

THURSDAY, JULY 8, 1886

THE ETIOLOGY OF SCARLET FEVER

A REPORT has just been issued by the Medical Officer of the Local Government Board, the importance of which, as regards the etiology and prevention of a widespread infectious disease, deserves the most careful attention of sanitary officers and the general public alike. Hitherto the general assumption prevailed that infection with scarlet fever has always had its origin from the human subject, that is to say, that scarlet fever is always transmitted to the human subject from a human being affected with the malady, either by direct contagion in its wider sense, or through milk, cream, &c., previously contaminated with the contagium derived from a human source. In the present Report we have an account of an extensive outbreak of scarlet fever in the north of London at the end of last and the beginning of the present year amongst the consumers of milk derived from a particular farm at Hendon. The first part of the Report of the Medical Officer contains an account by Mr. W. H. Power, Inspector to the Medical Department of the Local Government Board, of an investigation into this outbreak, and the evidence brought forward by Mr. Power is absolute and conclusive: it proves by a chain of circumstantial evidence as complete as can be wished, that this particular outbreak of scarlatina was transmitted by milk which could not have been previously contaminated from a human source.

Moreover, Mr. Power proves that certain milch cows recently added to the dairy and affected with a particular malady were the source from which the contagium had been derived; further, that as this malady once introduced by a few cows into the dairy spread to other milch cows, so the amount of milk containing the contagium, and also the number of cases of scarlatina amongst the consumers, increased, and as the milk-supply was discontinued so the spread of scarlet fever abated.

The malady with which the cows were affected consisted chiefly in a particular kind of ulceration of the teats and udder, and perhaps some slight cutaneous disorder. As regards the general health, the feeding and milking capacity, the cows seemed to present very little alteration.

The second part of the Report contains an account, by Dr. Klein, of the minute pathology and etiology of this cow disease. In the first place, Dr. Klein ascertained that the local disease on the teats and udder is inoculable in its specific characters into healthy calves; secondly, that the cows affected with the local disease of the udder and teats were at the same time affected with a disease of the viscera, as proved by the *post-mortem* examination, in many respects similar to a mild form of scarlet fever in the human subject.

From the ulcers of the cow Dr. Klein isolated by cultivation a streptococcus or chain-micrococcus, possessed of distinct and special characters, both as to morphology and mode of growth in various nutritive media, particularly in milk: in this latter it grows in a peculiar manner, and very luxuriantly. With artificial cultures of this streptococcus a disease was produced in calves by subcutaneous inoculation which bears a striking

resemblance to scarlet fever in man. The conclusion is thus forced on us that this streptococcus is identical with the *materies morbi*; further, that the scarlatina produced in the human subject by the consumption of milk from the Hendon farm was an experiment, carried out on a large scale, of infection with a cultivation in milk of the above streptococcus; and lastly, that the milk of the cows affected with the specific ulcers of the teats and udders became charged with the contagium by the hands of the milker during the act of milking. Although there are many details still wanting to complete the research, particularly those regarding the transmissibility of scarlatina from the human subject to the cow, there is sufficient evidence at hand already to warrant the hope that by a proper and effectual mode of superintending milk-farms it will be possible to considerably limit this dire scourge. A suggestion that at once presents itself is this: granted that the above-mentioned streptococcus is the real cause of the malady, there is no reason to doubt that boiling the milk would effectually destroy its life and infective power, just as is the case with all micrococci. True, the danger to contract scarlatina would hereby not be altogether annihilated, since cream cannot thus be disinfected, and since scarlet fever can unquestionably be contracted from a human source, but it must be obvious from this conclusive Report that milk *per se* coming from an infected cow plays a considerable rôle in conveying scarlatina from the cow to the human subject.

OILS AND VARNISHES

Oils, Resins, and Varnishes. Edited by James Cameron, F.I.C. (London: J. and A. Churchill, 1886)

THIS work, according to the preface, is intended to be "a hand-book useful to all interested in oils and varnishes, and especially to analysts, pharmacists, manufacturers, and technological students." The editor further states that in preparing this volume he used the information in Cooley's "Cyclopædia," which he has "supplemented from the latest publications." The modern literature of oils and varnishes exists chiefly in the form of workshop recipes, in trade journals, technological dictionaries and pharmaceutical publications, and if anybody ever wanted to know anything about the useful and heterogeneous products comprised under these terms he not unfrequently found it necessary to waste a good deal of time in hunting up the required information. This last addition to Messrs. Churchill's Technological Hand-books will therefore be valuable to those engaged in several distinct branches of industry, and the editor has certainly displayed considerable judgment in the selection and arrangement of the scattered materials which he has brought together in this little volume of some 370 pages in length.

Chemically speaking the word "oil" has no precise meaning. It seems in fact that an oil may be anything that is not water, since we have oils among such distinct families of organic compounds as the alcohols, acids, aldehydes, hydrocarbons, &c. Thus in Chapter I., on the "Chemistry of Oils," these compounds are in the first place classed under the usual heads of "fixed" and "volatile." Animal and vegetable fixed oils being generally ethereal salts of glycerol and acids of the fatty and

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oleic series, we have in this chapter brief descriptions of glycerol (nitroglycerol and dynamite), the fatty acids from butyric upwards, and the acrylic series from oleic acid upwards. The descriptions of the acids are concisely given, and their occurrence, preparation, and physical properties briefly described. Of the chemistry of the higher homologues of the acids of these series but little is known, and the name of the acid which heads each paragraph is simply followed by its empirical formula. This treatment is all that is necessary in such a work as the present, but it will certainly occur to the more advanced chemical readers that a very wide field of investigation is offered to those who interest themselves with the question of isomerism among these complicated compounds. Considering the cheapness and abundance of the commoner animal and vegetable oils in daily use it does appear somewhat remarkable that more work has not been bestowed upon them by scientific chemists, and that the information which we have concerning them should be almost confined to their commercial testing and valuation.

