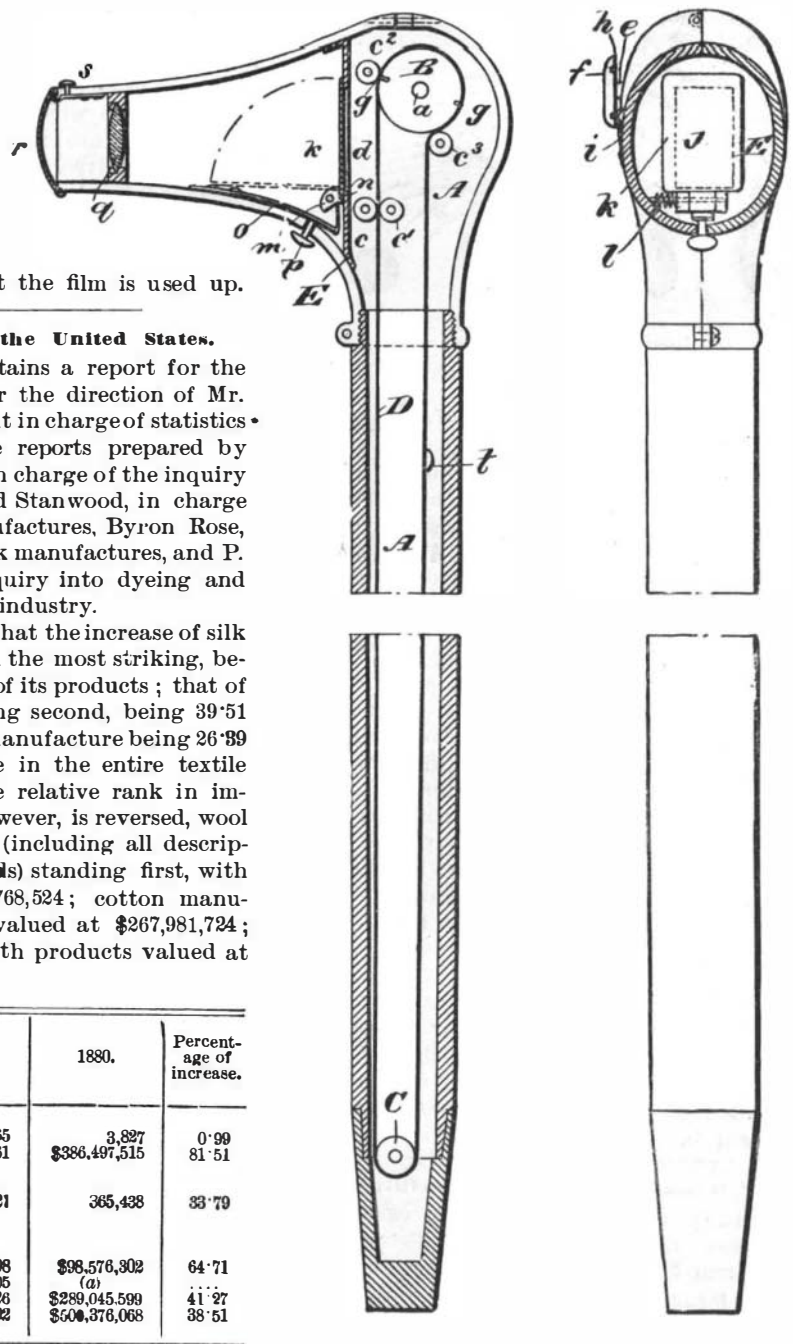
PHOTOGRAPHIC CANE.

In this cane, which is shown in front and side sectional elevation in the two figures, the head forms a camera, while the tubular body of the cane forms a reservoir for the sensitized celluloid strip. The head is screwed to the body and carries a plate, A, which extends down into the cane. On the stud, *a*, projecting from the plate is journaled the roller, B, and at the lower end of the plate, A, is journaled a roller, C. A celluloid strip, D, passes around the rollers, B, C. This strip is preferably made endless by joining its ends by means of two or three stitches or even a small pin to permit of giving suitable tension to the strip. The strip is guided by rollers, *c*, c^1, c^2, c^3. The rollers, c^2, B, and *c*, c^1, hold the section, *d*, of the film in the focal plane. The roller, B, is provided with a stem, *e*, which extends through the side of the cane head and is furnished with a milled head, *f*. The roller, B, is provided with points, *g*, on diametrically opposite sides for puncturing the sensitized film at the ends of the exposed portion, and the inner surface of the milled head, *f*, is provided with cavities, *h*, corresponding in position with the points on the roller, B, and to the side of the cane head is attached a spring, *i*, furnished with a projection which enters into one or the other of the cavities, *h*, and thus causes the film to register.

