Photographing in Colors.

Experiments with a view to photographing in permanent colors were made by Herschel in 1840, by Becquerel from 1847 to 1855, and by N. de St. Victor from 1851 to 1866; but without a coating of varnish the colors thus obtained faded within a couple of days at the longest. Now, Herr Franz Veress, of Klausenburg, Transylvania, has discovered a process to produce very brilliant colors that, according to *Iron*, have so far stood the test of a three weeks' exposure to ordinary daylight without suffering any change. The photographs were exhibited during a lecture delivered before the Society for the Propagation of Natural Sciences, as well as in the Photographic Institute of Vienna, but not yet exposed to the direct sunlight. The photographs are upon glass and upon paper. The former are diapositives, and, if looked through, show for the most part a ruby red ground color, with a picture in bright, sometimes brilliant, colors, from the deepest hue of ruby red—far deeper than the ground color—to light orange, with several shades of red and yellow, and from violet to aniline blue and the intensest, most brilliant blue. The same colors prevail also on the paper positives, which have all a grayish brown ground color, upon which the red inclines more to purple than ruby, and the violet is especially brilliant. Green is missing on all positives. Examination through a magnifying glass fails to detect any impurities in the pigment of the colors or vagueness in the contours of the pictures, and each color stands out from the other with striking distinctness. It is not known whether the colors are a real pigment or the effect of thin layers. The sensitive preparation is a silver chloride emulsion in collodion or in gelatine, and the solution, the preparation of which is the inventor's secret, is poured upon the glass or the paper, where it soon takes a brownish red color. The plate is put into a copying frame, and exposed to the rays from a transparent colored drawing, of which the negative picture is soon visible. The exposure has to last in the case of glass negatives two or three hours, and in case of paper at least three days, as the colors come out very slowly, but the picture having been fixed in an alkaline bath, the colors become brighter and more intense. The process in the camera would require an exposure lasting several weeks, but the latest improvements have greatly lessened the time of this kind of exposure only, especially for the paper negatives. The invention is believed to rest on a modification of the process described by H. Carey Lea some two years ago, of applying the photo chlorides of silver in the form of an emulsion.

The Tricentenary of the Microscope.

The magnifying power of lenses is a discovery whose origin is lost in the darkness of ages. Layard found a convex lens in the ruins of Nimrod's palace, and there would seem to be no doubt that the very delicate work of the ancient lapidaries owed its remarkable perfection to optical arrangements of greater or less simplicity that permitted of magnifying the apparent size of the objects worked.

Roger Bacon made known the magnifying power of segments of spherical glass, and a short time afterward appeared the double opera glass, the invention of which is attributed to an Italian optician. But it was not till 1590 that the idea of combining lenses and of constructing a microscope, properly so called, was realized for the first time. This invention is due to Hans Zansz or Jansen and his son Zacharias, both manufacturers of double opera glasses at Middelburg, Holland.

The year 1890 therefore corresponds to the tricentenary of this important invention, and the population of Anvers has decided to celebrate this historic date by organizing an international microscopical exhibition in which will figure the ancient apparatus, those of intermediate epochs, and the most improved modern ones. This is a project of great scientific interest, and we can only express the sincerest wishes for its realization and success.—*La Nature.*

PAINT spots may be removed from wood by covering them with a thick coating of lime and soda. Wash off after twenty-four hours.

A MACHINE TO SUPERSEDE TYPESETTING.

In the SCIENTIFIC AMERICAN of March 9, 1889, appeared an illustration and description of a machine then being successfully operated in the New York *Tribune* office, and which superseded all typesetting in the ordinary way, as heretofore done by hand. The accompanying engraving represents the same machine, but with important improvements and modifications which have since then been made. The machine is constructed after the patents of Ottmar Mergenthaler, now controlled by the Mergenthaler Printing Company, of New York City, and is styled the linotype machine, because it casts lines or type blocks, as shown in the small view herewith, to be used instead of individual

A LINOTYPE, OR TYPE BLOCK OF ONE LINE.

types set up and "spaced" to make the required measure. To form these lines a matrix is necessary for each letter or character, these matrices being assembled in the proper order by operating a series of finger keys like those of the typewriter.

