water, the cold is produced at the farther limb of the apparatus in a degree of such intensity as to cause a deposition of the moisture in the atmosphere in the form of dry snow. So great is the cold produced that, as previously hinted, we have seen, and that too, in a warm room, the solidification of mercury in the vessel into which the end of the tube was dipped. One end of this tube may be called the boiler, and the other the refrigerator, and a condition of success is that the connecting pipe between the two shall be kept cooled while the boiler is being heated, so that all gas passing to the refrigerator may enter it in a comparatively cool state. When this is used on a large scale, it suffices that a fire be applied for two or three hours once a day, by which the refrigeration is rendered singularly perfect. There are minor mechanical details connected with this apparatus, but the general principle is as above stated.

Thus is solved the problem of a process for attaining cold and ice without mechanical aid, and as the inventor says, "Its abounding efficacy is most evident in its freezing of mercury in the open air."—*British Journal of Photography.*

ELECTRIC-TECHNICS.

The progress of electric science and its rapid practical application to various lines of work, have made electricity a subject of so general an interest that numbers of our readers no doubt take pleasure in any matter we may give in that line.

The productions of the electrical current by way of the dynamo, the weaving of those invisible magnetic threads, as we may call them, or the revolving of the invisible magnetic power curves, is a purely mechanical thing, subject to the general principles of construction of machinery. Mechanical engineers are therefore the natural heirs to any electric invention applied in this way. Their knowledge and experience of their own department forms the most reliable basis for the success in the management of an Electric Light or Power Station. Moreover, there are a great number of manufacturers who are having a surplus of water or steam power which can be conveniently turned to account by applying it to furnishing electric current for various purposes.

In reviewing the existing methods of producing and distributing this current, we are not partial to any special system, but in discussing their claims of usefulness, our attention is naturally limited to those which are in command of sufficient figures and facts in proof of the actual results obtained during a longer period of the practical test. It will not answer for our purpose to refer to every new thing which may indicate the possibility of some new kind of improvement.

The history of the electric light is another proof that the experiment of the laboratory takes a long time before maturing into a public benefit. It is generally admitted that the electric light, in spite of the first very enthusiastic reception, has not made such a headway as might be expected. This is not due to want of appreciation. Everybody is aware of its importance for health and general culture, and one comparing glance suffices to make one realize that our present mode of furnishing light by distilling coal and pumping the poisonous gases into the houses through a vast system of underground pipes will be ridiculed by the coming generation. There is no doubt about the final victory, and there is a general disposition among the people of doing away with gas even at a financial sacrifice. But in this hard fight between the Dragon that blows the poisonous vapors from the nostrils, and the Knight in silvery armor, who makes his brave attacks, you will find that the Knight has been laboring extremely hard. To extend this comparison to a description of the mechanical resources of the two opponents, one might say that the Gas is all bowels, the Electric Light all muscles and nerves, there the bowels filled with a material which is literally had at no cost, here a coupling together of various machinery and all sorts of fine mechanical devices, requiring great skill and the most perfect discipline for handling them. The electric light business is of a very complicated nature, compared with the making of gas, which is made through the simple process of heating. Boilers, engines and dynamos are required to produce the current, a line of copper wire to conduct it, which must be kept so perfectly insulated that the current cannot escape, and a vacuum finally in which the filament can be made to glow without being consumed. Anyone can understand that the making of an incandescent lamp is a very fine piece of work. It is a matter of securing a perfect vacuum, of making a perfect connection between the line wire and the filament without causing a leak; of making all filaments uniform and suitable to the current, and of preparing them so that the continued effect of the current will not change them.

In addition to all these contrivances which are required for the distribution of the light, an automatic control of the current is needed in case of lamps being turned on or off, in order to have a strong enough current at all times, and to prevent injury to the machine and lamps from an over charge. It is plain that with such a variety of difficulties to overcome, the different light systems vary a great deal in their methods and accomplishments, regarding the quality of the light, cost of producing same, etc. The Multiple Arc System of which Mr. Edison is the principal promoter (most of the eastern systems bing mere side issues of the same), had the great disadvantage of being limited to a very small area, and therefore only suited for isolated plants, and thus the further progress of the electric incandescent light for public use in place of gas was naturally barred by the inherent defects of this method.

A new issue was made about five years ago by Chas. Heisler of St. Louis, who invented the first original long distance system which enabled him to supply entire cities from one central station. We have never yet seen a complete description of the same, although its practical success has been demonstrated in a number of large plants throughout this country, from the Pacific to the Atlantic Ocean. The importance which is due to the Heisler System may be characterized by the general falling in line of the older systems in copying certain original ideas of its inventor. Mr. Heisler first advocated the use of low resistance lamps, and he first changed the quotation of standard candle power from 16 to 30, as being more suitable for commercial lights. His most important move, however, was the introduction of the incandescent light for the illumination of the streets on a large scale, which, we believe, will prove the turning point in the warfare on the gas monopoly.—*American Engineer.*

THE VANILLA.

Of the many admirers of vanilla, and of vanilla-flavoured confectionery, but few know that it is produced from a species of orchid. This plant seems to require very little soil for its nourishment, and it generally attaches itself by means of its little aerial rootlets to walls, trees, and other suitable objects. It has a somewhat long and fleshy stem, and the leaves are alternate, oval, and lanceolate (shaped like a lance). The