

The lamina of gold being permanent, and not being broken or carried off like the coating of varnish; when the aquafortis has operated, we may with great facility correct the engraven plate if it has any defect, which is impossible in the old process. We shall give to our readers, in one of our next numbers, a specimen of this species of engraving, by means of which we have produced a new apparatus which we purpose describing on a future occasion.

An. Elec. Mag. & Chem.

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*On the Purification of Fish Oil.* By MM. GIRARDIN and PREISSER.

Translated for the Journal of the Franklin Institute, from the "Bulletin de la Société d'Encouragement," for July, 1842.

The constantly increasing price of seed oils (huiles de graines) has drawn the attention of speculators to whale oil; and those who first thought of mingling the latter with vegetable oils, for purposes of illumination, have realized large profits. It is now difficult to find the oils of colza, &c., entirely free from fish oil.

In various scientific and technical works, we find processes for the purification of fish oils, which, although simple, are useless, and rather tend to mislead those engaged in their sale, or purification.

Thus, Mr. Davidson, of Edinburgh, purifies oil by treating it with one per cent. of chloride of lime, diluted with water, under violent agitation; and he assures us that the odor is entirely destroyed, but we obtain only a bleached and thick matter, which is clarified by adding 85 grammes of sulphuric acid, diluted with sixteen or twenty times its weight of water. The mixture is stirred, gently boiled, and, after filtering warm, is suffered to cool and repose for several days. MM. Girardin and Preisser repeated this process without any satisfactory result.

The "Journal hebdomadaire des Arts et Metiers" points out several processes for the same purpose. The first consists in mingling 28 grm. pulverized chalk, and 42 grm. slaked lime, with a gallon of the oil, stirring well, and adding 0.236 litre water; after two or three hours of repose, it is mixed again, and this operation repeated for two or three days; 28 grm. of common salt, dissolved in 0.710 litre water, is then added, the mixture stirred at intervals for two days, suffered to settle, and the oil drawn off.

Another process in the cold, applicable to cod oil, consists in putting into 4½ litres of the oil, previously prepared by the preceding process, 28 grm. of chalk; then, after 24 hours, 28 grm. of potassa, dissolved in 113 grm. water; and finally, after several hours, 57 grm. common salt, dissolved in 473 grm. water. After settling a few days, the oil is drawn off.

Neither of these processes is sufficient, as MM. G. and P. have satisfactorily ascertained. The same journal asserts that the oil is obtained so pure by the following process, that it can be employed in woolen manufactures.

Put into 4½ litres (1 gallon) of impure oil, 35 grm. chalk, an equal amount of slaked lime, and 0.473 litres of water; after stirring, and a

repose of several days, add 0.473 litres water, and 85 grm. potassa; heat the liquid, without bringing it to boiling, and draw it off when the oil has a light amber color; it has now only a pungent, fatty odor: finally, add 0.473 litres water, containing 28 grm. salt, and, after boiling the mixture for half an hour, turn off the oil into a reservoir. This process does not refine the oil.

Many English patents for the same purpose were tested by Messrs. G. and P.

One treats fish oils in the cold by bone black, in small fragments, and filters through animal charcoal, after repeated agitation. Such a process clarifies the oils, and removes a portion of their empyreumatic odor, but does not in the least diminish their essential odor.

Another method, recently published in France, has succeeded no better. It consists in pouring into the oil a solution of bichromate of potassa, mixing thoroughly, then adding a solution of oxalic acid; the action is energetic, but, after repose and drawing off, the oil still retains its characteristic odor.

There is a process among the French patents, which consists in heating the oil merely to simmering with ten parts of water for five or six hours, and, towards the close of heating, adding a milk of one part of water, with one-twelfth of chalk, and one-twelfth of lime. After settling perfectly, it is drawn off and run into reservoirs, through carded wool, or pounded charcoal. This process clarifies the oils, but decolorizes them imperfectly, and does not at all remove their odor.

At Rouen, they refine whale oil by sulphuric acid, as in operating on seed oils; but this method removes neither color nor odor. If, previous to this operation, it be stirred for some hours with chalk, and a current of steam be passed through it, a bleached liquid is obtained, which, by the addition of a suitable quantity of sulphuric acid, deposits plaster on settling. The clear oil, filtered through animal black, has lost a portion of its deep color, and has not a strong odor; but it is not perfectly purified, even after many successive filtrations.

The oxygenation of oils leads to very bad results. Messrs. G. and P. remark, that oils filtered and treated, whether by chlorides, lime, chalk, or animal charcoal, and then left to themselves for thirty or forty days, deposite a bleached organic substance, soluble in water and ether, analogous to margarine, and, while depositing, the oil is more and more decolorized. Fish oil may be obtained, of a quality resembling fine olive oil in appearance, by exposing it to the sun, then to the action of chloride of lime, and filtering several times through animal charcoal. The odor is lessened, but not entirely removed.

A simple exposure to the sun for several months determines an abundant deposit, while the oil is clarified, and sensibly purified.

If whale oil be brought in contact with caustic ley, employed cold, and in small quantities, the decolorization is hastened; the mass separates into two distinct strata—the upper one, decolorized, is very fluid and limpid, but always odorous; the lower, which is very small, is a mixture of the alkaline solution, strongly colored brown, and of all the solid portion of whale oil analogous to margarine. It is not

necessary to submit the decanted oil to any other process of purification; in this state it is suitable for all manufacturing purposes, excepting on account of its odor, which is always well defined.

It appears from the experiments of Messrs. G. and P. on fish oils, that we at present possess no sufficiently efficacious means of removing their strong and disagreeable odor. The best method, at present, is to submit them either to the action of alkalies, or to the successive action of chalk, steam, and sulphuric acid; to suffer them to repose, and filter several times through animal charcoal. We thus obtain a clear oil, less colored, and of a less repugnant odor; but its want of odor is out of the question.

The refining and purification of fish oils is the more important, since, for the last twelve years, their importation has constantly increased. Thus, in 1827, there was entered only 3,000,000 kilogrammes. (about 6,000,000 lbs.) the greater part of which came from the islands of St. Pierre and Miquelon; while, in 1839, the importations amounted to 9,200,000 kilogrammes, representing a value of 5,500,000 francs.

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*On a Gaseous Voltaic Battery.* By W. R. GROVE, Esq., M. A., F. R. S., Professor of Experimental Philosophy in the London Institution.

In the Philosophical Magazine for February, 1839, I have given an account of an experiment in which a galvanometer was permanently deflected, when connected with two strips of platina, covered by tubes containing oxygen and hydrogen. At the conclusion of my notice I say, "I hope, by repeating this experiment in series, to effect decomposition of water by means of its composition." The next paper of mine, published in the same year, contains an account of a battery to which the public has since attached my name, and which led me into a different field of research.

In reading over my papers lately, for a purpose alluded to in my letter of last month, I was struck with the above sentence. My impression was, that I had expressed a hope not very likely to be realized; but, after a few days' consideration, I saw my way more clearly, and determined to try the experiment.

As the chemical, or catalytic, action in the experiment detailed in that paper, could only be supposed to take place, with ordinary platina foil, at the line, or water-mark, where the liquid, gas, and platina met, the chief difficulty was to obtain anything like a notable surface of action. To effect this, my first thought was to surround the platina foil with spongy platina, precipitated in the usual way by muriate of ammonia. This was suggested to me by the known action of spongy platina on mixed gas, which would, by its capillary attraction, expose a considerable surface of metal and liquid to the action of the gases. I still think this would be the best mode of effecting the object; but, as it was very troublesome in manipulation, I determined to try the platina platinized by voltaic deposition from the chloride,