In the improved machine the matrices, instead of being held, as formerly, in vertical tubes just above the keyboard, one tube for each different letter or character, are contained in the channels of a magazine formed of properly grooved top and bottom plates, set at a little distance above the keyboard, and inclined toward it at an angle of about forty-five degrees.

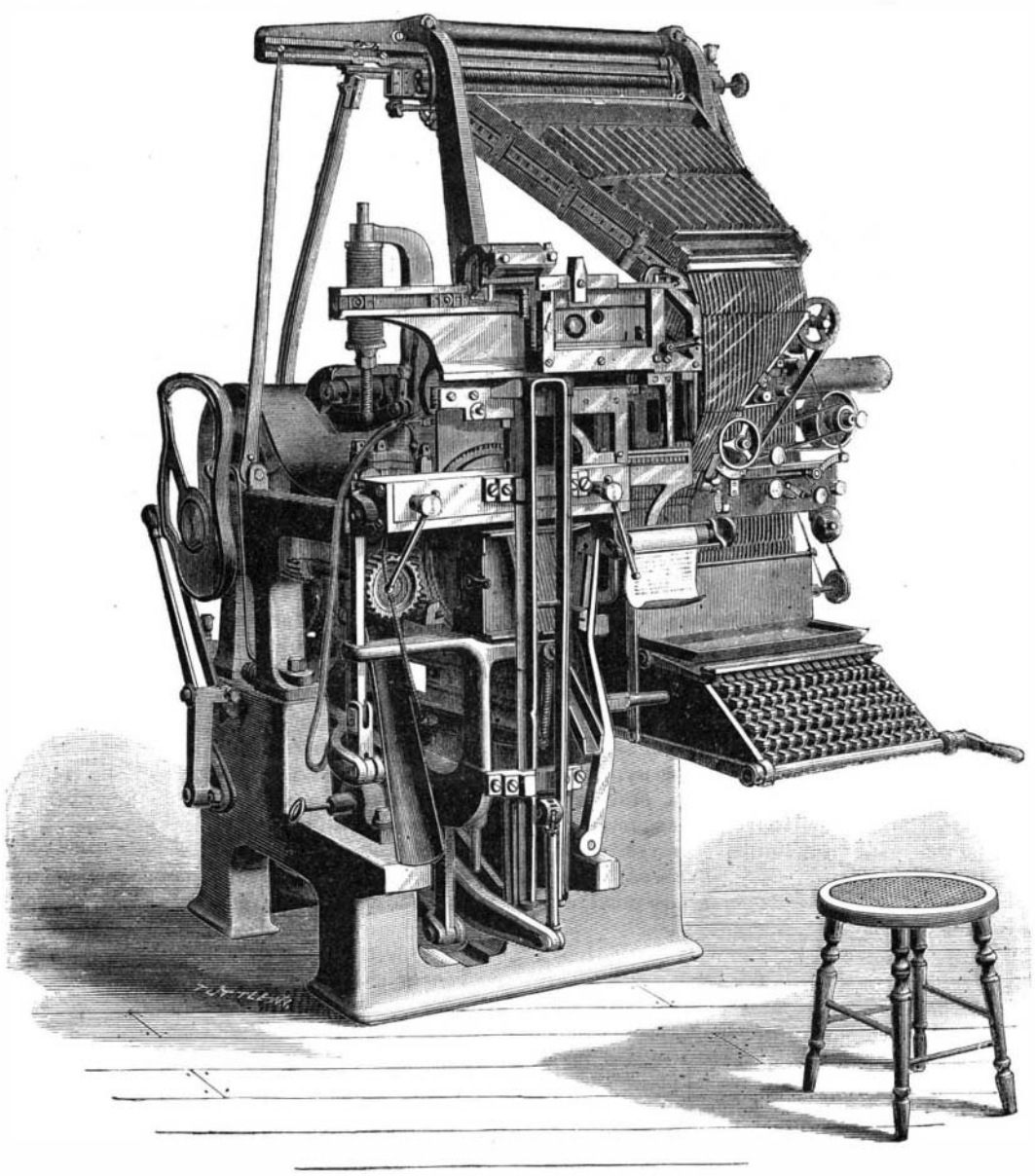
The matrices are flat pieces of brass, on the edge of which is the female die for forming its proper letter, and for each touch on one of the keys a single matrix drops from its inclined magazine down a vertical or nearly vertical chute to the point of assembling. The arrangement is such that no air blast is needed, as in the former machine, to bring the matrix quickly to its proper place in the formation of the line. To increase the speed of the matrices that are not in direct line vertically with the place of assembling, the vertical chutes at one side are made of gradually diminished length, the bottoms of the chutes of the chute section thus forming a sharp incline, just below which, and at a corresponding inclination, is a fast-running belt. In this way the matrices the farthest off come into position as quickly as those which are nearest, and there is no danger of transposition of the letters when the machine is worked at its highest speed. There is also a great advantage in the arrangement of the magazine with the grooved plates, instead of separate tubes, as heretofore, for, by making proportionate flanges on the sides of the matrices, one set of magazine plates can be used for matrices representing several different sizes of type, and the work of changing the machine from one size to another is but slight.

