MATHEMATICS-ENGINEERING

Atom-Smasher Uses Coils

➤ A NEW type of atom smasher, known as a "non-ferromagnetic synchrotron," is under development, Dr. C. G. Suits, research director of General Electric, revealed in Schenectady. The huge iron-core electromagnet, common in most atom-smashing machines, is omitted in this. Coils are employed instead.

Ultimately it will produce X-rays of 300,000,000 volts, it is expected. It has been operated thus far up to about a million volts and probably will be in operation at much higher energies before the year is out. It is being built under the sponsorship of the U. S. Office of Naval Research, and is to be used to study the effects of high-energy radiation, particularly in nuclear research.

Instead of the huge iron-core electromagnet usually employed to produce the required powerful magnetic fields, these fields are produced by specially designed coils of wire. These carry heavy currents, and are contained in a tank from which air has been exhausted.

An electromagnet weighing eight tons was used in the first operating synchrotron in the United States. Later, more powerful models employ electromagnets up to 130 tons in weight. The first was an 80,000,000-volt machine. Later models produce 300,000,000-volt radiation.

In this new General Electric synchrotron, there is a cylindrical tank 26 inches in height and 6.5 feet in diameter. It has one-inch-thick walls. Inside there are a group of coils, Dr. Suits explained, for obtaining initial betatron acceleration and subsequent synchrotron operation.

There is no separate doughnut-shaped vacuum tube, as in the earlier models, because the entire tank is evacuated and the electrons move in the space between the inner and outer coils.

During the first operation the vacuum was about a hundred-millionth of an atmosphere. This allowed enough gas molecules to remain to cause appreciable scattering of the electrons, though it does not prevent operation. As the vacuum is improved, to a billionth of an atmosphere or better, the scattering may decrease accordingly, Dr. Suits stated.

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MATHEMATICS-ENGINEERING

Baby Brains Aid Big Ones

➤ NEW arithmetic machines of small size, now completed, might be called "Little Brains" in contrast to the "Giant Brains" they supplement.

They are special machines for special problems, but like their predecessors are electronic computers and solve in seconds what might require days or even months by other means.

At least two have been recently revealed. One is the "Maddida" and is designed specifically to solve differential equations. Its full name is "Magnetic Drum Digital Differential Analyzer." It was constructed by Northrop Aircraft, Hawthorne, Calif., for the U. S. Air Force. It weighs about as much as an adding machine.

Although small, it is said to possess more mathematical capacity than the largest differential analyzer now in use. This large computer, built by the Massachusetts Institute of Technology, has an 18 integrator capacity, thousands of vacuum tubes and relays and hundreds of motors.

It occupies a large room and weighs several tons. Maddida has 22 integrators, 56 vacuum tubes, no relays, one motor, weighs 60 pounds, and occupies just a table-top of space. It gets accuracies of one part in a million, it is claimed.

The other "little brain" is a development of the Potter Instrument Company, Flushing, N. Y. Although it can do complicated arithmetic, it is not claimed to be a "giant brain." It imitates factory work and conditions at a tremendously accelerated rate to determine production schedules and wages.

It is called a "Time Study Computer." It will calculate pay for both working and waiting time, and enable industry to attain the most economical combination of men and machines. It is a specialized application of electronic computer principles to do the work that until now has required a large staff of statisticians on schedules and payrolls.

This computer can simulate the operation of ten of the machines used in the factory at the same time. Built in three panels each six feet high, two feet wide and 20 inches deep, the time study computer can be plugged into a wall socket. It costs approximately $15,000 to build. One girl can operate it by setting dials from work slips. No more skill is required than for operating an adding machine.

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AGRICULTURE

Wool Grows Faster in Summer, Not Winter

➤ WOOL grows faster on sheep in the summer and early fall when they ordinarily have the best feed. This finding contradicts the generally-held belief that sheep's wool grows best during the winter months.

It resulted from tests by Dr. John I. Hardy of the Agricultural Research Center in Beltsville, Md., made to determine the exact growth rate of wool fibers.

The wool-growth clippings were taken from sheep there and at eight cooperating state agricultural experiment stations immediately after shearing time every year. After 28 days for the medium and coarse wools, and 42 days for the fine wools, two small tufts of fibers were removed from each of the test sheep. These were then carefully measured to find the growth rate.

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