

Earth Yields 200,000,000 Amperes

Physics

The earth itself is a huge electric dynamo generating enough current to supply light, heat and other electrical needs to the ten largest cities in the United States for at least one million years. Recent researches on thermal reactions inside the earth, conducted by Dr. Ross Gunn, civilian scientist of the Naval Research Laboratories, and inventor of a short wave oscillator and airplane altimeter that have been taken up by the radio and aircraft industries, indicate that the earth is the greatest known electrical wonder in the universe.

Dr. Gunn has published a theoretical treatise on his studies in the *Physical Review*. The intricate theoretical problem of the earth's electrical condition showed that the currents generated inside the earth amount to more than 200,000,000 amperes. Dr. Gunn is careful to emphasize that this tremendous source of energy is unavailable for use by man. Like atomic energy, it will be kept in Nature's storehouse for the use of the generations of perhaps a million

years in the future, he says.

According to Dr. Gunn, the tremendous electrical currents that are produced inside the earth arise from the motions of the tiny electrical charges known as electrons. The motions are caused by the very high temperatures existing well inside the earth's crust.

Due to a peculiar and complicated type of interaction the electrons are caused to drift around the earth's axis of rotation. This drift of electrons constitutes an electric current which is so large that, if it were sent through the huge cables, supporting Brooklyn Bridge, it would melt them in less than a thousandth of a second.

The presence of the currents that flow in the hot interior of the earth may be detected by anyone who cares to observe the action of a magnetic compass on the surface of the earth, says Dr. Gunn, for it is precisely these deep-seated electric currents that orient the compass needle in a north-south direction. He adds that it has been known for thousands of years

that the earth behaved like a giant magnet, but the mechanism by which this magnetism was produced was not understood.

The study pursued by Dr. Gunn sheds much light on the manner in which the earth was originally formed. His work and known facts relating to the earth's magnetic field indicate that the earth was part of the sun or some other liquid star millions of years ago. When the earth was thrown off the sun, it came off in such a manner that the hemisphere now embraced by the continents was made up of relatively cool surface material having a mean temperature of perhaps 50,000 degrees while the hemisphere embraced by the Pacific Ocean came from deeper and much hotter layers.

This unsymmetrical temperature distribution of the earth's interior is said to account for the volcanic activity and earthquakes in the countries in and adjacent to the Pacific Ocean.

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Two Comets on Successive Days

Astronomy

Two new comets on two successive days is August's gift to the astronomical world. On August 1, David Lamont Forbes, an amateur astronomer of Rondebosch, South Africa, found one in the constellation of Sagittarius, according to an announcement by Dr. Harlow Shapley, director of the Harvard College Observatory. The following day Dr. G. Neujmin, a Russian astronomer at the Simeis Observatory in the Crimea, discovered another not far away, in the constellation of Aquarius. The Russian discovery became generally known several days before news of the one in South Africa was circulated, however.

When observed on the evening of August 3, Forbes' Comet was at the position 20 hours and 52 seconds right ascension and 30 degrees 26 minutes south declination. This is in Sagittarius, a star group that is directly south in August evenings. Sagittarius contains no very bright stars, but is characterized by five stars forming the "little milk dipper". This dipper has four stars outlining the bowl and one to the west at the end of the handle. The dipper is inverted and the brightest star of the constellation is in its uppermost part. The comet, on August 3, was to the east of this

milk dipper, and distant from it a little more than its length. Though Dr. Shapley has not been advised of its brightness, the comet is presumably too faint to be seen without a large telescope. It is moving to the northwest, and if it becomes brighter, it may come into naked-eye view.

When Dr. Neujmin found his comet on the evening of Friday, August 2, it was in the constellation of Aquarius. Its apparent place was 21 hours, 16 minutes, 4.6 seconds right ascension and 12 degrees, 45 minutes, 41 seconds south declination. Aquarius is a constellation that can now be seen in the southeastern evening sky. About midnight it is directly south and about 40 degrees above the horizon. A curious feature of the discovery is that the comet was very close to the ecliptic, the path in which the planets move, and it had a planetary motion, according to the discoverer.

In accordance with custom, the new comets will be named after the discoverers. Dr. Neujmin is no stranger to this honor, for in 1914 he discovered a periodic comet which bears his name. In 1914 he discovered another, not periodic; then he found another periodic one in 1916. When it re-

turned in 1926 he first located it. Until the orbit of the new comet is calculated, it cannot be told whether it is periodic or not, or whether it will become bright enough to be visible without a telescope. It is now of the 13th magnitude, much too faint to be seen except with a large telescope. Mr. Forbes discovered his first comet last year.

The past two years have been rather sparse in comet discoveries, which is especially marked, because seven were found in 1926 and ten in 1927. Six of the discoveries in the latter year were of new comets, while four were of old friends on return visits. In 1928 three comets, all new, were discovered. All of the comets in 1929—the two new ones and one discovered in January by two German astronomers named Schwassmann and Wachmann—were previously unknown. Just why there should be such a difference in the number of discoveries is uncertain, but it probably means that astronomers are not watching for comets as closely as they were in 1927.

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A shark weighing 200 pounds has a liver weighing 20 or even 30 pounds.