In the cane head near the film, D, is secured a plate, E, provided with a rectangular aperture, *j*, through which the exposure is made. To the front of the plate is hinged a shutter, *k*, the pivot of which is prolonged and furnished with a spring, *l*, which tends to close the shutter and keep it closed. The cam, *m*, formed on the hinge is provided with a notch, *n*, for receiving the end of the spring, *o*. A button, *p*, extends through the lower wall of the cane head. When the button, *p*, is pushed the shutter is thrown open and the cam, *m*, trips the end of the spring, allowing the shutter to close. If it is desired to prolong the exposure, the shutter may be opened more carefully and held open as long as may be required before pushing the button, *p*, far enough to cause the spring to trip.

The lens, *q*, is placed in the cane head in proper relation to the exposed portion of the film, D, and the end of the cane head is furnished with a small hinged cap, *r*, which is held in a closed position by the spring catch, *s*. When it is desired to make an exposure the spring catch, *s*, is pressed, when the cap, *r*, flies open; then the button, *p*, is pushed, opening the shutter in the manner already described, making the exposure. After the exposure is made the milled head, *f*, is turned a half revolution, when the camera is ready for another operation. Of course it is necessary for the operator to either count the number of exposures, or to attach to the film a button, *t*, which will not pass between the rollers, C. When the film can be turned no further, it will indicate that the film is used up.



PHOTOGRAPHIC CANE.

The Textile Industries of the United States.

Census Bulletin No. 242 contains a report for the eleventh census, compiled under the direction of Mr. Frank R. Williams, special agent in charge of statistics of manufactures, from separate reports prepared by special agents S. N. D. North, in charge of the inquiry into wool manufactures, Edward Stanwood, in charge of the inquiry into cotton manufactures, Byron Rose, in charge of the inquiry into silk manufactures, and P. T. Wood, in charge of the inquiry into dyeing and finishing of textiles as a distinct industry.

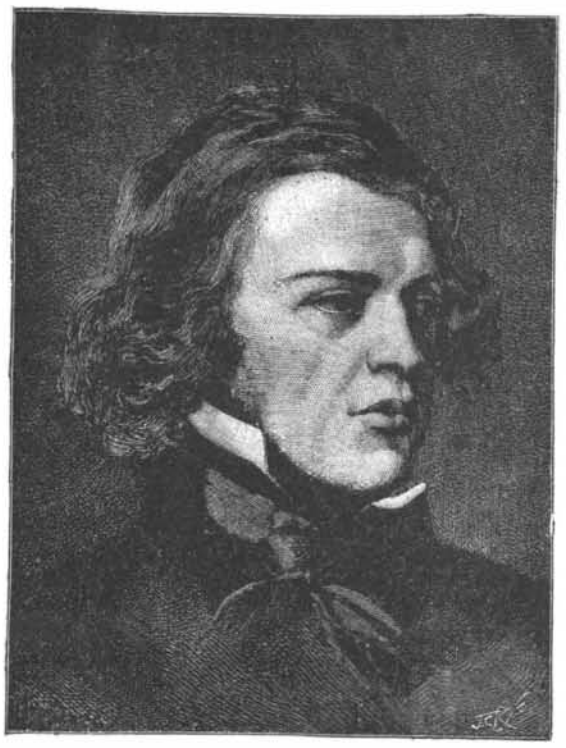
It appears from this bulletin that the increase of silk manufacture since 1880 has been the most striking, being 112·75 per cent in the value of its products; that of the cotton manufacture ranking second, being 39·51 per cent, and that of the wool manufacture being 26·39 per cent. The average increase in the entire textile industry is 38·51 per cent. The relative rank in importance of these industries, however, is reversed, wool manufacture in all its branches (including all descriptions of hosiery and knit goods) standing first, with gross products valued at $337,768,524; cotton manufacture second, with products valued at $267,981,724; and silk manufacture third, with products valued at $87,298,454.

	1890.	1880.	Percentage of increase.
Number of establishments...	3,865	3,827	0·99
Capital invested.....	$701,522,861	$386,497,515	81·51
Number of hands employed (not including officers and clerks in cotton industry)..	488,921	365,438	33·79
Amount of wages paid (not including wages paid officers and clerks in cotton industry).....	$162,365,598	$98,576,302	64·71
Miscellaneous expenses.....	$40,910,405	(a)	....
Cost of materials	$408,328,226	$289,045,599	41·27
Value of product.....	$693,048,702	$500,376,068	38·51

(a) This item was not reported at the census of 1880.

LORD TENNYSON.

The recent death of Lord Tennyson, Poet Laureate, brings to a close the career of probably the greatest literary genius of the present century. Alfred Tennyson was born August 6, 1809, at Somersby, and died at Aldworth, Sussex, October 6, 1892, being a little over 83 years of age. He was the son of Rev. Dr. G. C.