Animal oils, fixed and volatile, are described in the second chapter, the former being divided into animal oils proper (butter-fat, lard, neat's foot, tallow, &c.), fish oils (cod-liver, seal, sperm, whale, &c.), and insect oils (niin, ant-grease, &c.). Among the volatile oils of this class we have bone-oil, castoreum, and civet oils (animal), and ambergris (fish). The third and fourth chapters are devoted to vegetable oils, a list of 19 drying and 23 non-drying oils being given. Linseed and olive oils, the most important members of this group, naturally claim the largest amount of space, and the technology of these products is well treated of. The volatile vegetable oils are very fully dealt with, no less than 56 pages being devoted to their consideration. After a description of the various methods of extraction by distillation, solvents, &c., the oils themselves are described individually according to their vegetable sources, the botanical names of the class and order being followed by a descriptive list of the oils obtained from each group of plants. Thus under *Aurantiaceæ* we have the oils of bergamot, cedrat, citron, lemons, limes, neroli, and orange; under *Caryophyllaceæ*, cajeput and clove oils, and so forth.

In the fifth chapter, empyreumatic, medicated, mixed, and perfumery oils are treated of. We give a specimen of the editor's conscientiousness in his description of medicated oils:—"EARTHWORM OIL. *Syn. Oleum. Lumbricorum* (E. Ph. 1744). Washed earthworms, $\frac{1}{2}$ lb.; olive oil $1\frac{1}{2}$ pint; white wine, $\frac{1}{2}$ pint. Boil gently till the wine is consumed, and press and strain." We are not informed what special merit is possessed by this gruesome concoction, but it was no doubt applied in good faith in the last century. Under "mixed oils" will be found a collection of strange mixtures, some of which might have formed ingredients in that "charm of powerful trouble" brewed by the witches in Macbeth. The familiar "nine oils" of the past generation of housewives, and even furniture oil, find place herein, together with some three dozen others. Chapter VI. contains an account of waxes, which are classed as animal, vegetable, and artificial, a useful method of distinguishing these substances by their behaviour with chloroform concluding the section.

The seventh chapter, a somewhat lengthy one, is

devoted to mineral oils, viz. those obtained by the distillation of shales, coal, lignite, and peat, and those found naturally formed in various parts of the world. The treatment of coal tar and the petroleum industries are well described, and the chapter concludes with sections on the storage of petroleum and the construction of petroleum lamps. Oil refining is treated of in the eighth chapter, which is a short one—almost too short considering the large number of processes which are now or have been formerly in use. The methods for refining tallow, wax, petroleum, and resin oil are included in this chapter, besides the purification and bleaching of animal and vegetable oils proper.

The longest chapter in the book is the ninth, which extends to 109 pages, and is devoted to the important subject of the testing of oils. This chapter is certainly a good one, both for thoroughness and the arrangement of its contents. Thus the testing of an oil may have for its object, the determination of purity, the lubricating efficiency, or the illuminating value. The purity may be ascertained by chemical or physical tests, both of which methods are very fully and lucidly treated of for each class of oils. Among physical tests are described the various methods of determining the specific gravity and melting point, cohesion figures, &c. The descriptions of the latter, which are quoted from a paper by Miss Crane, would have been of more value if figures had been given. The chemical tests, qualitative and quantitative, are given with great completeness. A figure of Abel's petroleum tester and the method of using it as prescribed by the Act of Parliament finds place in this section. For testing the lubricating value the machines of Stapfer, Thurston, and Bailey are described and figured; for viscosity the apparatus devised by Lamansky, and by Townson and Mercer; and for fluidity the apparatus of Bailey is also described and figured. The section on illuminating efficiency is not so full, and might be advantageously expanded in a future edition.

Chapter X. is devoted to resins and varnishes, and the last chapter contains descriptions of Mills' bromine absorption process and Hirscholm's method of testing resins. The appendix contains some useful tables of prices, of the amount and value of the export of seed oils during 1882, 1883, and 1884, and of the production of shale oil in the United Kingdom during the last five years.

From the foregoing epitome of the contents it will be seen that the volume, although a small one, gives a most comprehensive view of the subject of which it treats, and the amount of useful information which has been condensed into this small compass is mainly due to the concise mode of treatment which the editor has adopted. We can certainly recommend it to those for whom it is written.

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HARTLAUB ON THE MANATEES

Beiträge zur Kenntniss der Manatus-Arten. Von Dr. Clemens Hartlaub (Bremen). Separatabdruck a.d. *Zoologischen Jahrbüchern*, Band I. (1886.)

AMONGST other interesting articles with which Dr. Spengel's new zoological journal has commenced its career is one by Dr. Clemens Hartlaub (son of the