these densities and that of water at 100°, *i.e.* their specific gravities at 100°. But for any particular instrument, the different values obtained with different fatty matters exhibit the same differences as those obtained with any other instrument; whilst the indications of any two instruments are obviously comparable, provided that the mode of graduation and the coefficient of expansion of the plummet are the same; which practically is the case if a *glass* plummet be always used, as recommended. In a recent communication to the *Analyst* (January 1887, p. 18), the author suggests that the term "*indicated plummet-gravity*" should be employed to represent the apparent values obtained at such and such a temperature by means of the plummet-balance; which is clearly preferable to the use of either of the terms "specific gravity" or "density" in such cases. It may be noticed in passing that the "indicated plummet-gravities" of fats and oils at 100° or thereabouts by no means necessarily follow the same order as the so-called specific gravities obtained at lower temperatures, not only on account of difference of physical state, but also through the different rates of expansion possessed by the various substances.

Another point on which the author has worked with results of some interest is the determination of the amount of glycerol yielded by fats and oils on saponification. He concludes that there is no experimental basis for the suggestion put forth some time ago by Wanklyn and Fox that *isoglycerides* are present in such substances, these bodies yielding on saponification propionic (or other homologous) acid and water, instead of glycerol. Such a view is opposed not only to the author's laboratory experience, but also to that of manufacturers, who frequently recover 7·5 to 8·0 parts of glycerol per 100 of fatty matter, instead of less than 5 as stated by Wanklyn and Fox. Making allowance therefore for deficient saponification and loss of glycerol by evaporation during recovery, the theoretical amount of glycerol obtainable is satisfactorily accounted for, instead of being largely in excess of that actually produced. It is noticeable that, whilst the author obtained results reasonably concordant with the permanganate process for the determination of the glycerol produced during saponification as compared with the other ordinary methods in many instances, this was not always the case, the former process sometimes yielding figures far in excess, indicating the presence of other substances besides glycerol capable of forming oxalic acid by treatment with permanganate. An extreme case was afforded by linseed oil dried up to elastic skin, which gave 4·9 per cent. of impure glycerol directly isolated, and 15·5 per cent. by the permanganate process.

The author considers that the usually received molecular weight of linoleic acid, generally represented as indicated by the formula $C_{16}H_{28}O_2$, is incorrect, as the mean equivalent of the acids obtainable from linseed oil on saponification has been found by him to be considerably higher than that thus indicated. The formula $C_{18}H_{32}O_2$ agrees better with his results, and moreover is not at all incompatible with the analytical data obtained by previous investigators. The analogous determination of the mean molecular weight of the acids produced on saponification (by means of alcoholic potash and phenolphthalein) of fatty, wäxy, and oily matters, and of the fatty and resinous acids contained in soaps, is justly regarded by the author as a valuable criterion in judging of the nature of such substances, especially when taken in conjunction with other data (*e.g.* in the case of butter-fat, the amount of volatile acids capable of being subsequently distilled off along with water, working under particular constant conditions as recommended by Reichert; and the proportion between acids soluble and insoluble in water, &c.); and a large amount of experimental work has been done by him in connection with such valuations. He has also made an excellent digest of recent researches in connection with fats, oils, waxes, soaps, and analogous bodies. In connection with toilet-soaps, he regards the addition of sugar to produce transparency as "simply diluting the true soap-material as so much water would do, without communicating any compensating property of value." This is a very mild way of putting the case, the fact being that soaps containing sugar are liable to produce, in sensitive subjects, a great amount of irritation of the skin (in fact, a mild kind of "grocer's eczema," traceable to the same cause), even though free from causticity and otherwise unobjectionable: and numerous persons are, to the reviewer's knowledge, unable to use certain widely-advertised soaps, in consequence of the large admixture of sugar therein contained, although the composition would otherwise be quite uninjurious.

The sections devoted respectively to hydrocarbons and phenols are equally comprehensive, including descriptions, necessarily in some cases somewhat brief, of the leading points in the petroleum, coal-tar, and shale-oil industries, and of the technical examination of the various products obtained on fractional distillation and subsequent further treatment of these and allied raw materials, *e.g.* wood-tar; and the commercial examination of turpentines and resins, essential oils, camphors, and various miscellaneous substances, such as cantharidin and cholesterin. In these, as in the previous section, the value of the various *précis* given of other observers' work is frequently further enhanced by the comparative experiments and examinations made in connection with different analytical methods, &c., by the author himself. Bone-tar, obtained as a by-product of the animal charcoal manufacture, is not described, probably on account of the limited uses to which, hitherto, it has been put; whilst, for similar reasons, but little is said of blast-furnace and coke-oven tars.

C. R. ALDER WRIGHT

OUR BOOK SHELF

Practical Dynamo-Building for Amateurs. By Fred. W. Walker, M.E. (London: Iliffe and Son, 1886.)

WOULD that all books for amateur guidance were written with as full a knowledge of proper principles as this unassuming little work. We are not saying that the machine which the author recommends amateurs to construct is the equal of the commercial dynamos of the current date. His field magnet cores are of cast iron, and not of the best form; his armature might be improved by getting greater cross-section of iron into it. But there is nothing wrongly done. All instructions about the essential details of proper insulation and testing of the work in progress are accurate and full; and an appendix on alternative constructions of field-magnets supplies in some degree the deficiencies of the earlier text.