

Every Star A Celestial Furnace

Physics—Engineering

Extreme Heat Required to Release Atomic Energy

TEMPERATURES of forty million degrees Centigrade (about 70,000,000 degrees Fahrenheit) will be required before man can release the energy of the atom, a release that is continually occurring in the stars and keeping them going. So members of the World Power Conference were told by Sir Arthur Eddington, famous Cambridge University astronomer.

Every star is a celestial furnace, declared Sir Arthur. It is fed by subatomic energy. He expressed the belief that the source of this energy is the continual building up of complex elements out of hydrogen, the simplest of the elements. According to his theory, there is a process going on deep within the stars by which the primitive electric charges are evolving into atoms. Another possibility for the source of stellar energy, he admitted, is the annihilation of the electrons and protons of which atoms are made. As one is negative electricity and the other positive, the union of an electron and a proton would eliminate each and result in a burst of light or other electromagnetic radiation.

An approach to the far distant time when the atomic energy can be released by man, by the use of the forty million degree temperature, has been made by Dr. Kapitza, of the Cavendish Laboratory at Cambridge. Sir Arthur told of his colleague's experiments with extremely intense, though momentary, magnetic fields, the highest corresponding to a million degrees of heat.

A possible way in which subatomic energy may be released without such high temperatures may be found in the process causing the penetrating radiation studied by Kohlhörster in Germany and Prof. R. A. Millikan in America, said Sir Arthur. According to Prof. Millikan's views these rays are caused by the building up of atoms in interstellar space.

In any event, said Sir Arthur, the

universe will eventually reach a state of stability, of "uniform changelessness".

NOT content merely to substitute for mechanical power and manpower on the farm, electricity is finding new and exclusive ways in which it can bring to agriculture advantages of research corresponding to those enjoyed by industry.

Electric lubrication of the soil to make plowing easier, electric treatment of ensilage so that it will keep better, the heating of hotbed soil with electricity, and putting crops under electric discharges and under ultraviolet and white light to increase yield are subjects of recent research, C. A. Cameron Brown, of the British Institution of Electrical Engineers, reported to the conference. The cheapness of electrical energy is apparently the greatest factor determining the success of the new methods.

WHILE coal in the United States and England is being rapidly exhausted, Canada is saving 34,000,000 tons of her vast deposits every year by the extensive use of hydroelectric power.

"It is reasonable to state that a saving of coal of six tons per annum is capable of being effected by each installed horsepower of water-powered generators," J. T. Johnson of

The Answer Is

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the Canadian World Power Conference Committee, has reported.

Canada's rivers supply many opportunities for water power development, and she uses power from this source much more than most other nations. Of all the electric power used in Canada, 99 per cent. comes from hydro-electric plants whose capacities make up 95 per cent. of the electric generating equipment of the Dominion.

Science News-Letter, July 5, 1930

Power Plant Sentinels

WHEN hundreds of thousands of horsepower traveling with the speed of lightning are instantly halted, you may be sure there will be a grand disturbance. And there is, but all the fuss is confined in steel tanks 25 feet tall and 10 feet wide, filled with oil.

Two such tanks are shown on the front cover of this week's SCIENCE NEWS-LETTER. They are said to be the largest oil circuit breakers in the world and the picture shows them being tested by the Westinghouse Electric and Manufacturing Co. They will soon be interrupting power on a 220,000 volt transmission line in New Jersey.

When all is well on the power line each will allow 600 amperes of current to flow through it. But when a thunderstorm sends a big rush of current down the line to them, which if allowed to pass would damage transformers and generating apparatus, they will instantly open the circuit. In this way they can break an arc of 8,000 amperes at 220,000 volts, or 3,000,000 arc kilovolt-amperes.

Such an arc would flame high in open air, melting its contacts and burning nearby apparatus. It would not be stopped in time to save the transformers and generators. But the flame is quenched in each breaker by 22,000 gallons of highly purified oil.

Electricity

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