminic or antiallergic agents now available for the management of allergic conditions. Dr. Fred W. Wittich, secretary-treasurer of the American College of Allergists, announced.

The new histamine antagonist was developed in the research laboratories of the Wm. S. Merrell Company, and its advantages and uses were reported by Dr. Ethan Allan Brown of Boston, Mass., and his colleagues (*Annals of Allergy*).

Approximately 80% of all allergic symptoms were relieved by Decapryn. Analysis of results showed that 80% of patients with typical hay fever and over 85% of patients with urticaria or angioneurotic edema were completely relieved. In bronchial asthma, the effects, as with other antihistaminic drugs, are quite unpredictable. Of 54 patients, 30% were

markedly relieved, 40% were moderately relieved. In the remainder there was no noticeable relief, although in the group with associated nasal symptoms, a good number were relieved of these latter.

Drowsiness was the most common side action encountered. It was observed in about one patient out of six. Of the total number of 23 patients who reported disturbing side actions, 15 were in the asthma group, who received comparatively excessive dosage. Reactions in the remaining eight patients were moderate in five and severe in three. On the basis of a dose of 12.5 to 25 milligrams, used in treating patients other than the asthmatics, reactions occur much less frequently, probably in fewer than 10%.

Further studies on the effects of Decapryn on cutaneous whealing response and other clinical evaluations are in progress and will be reported upon separately in the near future.

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RADIATION DWARFS COTTON—Hereditary changes are evident in the squat, compact plant on the left which grew from a seed which had been exposed to gamma radiation on the deck of a ship on "Able" day at Bikini. The plant on the right, grown from the same strain but from an unexposed seed, is less dense and taller. Plants from most treated seeds grown at the Texas Agricultural Experiment Station by Dr. Meta S. Brown, that sprouted at all, were nearly normal in appearance, but radical changes in the chromosomes in their cells were rather general.