

New Fac-simile Printing Process.

We have lately examined, says the *Paper and Printing Trades Journal*, a novel fac-simile printing process (Byford's patent) introduced by Messrs. S. Straker & Sons, of Fenchurch street, London, E. C., by which useful invention a number of fac-simile copies of circulars, drawings, or any matter that can be written on ordinary paper, may, with the aid of an office copying press, be printed in a few minutes, and with little or no preparation, and on any description of dry paper, the original document or drawing remaining unimpaired. The fac-simile printing process is based on the well known and remarkable qualities of aniline. The document from which a number of copies are required is written with a patent aniline ink of immense strength, which is allowed to dry without being blotted up. A sheet of transfer paper is damped, the document is laid on its face downward, they are then placed in the "printing pad" (which is a leather portfolio of peculiar construction), and subjected for a few moments to pressure in the copying press. On removing the original document, a copy in reverse will be found on the transfer paper, and the operator can at once proceed to print the required copies, which is done by laying a sheet of ordinary paper on the transfer paper, the impression plate over it, and pressing for a few moments in the copying press, when it will be found that a duplicate or fac-simile of the original document has been produced; and so the process goes on until the impression becomes faint, when it is at once revived by damping the under side of the transfer. If a large number of copies are required, a second, and even a third, transfer may be taken from the original document, and printed from in the same manner as the first. The fac-simile printing process is somewhat analogous in its results to, but far simpler than, lithographic printing, and is being extensively used in government and public offices. It is so simple that the smallest or dullest office boy can work it without any fear of coming to grief; and as a useful adjunct to the counting house it will be thoroughly appreciated by all classes engaged in commercial pursuits.

Blue Glass Photography.

The blue-violet glass mania abroad seems to be confined to the photographers, and the conflict over the deceptive theory is being waged, not on the question of the curative powers of the light transmitted, but regarding the assertion that increased chemical action can be obtained by glazing photographic studios with the cerulean panes. M. Scottelari, the blue glass defender abroad, has fallen into the same errors as his co-believers on this side of the Atlantic: that is, he confounds the blue-violet rays of the spectrum with blue-violet transmitted sunlight; while he also reaches the obvious absurdity that the violet ray, when isolated from the spectrum, possesses greater capabilities than it had when mingled with the other rays. It is perfectly true that the violet ray is more active, chemically, than the other rays; but the latter do not detract from it when combined with it, and the chemical action of white light containing violet rays is precisely as great as that of the violet rays separated and tested alone. Hence it follows, as a matter of course, that a window glazed with white glass transmits the whole of the solar rays which reach it, violet among the rest. A window of the same size glazed with violet glass would transmit one seventh part of the rays reaching it, and these would be violet-colored rays; but it would not transmit one single violet ray more than the other window.

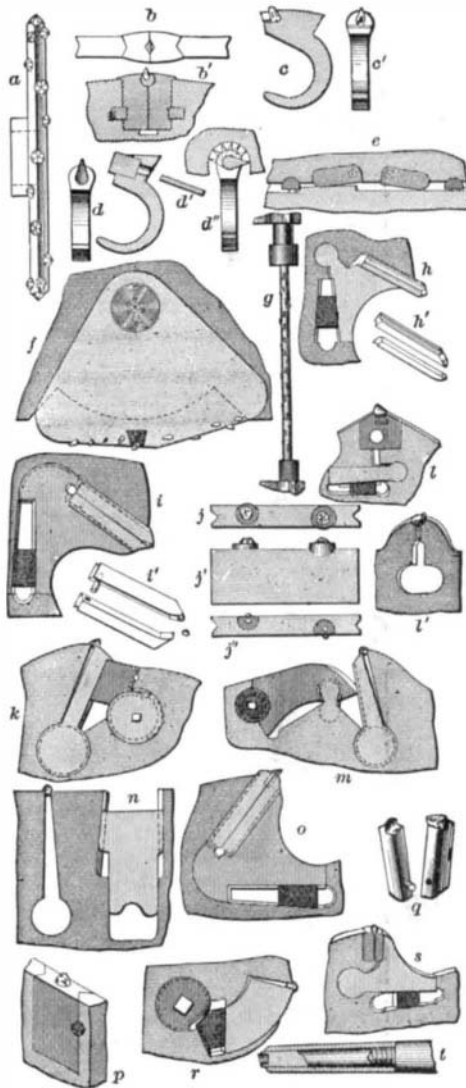
The *Photographic News* adds that, according to Draper and others, all the rays of the spectrum probably possess photogenic power on some substances; and therefore it is but just to M. Scottelari to conceive that he has found that the rays other than violet have an antagonistic influence on that ray, and obstruct its action on bromo-iodide of silver. But Mr. Thomas Gaffield of Boston, has recently made some new investigations on this very point, wherein the inferiority of the violet glass to clear glass is most clearly shown. Mr. Gaffield's conclusion relative to the photographic aspect of blue glass accords with our own relative to its employment for curative purposes. He says: "It is undoubtedly true that violet or other colored screens may be used with advantage in cutting off too much, or in making an even diffusion of, light upon the face of the sitter; but it can never be true, while two from six leave a less number than six, that the cutting off of a third, or any fraction, of the chemical rays of sunlight by a violet glass can enable the photographer to obtain more rapid or effective results."

