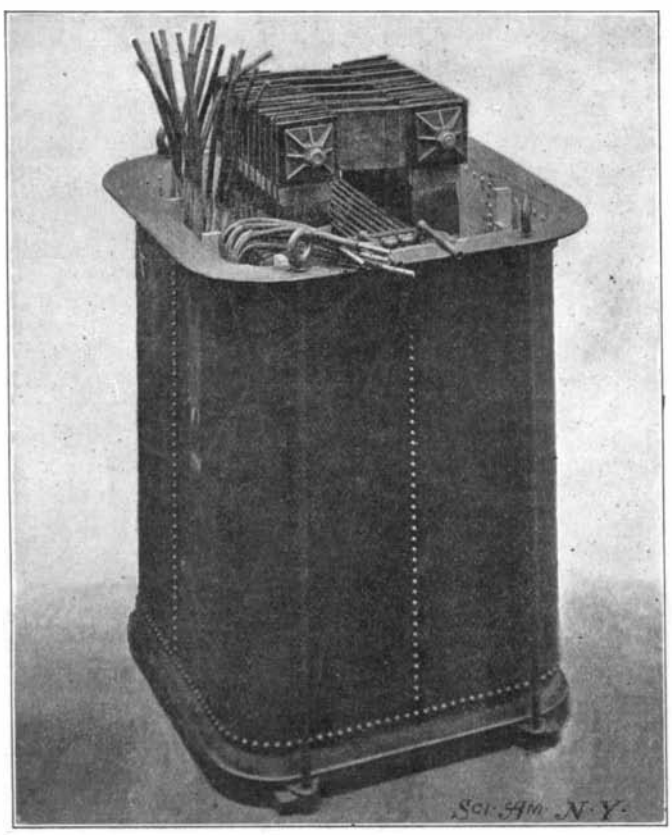
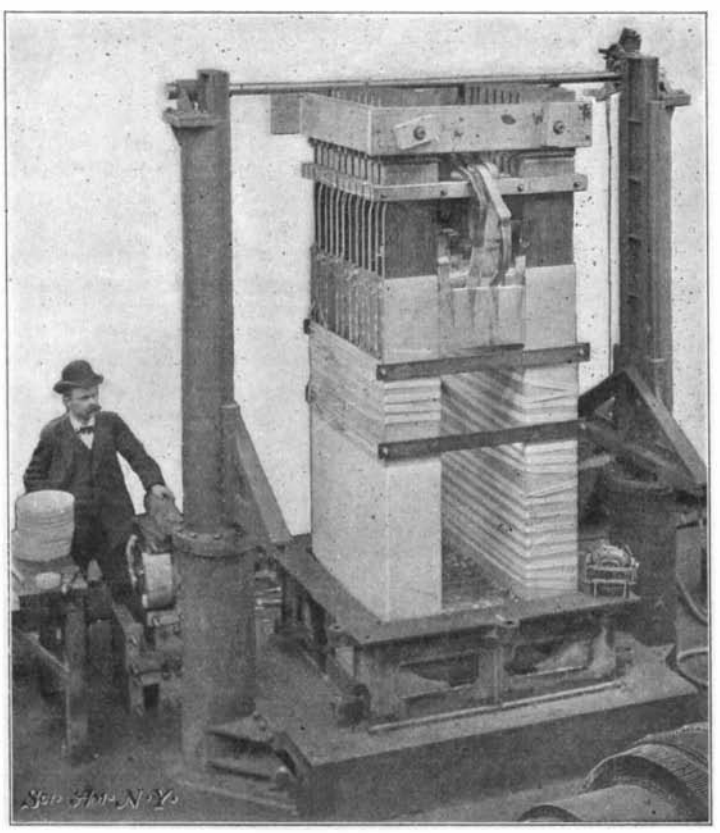
THE LARGEST TRANSFORMER IN THE WORLD.