TENNYSON AT TWENTY-TWO.

Tennyson, rector of the church at Somersby. Alfred Tennyson was educated at Cambridge and soon became distinguished for his poetical compositions, which increased in power and beauty with maturing years. In 1850 he was appointed Poet Laureate in succession of Wordsworth. In 1884 he accepted a peerage of the United Kingdom with the title of Baron Tennyson. Of his many portraits, one of the most pleasing is that taken when he was a youth of 22 years, painted by Sir Thomas Lawrence, an engraving of which is here presented.

Instruments for Recording the Temperature of Blast Furnaces.

For some time Professor Roberts-Austen, the English metallurgist, has been impressing on iron masters the necessity of ascertaining and recording the temperatures at which the reduction of iron ores is conducted in the blast furnace. He holds that the composition of pig depends to a large extent on the temperature at which it is formed, and when our knowledge on this point is extended, it will be possible to regulate the thermal conditions which determine the passage of elements into iron.

Sir Lowthian Bell, of Middlesborough, was the first to adopt the suggestion, by placing a platinum-rhodium pyrometer in the hot blast mains in his furnace, and since then several other methods have been employed at many works to attain the same object. It is not until lately, however, that any attempt has been made to automatically record the temperature of the hot blast. A few months ago Mr. Martin, of the Dowlais Works, in South Wales, requested Professor Roberts-Austen to devise some method of doing this. Mr. Martin has already introduced a method of automatically recording the times at which the valves were reversed. Accordingly, the professor has recently arranged a set of instruments. There are six new blast furnaces at Dowlais. In the hot blast main of each a pyrometer has been placed, consisting of a thermo-junction of platinum and platinum-rhodium. The wires from these six thermo-junctions are brought to a switch in the laboratory, where they can be connected one after another with a D'Arsonval galvanometer. The spot of light is thrown upon a cylinder, which is covered with sensitive photographic paper and which revolves once in twenty-four hours. A datum line representing the required temperature is first drawn so that the distance of the line traced by the spot of light from this datum line represents the variation of temperature of the blast. By this arrangement it will be seen that the heat of only one blast can be recorded at a time, and that the full record of variation in temperature cannot be obtained. The reason for this is apparently that the apparatus is only experimental, and that if it is found to be perfectly reliable, a more complete set of instruments will be employed. In reading an article before the Iron and Steel Institute, on September 20, the professor stated, with Mr. Martin's corroboration, that excellent results had already been obtained, and that they could recommend the general adoption of the apparatus. In reply to questions he said that these thermo-junctions gave constant and reliable readings and did not deteriorate with usage.

Sleep.

Sleep is one of the least understood of physiological phenomena. A new theory of it (we learn, says *Nature*, from the *Revue Scientifique*) has been offered by Herr Rosenbaum. He supposes the essential fact in the fatigue of the nervous system leading to sleep to be a hydratation of the nerve cells, an increase of their water content. The greater the hydratation, the less the irritability. This hydratation arises through chemical change of the nervous substance during activity. A small part of the water escapes by day through the lungs, but the greater part is eliminated during sleep. Its passage into the blood takes place by virtue of the laws of diffusion, and depends on the quantity and density of the blood, its amount of fixed principles, speed of its flow, etc. Elimination of the expired air takes place according to the laws of diffusion of gases. The assimilable substances of the body take the place of the water eliminated in sleep. The repair of the physical and mental forces through sleep is due to this elimination and replacement. Intelligence is in inverse ratio of the proportion of water in the brain, and may be measured by this proportion, at least in the child. It may be doubted whether this theory explains the sleep of hibernating animals or that caused by opium and anæsthetics.

Azo-Cochineal.

Azo-Bordeaux and *azo-cochineal* are two new azo colors. Azo-Bordeaux dyes wool and silk in an acid bath a red, while azo-cochineal gives them a bluish red, much like cochineal red. They are excellent colors on account of their clearness and brilliancy, are fast to air and light, and do not bleed. They give even shades and can be used for heavy shades upon heavy goods, also for light and delicate shades. These two colors furnish shades that are absolutely fast to alkalies and sulphur, but those obtained upon silk do not resist washing, while those on wool are not fast to fulling and cannot be fulled with whites. Azo-cochineal and azo-Bordeaux can be used in mixtures with all azo colors which are dyed in an acid bath. These products cannot be used upon vegetable fiber. *Method of Dyeing.*—Dye the well scoured goods for one hour in a boiling bath, with from 2 to 5 per cent of sulphuric acid, 10 per cent of sulphate of soda, and sufficient color to give the shade; rinse, and, if necessary, add more acid, as the two colors take evenly, even in the presence of considerable acid.—*Journal de Teinture.*