THE "London" cement for joining broken glass, china, wood, etc., is made by taking a piece of Gloucester cheese, boiling it three times in water (each time allowing the water to evaporate), and mixing the paste thus left with dry quicklime.

STONE-WORKING IMPLEMENTS.

In stone working, as our readers are aware, the carbon or black diamond is now greatly used. The difficulty promi-

Fig. 1.



nently encountered, however, in this particular, is that of fixing the diamond in the saw or cutter head so that it shall not work loose. In Fig. 1 (selected from Knight's "Me-

wedges in the slot, or by clamps which are themselves jammed by wedges, etc.

In Figs. 2 and 3 are represented all the various kinds of

STONE WORKERS' TOOLS,

the names of which are as follows: *a*, square etching needle; *b*, marteline chisel; *c*, toothed chisel; *d*, marteline chisel; *e*, puncheon; *f*, *g*, scrapers for sinking flutings; *h*, *i*, etching needles, called *houguettes*, partly flattened and sharp; *j*, hook for leveling cavities; *k*, round-nose chisel, for leveling cavities; *l*, sharp edged notched scraper, for sinking flutings; *m*, half-round rasp; *n*, round file; *o*, flat file; *p*, German half-round rasp; *q*, *r*, safe-side rasps; *s*, *t*, marteline chisels; *u*, *v*, puncheons; *w*, *x*, *y*, parting tools, with curved ends in rasp or file; *z*, *a'*, gravers and burins; *b'*, *c'*, *houguettes* or etching needles; *d'*, *e'*, gravers and burins; *f'*, parting tool, with curved rasps; *g'* to *t'*, moulding chisels and scrapers, having edges of varying patterns; *u'*, wimble, for drilling; *v'*, stone-worker's bench; *w'*, *x'*, marteline hammers; *y'*, square; *z'*, triangle; *a''*, bevel; *b''*, *c''*, *d''*, rules and straight edges; *e''*, *f''*, *g''*, saws of various sizes and construction; *h''*, *i''*, *j''*, *k''*, compasses of various sizes and forms; *l''*, sebillia, or wooden bowl for holding sand and water; *m''*, handsaw; *n''*, level; *o''*, mallet; *p''*, *q''*, sledges; *r''*, *s''*, *t''*, *u''*, chisels of various sizes; *v''*, ladle for feeding sand and water to the saw; *w''*, *x''*, hand saws.

Contamination of the Air by Artificial Illumination.

In judging of artificial light from a sanitary point of view, we must consider its effect on the visual organs as well as on the other organs, and we have to notice both the effects produced by the products of combustion on the air we have to breathe and the increase of temperature due to the flame. Frederick Erismann has made some comparative measurements in both directions with different means of illumination. The results were published in the *Zeitschrift für Biologie*, xii., 315.

The experiments were made in a portion of the laboratory inclosed with wood and glass walls, and having a space of 353 cubic feet, or 10 cubic meters. The air was drawn out of this space at different heights by means of aspirators. By the use of a forked tube, a portion of the air was conducted directly into baryta water, and another portion through a tube filled with oxide of copper and kept at a red heat, and then into baryta water. The first portion gave the percentage of carbonic acid in the air, and the second the amount of other carbon compounds. The lights used for comparison were obtained by burning stearine candles, rape seed oil, petroleum, and coal gas. They burned for eight hours in this space with as equal flames as possible, and in the experiments with the candles six were burned at a time. The results of the measurements lay no claim to absolute exactness, because a whole series of inaccuracies, difficult, if not im-

Fig. 2.

