A NEW INCANDESCENT GAS MANTLE.

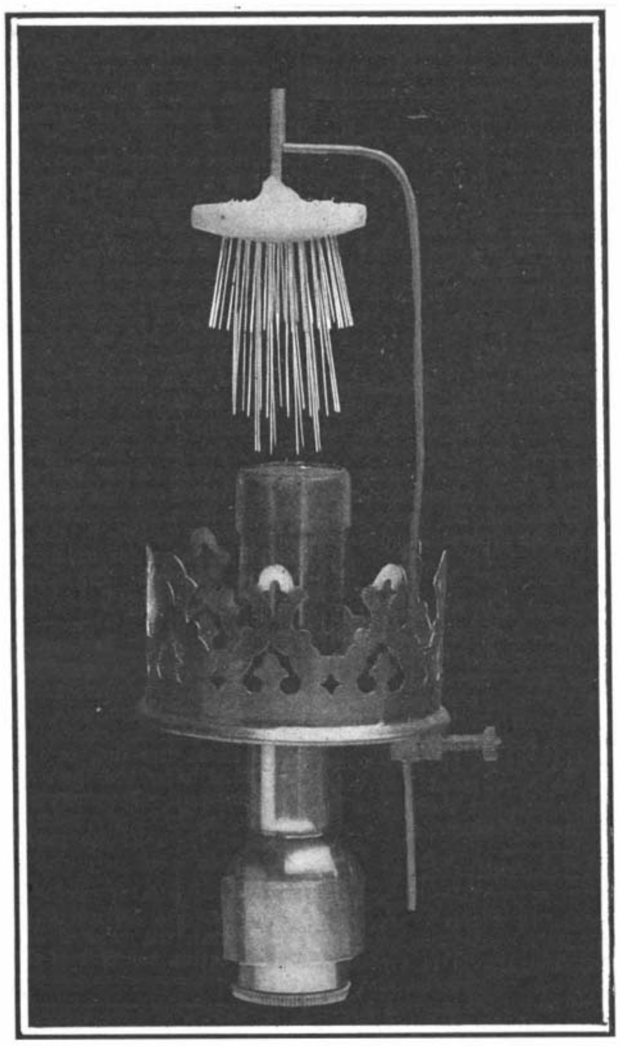
Numerous efforts have been made from time to time to effect improvements in the incandescent gas mantle invented by Dr. Auer, with a view to securing additional strength and attendant prolonged durability, but the fragile and perishable character of the cotton foundation rendered such attempts only moderately successful. The majority of such improvements proved only to be of a temporary nature, with the result that the mantle soon lost its power of incandescence.

Greater success, however, has attended the experiments of a recent inventor. In this device the cotton foundation is abandoned, and instead a cage or "bush" of thin rigid filaments projecting from a solid base, on much the same principle as the bristles of a brush, is used. The principle of the invention is based upon obtaining by fusion at a very high temperature radiant and unchangeable threads composed of various oxides. These filaments are perfectly solid and white, closely resembling glass or porcelain. They are made in the form of rods or needles of a thickness of 0.8 millimeter (0.03 inch) and from 25 to 30 millimeters (0.98 to 1.18 inch) in length. As may be seen from the accompanying illustration, the rods or needles are disposed in three rows of different lengths in the form of a bush, and the intensity of the incandescent illumination obtained is controlled by the number and length of these bristle-like filaments.

The threads are raised to a high state of incandescence by the blue flame of the Bunsen burner in precisely the same manner as the ordinary Auer mantle, the flame being projected into the center of the overhanging bush by means of a special gas injector in the burner. Any shade or tint of light preferred can be secured merely by the introduction of certain oxides in the production of the filaments. Moreover, owing to the great strength of the threads, the light can be made in a variety of forms—flat, inverted, round, or assume fanciful designs, such as flowers, stars, and so forth—rendering it useful for decorative purposes. Furthermore, it can be adapted to any system of gas illumination with equal readiness and success, such as petroleum, natural gas, gasoline, alcohol, etc., and can be used with portable lamps.

The filaments are of great strength considering their spider-thread-like thickness. In fact, if a rod be placed between the thumb and finger, it cannot readily be broken. Changes of temperature exercise no harmful effects, nor is it affected by drafts, wind, or rain. A mantle can be taken from the burner while in a perfect state of incandescence, plunged into cold water, and then reinstated over the flame without sustaining injury or any impairment of its efficiency.

The mantle is suspended in position over the flame by the hook of a thin fork, which slips into the slot of the metal holder of the mantle, and all that is necessary to do is to see that the bush is centrally placed over the burner, and that the strongest filaments are not more than ¼ inch distant from the burner, adjustment in this direction being secured by sliding the supporting rod up and down in a small clutch at the side clamped by a screw. Control of gas is effected by means of a small screw regulator at base of burner, by means of which it is possible to enable just sufficient gas to be passed to the burner to raise the filaments to their maximum state of incandescence, and without any waste of gas. One of these mantles under normal conditions of working will last from two to three years, and there is no accompanying diminution in the intensity of the light emitted with use.



A "BUSH" OF FILAMENTS AS A SUBSTITUTE FOR THE GAS MANTLE.

THE MEASLES CANNIBAL.

BY CRITTENDEN MARRIOTT.