What is claimed to be the largest transformer in the world has just been built for the Pittsburg Reduction Company, and will be used at their Niagara plant for the manufacture of aluminium by the process of electrolysis. The transformer is rated at 2,000 kilowatts, which is 250 kilowatts more than the capacity of any other transformer with which we are acquainted. But more remarkable still is the unusual quantity of current which is induced in the secondary winding. This large current is required by the peculiarities of the aluminium reduction process, in which the current used may be very heavy, though the voltage must be very low. The primary winding of the transformer is designed to receive a current of 908 amperes at 2,200 volts and this will be transformed in the secondary winding to a current of 40,000 amperes at 50 volts pressure. Our illustrations give an approximate idea of the size of the mammoth transformer. The transformer at its base measures 7 feet 2 inches square and its height is 8 feet 8 inches. One of our views shows the transformer in process of construction, which construction, in view of the unusual capacity of the apparatus, is of special interest. The secondary winding consists of heavy laminated copper bars, a large size being required to carry the enormous current for which the transformer is built. These bars obviously cannot be bent to form coils in the ordinary sense of the word, but are connected at the top and bottom by copper plates clamped thereto. These may be seen best in our other view of the transformer. The primary winding of the transformer is made up of copper ribbon coil-sections, a coil-section being placed between each successive pair of bars in the secondary winding. Taps from each coil section of the primary winding are run up to a switching device called the "regulator head" whereby any number of coils may be cut in or out to change the voltage to any pressure desired, the ratio between the primary and secondary voltages being of course directly proportional to the number of turns in each. The illustration shows the windings complete and ready to receive the iron core. This consists of thin sheets of soft iron built up about the coils. The upper part of the apparatus, after the core is in position, is surrounded by a coil of piping through which cold water is circulated to carry off the heat generated by hysteresis and by the current in overcoming the resistance of the conductors. An additional coil is placed above the primary winding and within the secondary winding as shown in one of our views. The entire apparatus is incased in a tank filled with oil which circulates through the transformer and carries the heat from the lower heated sections to the top where it is taken up by the cooling coils. The oil also serves as an insulating medium in the gaps between the coil sections and between the coils and the iron core. These parts are also separated from each other by sheets of insulating material. The tank in which the transformer is incased is made of heavy boiler plate, which cannot be torn or broken in the event of fire and thereby cause injury to the coils by the release of the oil. The transformer was built by the Stanley Electric Manufacturing Company, and by way of contrast we have shown on the base of the partly completed giant transformer a transformer of one-half kilowatt, which is the smallest transformer built by the Stanley Company.



Top of the Transformer Case Removed, Showing Secondary Windings and Cooling Coils.



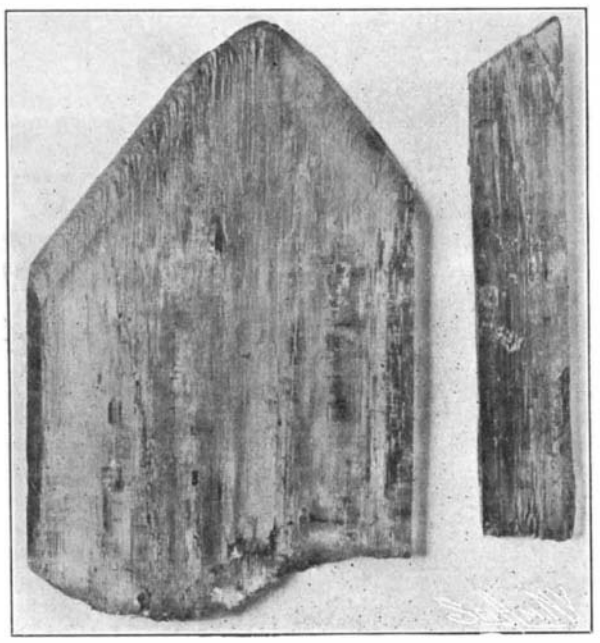
The Transformer in Process of Construction. A ½-Kilowatt Transformer Shown on the Base at the Right.

THE LARGEST TRANSFORMER IN THE WORLD.

VESUVIUS AGAIN BURSTS FORTH.—Another new fissure has formed in Vesuvius about two-thirds up the mountain. Lava is flowing out and has already reached Atrio del Cavallo. This latest eruption occurred without any warning whatever. There was no earthquake, no detonation, no rain of ashes, nothing but a stream of lava and red-hot stones thrown to a height of 700 feet. Lava ran in a stream fourteen feet broad and soon traveled a distance of three-quarters of a mile.

KUNZITE—A NEW GEM.

