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*INCANDESCENT GAS LIGHTING.*

*L'éclairage à Incandescence.* Par P. Truchot. Pp. x + 255. (Paris : Georges Carré et C. Naud, 1899.)

IN looking back to the achievements of the past half-century, few domestic improvements will strike the observer more forcibly than the advances made in the development of light from coal gas. In the early fifties the metal flat flame and argand burners were looked upon as so satisfactory and so little likely to find a rival, that practically no efforts were made to improve them, and it was only in 1852 when the late Sir Edward Frankland first made his double chimney argand—afterwards known as the Bowditch burner—in which he led the air supply down between two glass cylinders surrounding the flame, and so utilised some of the heat which would otherwise have been wasted to heat the air supplied to the flames, and found as the result a distinct increase in illuminating power, that the idea arose that it was possible to obtain more than the two to three candles of light per cubic foot of gas consumed which the best burners then gave.

Frankland's burner marks the inception of the idea of regeneration as applied to an illuminating flame, an idea perfected by Siemens in 1879 and followed by a number of regenerative burners which doubled, and in some cases nearly trebled, the light obtainable from coal gas as compared with the ordinary burner.

At the same period that the regenerative burner was struggling into prominence, Bourbouze, and later Lewis, devised a method of producing light from coal gas by burning it in a long bunsen burner, and making the flame impinge upon a mantle of fine platinum gauze, which heated to high incandescence gave more light than would have been emitted by the gas if burnt in an ordinary burner; and although this process never achieved much success owing to the fact that platinum soon got acted upon and lost its power of light emissivity, yet it was undoubtedly the forerunner of the incandescent mantle of to-day which has revolutionised our ideas as to artificial illumination, and yields ten times as much light for the same gas consumption as the ordinary No. 5 flat flame burner.

So important has incandescent lighting become, and so abundant is the literature with regard to it, that the time had clearly arrived for it to be collected and welded into a handbook that should prove a guide and companion to all working in this branch of industry. This task has been undertaken by M. Truchot, who in "*L'éclairage à incandescence par le gaz et les liquides gazéifiés*" has given us a concise record of the history of incandescent lighting and a work of both theoretical and practical importance.

In the twelve chapters of which the book consists, the author passes in review the properties and production of light, photometry, the proper distribution of light, the theories of Drossbach, St. John, Westphaal, Killing, Bunte and others who have attempted to explain the cause of the high incandescence of the metallic oxides forming the mantle skeleton, an excellent history of in-

canescent lighting and a full account of the various minerals employed as a source of the rare earths and their treatment. Especially valuable will be found the description of the various methods of making the mantle and the chief points to be observed.

The author then passes to the various forms of bunsen burner, and the results which can be obtained from them, but hardly gives sufficient credit to Bandsept's inventions, which practically cover the ground upon which the chief advances in this direction have since been made. It would have been better also if a chapter had been devoted to the theory of the bunsen burner, as it would have made the differences existing between the various forms of burner clearer.

Very excellent in its way also is the chapter devoted to the lighting of the burners, and the effect which this has upon the life of the mantle. The author also goes fairly fully into incandescent mantle lamps for use with alcohol, petroleum and other easily gasifiable hydrocarbons.

The book concludes with a review of the use of incandescent lighting for railway carriages, lighthouses, photography, &c., and comparisons of incandescent light with other systems; whilst the list of French patents for mantles and burners forms a useful finish to the work.

M. Truchot has done his work well, and his book should be in the hands of everybody interested in incandescent mantle lighting.

*AN AMERICAN TEXT-BOOK OF GEOMETRY.*  
*New Plane and Solid Geometry.* By W. W. Beman and D. E. Smith. Pp. x + 382. (Boston, U.S.A. : Ginn and Co., 1899.)

THE Americans are an eminently practical people, and in seeking for the path of least resistance towards any desired end they are happily free from the shackles of inherited prejudice and irrational reverence for established tradition. This makes their mathematical textbooks very instructive reading; and although in some cases the desire for simplicity leads to a certain superficiality, this reproach cannot be fairly applied to their mathematical literature as a whole. Every reasonable person must admit that the simplest way of demonstrating a mathematical truth is the best one; and that energy wasted on the rudiments is so much loss of valuable time which might have been spent with profit otherwise.

The "*New Plane and Solid Geometry*," which is a revised edition of a work first published in 1895, illustrates very well the attitude of two experienced and competent American professors towards the problem of teaching elementary geometry. It is not to be expected that their work will meet with universal approval in all its details; but it has many conspicuous merits which cannot fail to commend themselves, and deserves to be carefully studied by every teacher, whatever his personal views may be.

The first thing to notice is the order and proportion which the authors have succeeded in maintaining. After a short, but very useful, introduction, there are eight Books dealing respectively with rectilinear figures; equality of polygons; circles; ratio and proportion; mensuration and regular polygons; lines and planes in