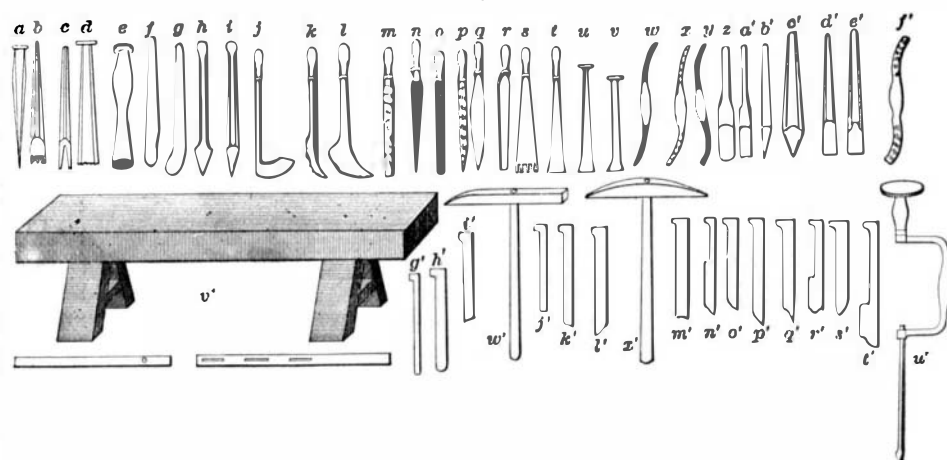
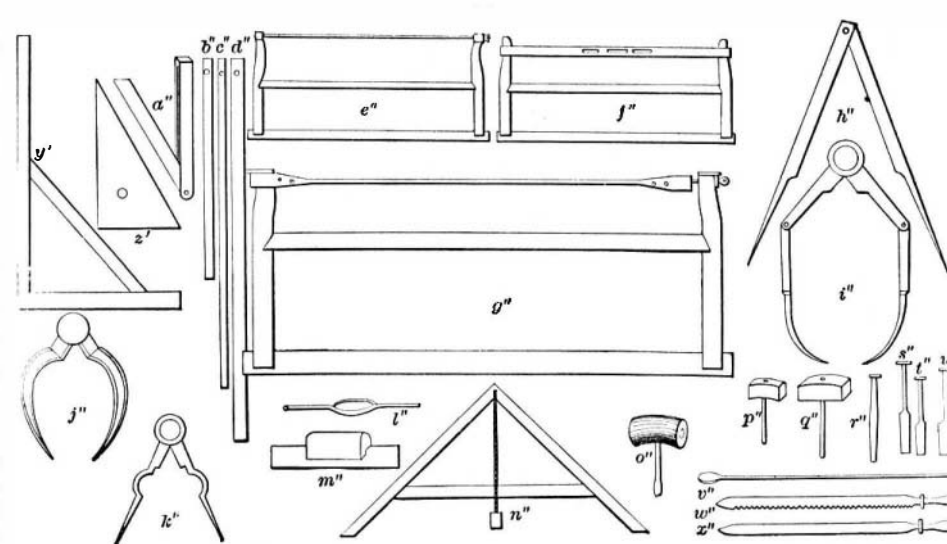


Fig. 3.



possible, to remove, come in here; nevertheless they are of interest for relative comparison. The figures obtained show that, under all circumstances and with all kinds of luminants, the air of an inclosed space contains more carbonic acid and carbonaceous organic substances than in the absence of artificial illumination; yet in Erismann's experiments the quantity of carbonic acid was never greater than 0.6 or 0.7 per 1,000, while the percentage of other carbon compounds was extremely variable, so that the amount of carbonic acid is not a correct criterion for the pollution of the air. The quantity of carbonic acid actually found in the air of this experimental chamber was only a small fraction of that produced by combustion, so that by far the greatest part escaped by natural ventilation.

To compare the relative contamination of the air by the four luminants mentioned, the amount of carbonic acid and hydrocarbons was reduced to the standard of six normal candles. It was shown that with lamps of good construction petroleum contributed less carbonic acid to the air than any other source of light tested; and, what is more important, less of the products of incomplete combustion. Also that by equal illumination stearine candles contaminated the air most of all.

In regard to rise of temperature, Erismann made his experiments at four different places. They show that during the eight hours of the experiment, the lower strata of air, up a height of 5 ft., increased but slightly, on an average 3.5° to 5°, while the temperature of the uppermost strata near the roof increased considerably; for gas, oil, and petroleum this increase was 19° to 19.5° Fah., and for candles only 7-12°.

If we regard the photometric effect of the flames during the experiments, it showed that with equal illumination rape oil and gas increase the temperature much more than petroleum, so that the action of the latter is about equal to that of the candles.

ROPES made from sheep's entrails are now made at Oakland, Cal., to be used for hoisting in mines.

chanical Dictionary") we illustrate several modes of inserting the boot in

STONE SAWS.

It will be perceived that some of these imbed the diamond in the saw by sockets, rings, or solder; others grasp it by fingers which are clamped in sockets; others grasp it by

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