There is always something particularly interesting in bringing to light a new gem. A remarkable discovery of unaltered lilac-colored spodumene has been recently



Kunzite—A New Gem.

made at Pala, San Diego County, Cal. The new gem was named after its discoverer, Dr. George F. Kunz, the well-known mineralogist and gem expert. The crystals are of extraordinary size, transparency, and beauty, some of them weighing 17 troy ounces. The crystals are flat and the color varies from a very pale tinge to a rich amethystine hue. They have been etched by weathering. They are remarkably free from flaws. The specific gravity of the crystals is 3.183 and the hardness is 7. When cut and mounted parallel to the base the gems are of rare beauty. The new mineral is being analyzed by Dr. Charles Baskerville, of the University of North Carolina, who suggested the name "Kunzite."

By the action of Röntgen rays Dr. Baskerville excited a crystal of the new mineral sufficiently to make it photograph itself when placed upon a sensitive plate and kept in the dark for ten minutes.

In the course of the tests by Dr. Baskerville the Kunzite crystals were subjected to the action of ultra-violet light without showing any evidence of fluorescence or phosphorescence, and it was not until it was subjected to the bombardment of X-rays of very high penetration that it became at all fluorescent. On its removal to a dark chamber, it exhibited a persistent white luminosity never before observed in its class of minerals.

The traffic receipts of the Forth Bridge for the past half year were $365,000, an increase of $12,500.

Some Postal Figures.

Postal and telegraphic statistics for 1900 which have just been printed in the Statistical Yearbook for the German Empire, show the following figures, says Simon W. Hanauer, deputy consul-general at Frankfort, in a report to the State Department.

Germany had in that year 44,775 post offices, following next to the United States, which had 77,957. Great Britain had 22,194, France (including Algeria), about 11,000; Italy, nearly 8,000; Austria-Hungary and Russia about 6,000 each.

In the number of persons employed in European postal departments, Germany stands first with 222,800; Great Britain, 173,184; France, 77,245; Italy, 74,958; Russia, 56,217; and Austria-Hungary, 67,584.

Letters and postal cards forwarded by the public mails in 1900 were taken, in round numbers, as follows:

United States	7,250,000,000
Great Britain and Germany each about	3,500,000,000
France	2,250,000,000
Austria-Hungary	1,000,000,000
Italy	755,000,000
Japan	730,000,000
Russia	566,000,000

Nearly one-third of the total for Germany consisted of postal cards, while only one-twelfth of the total figures for the United States were postal cards. This difference is attributed to the saving spirit of the Germans.

In 1900 Germany had 24,471 telegraph offices, with 36,000 instruments in operation; Great Britain, 11,512 offices and 38,000 instruments, and the United States, 22,954 offices and 81,000 instruments.

The number of telegraphic dispatches transmitted in 1900 was:

Great Britain	92,000,000
United States	63,000,000
France	50,000,000
Germany	46,000,000

In Germany there were 2,411 cities or towns having public municipal telephone systems, with 305,795 connections. France had 1,199 public telephone plants with 72,480 connections.

There are a variety of chemical methods for the systhesis of ether from acetylene, but they are in general indirect, alcohol being formed as an intermediate product. In a method proposed by Joseph W. Harris, and described by Mr. C. P. Townsend in the Electrical World, the transformation, for all practical purposes, is direct. From this description it seems that acetylene is introduced into strong sulphuric acid solution in the cathode compartment of an electrolytic cell, the anode of which is inclosed in a porous cup. The gas reacts with the liberated hydrogen, yielding a mixture of ethylene and ethane, the conditions of the reaction being such as to restrict as far as possible the production of the latter gas. This ethylene, formed in strong sulphuric solution, passes at once into ether, the controlling feature of the reaction being the presence of relatively small percentages of water — not to exceed 35 per cent — in the acid. At lower acid concentrations the formation of alcohol is noted. The author states that the reactions considered most probable by Mr. Harris are as follows: first, acetylene by union with hydrogen passes into ethylene; second, ethylene unites with sulphuric acid to form ethyl-sulphuric acid; and third, ethyl-sulphuric acid in the presence of water breaks up with formation of ether and regeneration of the acid electrolyte. Inasmuch as certain of the known carbides and carbide mixtures react with water with formation of ethylene, it would be interesting to determine whether they would yield some ether by decomposition with strong sulphuric acid.