A few years ago, an epidemic of measles broke out among the Indian tribes living on Vancouver Island in British Columbia, not far from Fort Rupert, and the shamans or medicine men came to the conclusion that a cannibal sorcerer, whom they termed the *hamatsu* (measles cannibal), was slaying their children to eat them, and that he would continue to do so until he was killed.

As they could not slay a ghost in his own person, they arranged a ceremony in which one of their number posed as the cannibal, and was treated as they would have liked to treat the real foe. This fact of a substitute was, of course, not made public, only the medicine men knowing the truth of the matter.

Against a wall of rock was painted an imitation opening, in the center of which the "cannibal" was fastened, just as he appears in the accompanying photograph (which, by the way, was not taken at the time, but some days later, when the medicine men were induced to give a private exhibition for the benefit of members of the Bureau of Ethnology). At the proper time, after going through various incantations, a covering was jerked away, exposing the cannibal, apparently springing through the solid rock. He was promptly grasped by two of the priests, who dragged him out and rushed him through a fire which was burning in front of the place and which was surrounded by all the members of the tribe, beating drums and singing at the top of their voices. By some jugglery, the cannibal was gotten rid of, and the people were told that he had flown away through the air and would not come back.

After this ceremony had been repeated several times to put an end to other epidemics, which were only too prevalent among the Indians, it grew into a sort of annual affair, managed by the members of a secret society whose members know that the supposed *hamatsu* was only a man.

THE MEASLES CANNIBAL.

Ammonio-Copper Processes of Making Artificial Silk.

The production of artificial silk steadily increases as the strength of the product is increased. Silk made from ammonio-copper solutions of cellulose is cheaper than silk made from solutions of nitrocellulose, and its manufacture appears to be on the eve of a great development. A great many processes have been devised, as is indicated by the following list:

Early Processes.—Desplessis Process.—This is the earliest process and the foundation of the others. It consists in dissolving cellulose in Schweitzer's reagent (ammoniacal solution of hydrated oxide of copper) and forcing the viscous solution through spinnerets into a weak acid bath which coagulates the mass and consequently transforms the liquid streams into solid fibers, from which the ammonia and the copper are removed, and recovered, by washing. The French patent was issued in 1890 and expired at the inventor's death in 1892.

Pauly Process (1897).—The solution is formed without heating, by an immersion lasting a week, in order to increase the strength of the fibers.

Fremery and Urban Process.—The cellulose is first oxidized, in order to lessen the time required to dissolve it, and the fibers receive special treatment to increase their strength and gloss. These processes are employed in the factory at Oberbruch, Germany.

Mulhouse Process.—Cotton bleached, mercerized, again bleached and ground with copper sulphate. The mixture is dissolved in strong ammonia.

Soie Parisienne.—The cotton is ground with sulphate or carbonate of copper and dissolved in a 14 per cent solution of ammonia at 32 deg. F. The fibers are coagulated in strong sulphuric acid (up to 80 per cent).

New Processes.—In most of the new processes the cotton is first mercerized. Bemberg, however, converts unmercerized cotton into hydrocupro cellulose by mixing it with sulphate and chloride of copper, caustic alkali and water. The product is then treated with ammonia and exposed to the action of the air. Raw silk or silk wastes may be added to the cellulose. The fibers are spun in a bath containing castor oil and caustic soda.

Foltzer increases the solubility of the cellulose by heating it with alkaline solutions, under gentle pressure.

Linkmayer immerses the cotton in a weak bath, in which it swells, and then in a stronger bath, where it dissolves, and subsequently extracts part of the ammonia of the bath with an air pump, which permits a weaker coagulating bath to be used.

The Hanan Kunstseide Fabrik accelerates solution by saturating the cotton with ammonia and mixing it with a paste of hydrated oxide of copper.

Crumière adds an excess of metallic copper to Schweitzer's reagent.

Draeper dissolves cellulose or hydro-cellulose in an ammoniacal solution of copper carbonate.

Friedrich proposes to substitute alkylamines for the ammonia.

Lecoeur recommends coagulation by bisulphites of the alkalies.

The Soie Nouvelle company obtains very flexible fibers by coagulating and washing in presence of glycerine. Boncquey adds sugar or molasses to the bath and the Sociéte Francaise des Soies Artificielles uses a coagulating bath of strong caustic soda, mixed with glucose or glycerine.

Guadini employs a mixture of sulphuric and hydrochloric acids.

Thiele passes the fibers through a bath of ether, benzene, chloroform or tetrachloride or carbon, containing oil or grease in solution, which produces partial coagulation, and then through the regular coagulating bath.

Linkmeyer and Kracht also effect the coagulation in two stages, with a weak and a strong bath, in order to prevent the fibers adhering to each other.

Finally, in several processes the semi-liquid cellulose is treated with caustic alkali, or the coagulated fibers are mercerized with caustic soda, chloride of zinc, or acids. Linkmeyer and Pollak subject the fibers to tension during mercerization.

Experiments are being carried out in the German navy with acetylene shells, which have been designed to take the place of searchlights. The shell is fired from a special gun, so as to fall in the water in the neighborhood of a hostile ship or fortification. It is ignited on striking the water, and each shell has been constructed to burn with 3.000 candle-power for a period of three hours.