The work of "spacing" is essentially unchanged. The spaces are simply long, tapering wedges, dropped in their proper places by the operator in the same manner as a letter would be in the formation of a line, and, when it is seen that the line will take no more of the text, a simple touch of a lever pushes all the wedges simultaneously enough further in to make a perfect "justification," in which there is no possibility of uneven spacing. Thence the line of matrices, properly clamped, is taken automatically to a pot of metal automatically kept at the proper temperature, substantially as heretofore described, the type block is cast and deposited in proper order with its predecessors, and the matrices themselves taken to a distributing device at the top of the magazine, to the proper places in which they are returned, the whole work being done automatically. A great improvement in the direction of simplicity and positiveness of action has been effected in the distributing device, and the whole machine is much less complicated than formerly. To a person of sufficient intelligence it must be as easy to "learn to set type" with this machine as to acquire facility in operating a typewriter.

Much as printers generally are inclined to be skeptical as to the practicability of any typesetting machine in actual work, it is hardly possible to observe the operation of this machine without being convinced that, for ordinary composition, it is a remarkable success. A compositor will ordinarily compose or "set up" 1,000 to 1,200 ems an hour, and it requires one-third of his time in addition thereto to "distribute" his type, or put them back in the case. This machine performs both operations simultaneously, and at a speed equal to that of a typewriter. One but ordinarily expert in typewriting can readily write from thirty to forty words a minute, and, to illustrate the amount of composition accomplished at different rates of speed, a table has been prepared by an expert printer, from which it appears that

20	words a minute	equals	3,158	ems an	hour.
25	"	"	"	3,947	"	"
30	"	"	"	4,737	"	"
35	"	"	"	5,526	"	"
40	"	"	"	6,316	"	"
45	"	"	"	7,105	"	"
50	"	"	"	7,894	"	"
55	"	"	"	8,784	"	"
60	"	"	"	9,474	"	"

It is said that the machine can be run at the rate of 10,000 ems an hour, if the operator can work the keys fast enough, although from 5,000 to 6,000 ems an hour has been found to be about the highest practical speed thus far. The work is cleaner and much less tiresome than typesetting by hand, and to learn it is but the task of only a few hours. The machine in its old form has been for a considerable time in successful use in several large daily newspaper offices, in different sections of the country, and its importance has been recognized and is appreciated by the International Typographical Union, which directs practical printers to run the machines in all offices within its jurisdiction where they are used. The President of the New York Typographical Union, after witnessing recently a trial of the new machine, writes: "I conclude that the acme of perfection in a typesetting machine has been reached."



THE LINOTYPE MACHINE, TO SUPERSEDE TYPESETTING.

A New Gas Detector.

Spongy platinum, as is well known, glows in a mixture of combustible gas and air; but hitherto no convenient arrangement has been devised for utilizing this reaction. H. N. Warren proposes to saturate asbestos yarn with a saturated solution of platinum oxalate, and then ignite it in a platinum crucible. This prepared yarn when heated to 80° F. becomes incandescent in an atmosphere containing 0·5 per cent of coal gas by volume, and by arranging it by the side of the wick of an ordinary spirit lamp, it is easy, by lighting for a short time, to raise the temperature of the yarn to the requisite temperature, so that when the lamp is blown out it will become incandescent if there is any escape of coal gas in the neighborhood.