488 MORPHINE, CODEINE, AND NARCOTINE IN INDIAN OPIUM

NOTES.

The Editor desires to point out that the pages of the Journal are open for the inclusion of short notes dealing with analytical practice and kindred matters. Such notes are submitted to the Publication Committee in the usual manner.

FORMULÆ FOR DILUTING ACIDS, ETC., TO A DESIRED STRENGTH.

For calculating the amount of water to be added to, say, 1 litre of nitric acid of sp. gr. 1.42 to reduce it to *e.g.*, sp. gr. 1.20, the only formula required is $W = VS$, where W represents the weight of a body or liquid with volume V and sp. gr. S . The necessary data are then obtained from sp. gr. tables.

If x represents the volume in c.c. of the diluted acid,

$$1000 \times 1.42 \times \frac{69.80}{100} = x \times 1.2 \times \frac{32.36}{100},$$

and

$$x = \frac{1420 \times 0.698}{1.2 \times 0.3236} = 2552.4 \text{ c.c.}$$

Hence, the required amount of water to be added is: $2552.4 - 1000 =$ (say) 1552 c.c. If contraction takes place during admixture the strong solution must be diluted with water, with cooling if necessary, until the required volume of liquid at 15°C. is obtained. Obviously, the above result also gives the amount of water required to dilute the strong acid to a strength of 32.36 per cent. This simple procedure, which depends on first principles only, is preferable to a formula which is not always remembered.

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THE IDENTIFICATION OF PECULIAR CONSTITUENTS OF FÆCES.

Substances alleged to have been found in fæces, when submitted for identification, call for some caution, as there is a type of patient that thinks it humorous to deceive his medical attendant and another type that malingers. In the following three cases, however, all the evidence pointed to the foreign bodies being genuine constituents of the excretions.

I. A specimen was sent with a request for information whether the creature was an intestinal parasite. It had an arch-shaped body with a tiny anterior segment and ten other segments. Along the dorsal or outer curvature the length was 1 inch, whilst the lower curvature measured $\frac{3}{4}$ -inch. The posterior segment was continued as a tail $\frac{7}{10}$ -inch long, bent at a pronounced obtuse angle at $\frac{1}{2}$ -inch from the body. It was identified as "the rat-tailed larva" of *Eristalis*, a fly of the family *Syrphidae*, which comprises the Hover Flies or Common Drone Flies. The larvæ are said to live in liquid manure and foul water, and have been seen on watercress. Fantham, Stevens, and Theobald ("Animal Parasites of Man," 1916) only mention one specific case of human infection—that recorded by Austen—where in the autumn of 1907 a number of larvæ of *Eristalis tenax* was passed *per rectum* by a woman in Hampshire, who had recently arrived from France. The patient had eaten a considerable quantity of watercress before leaving France.

The larva was described about 1750 by Réaumur, and was called by him *le vers à queue de rat*. Henry Baker ("Of Microscopes," 1785) obtained a larva from a cistern of rain-water in August, and he observes the flies to be more common in France than in England. This author mentions the power the larva has of lengthening and retracting its tail, which he found could reach a length of four inches on occasion. This is of importance, because, until the telescopic nature of this organ is known, there is difficulty in identifying with illustrations a dead larva possessing a partly retracted tail.

The present specimen came from Kent at the beginning of October, 1921.

II. Some pale cream-coloured shreds were submitted to ascertain whether tapeworm was present. Microscopical examination indicated nothing in the contour of the fragments to suggest tapeworm, and no ova could be found. There was, instead, a matrix of some translucent substance with pieces of talc-like material embedded therein. When ignited the specimen did not emit a nitrogenous odour, but left an appreciable amount of ash containing 61 per cent. of silica, some magnesium, and traces of iron and aluminium. It also contained calcium and phosphate distinct from the magnesium silicate. Enquiry showed that the patient was in the habit of taking twenty saccharin tablets a day, which presumably formed the source of the talc, though a *post hoc* explanation of the presence of an article in fæces is unconvincing, because from time to time instances occur of masses remaining in the intestines for years before digestion.

III. This specimen consisted of five stones, each of which had a brown waxy centre and a creamy-brown powdery coating. The total weight was 1.4 grms. They had the following percentage composition: Moisture, 6.5; mineral matter, 4.0; mucin, 1.7; vegetable tissue, 2.8; resinous matter, 80.3; and other substances, 4.7. The bran of grain and a trace of cork tissue were found among the vegetable debris. No notable amounts of cholesterol, bile-pigments, or calcium carbonate were present. The extracted resin was insoluble in water, but soluble in ether, in alcohol, and in quite a small quantity of acetic acid. These results would appear to exclude euonymin and podophyllum resin, which had been prescribed, as sources of origin. Later information suggested that it might be a residue from one or other of the drugs prescribed for urinary antiseptis. A trace of iron and a faint trace of zinc, but no copper, were present.

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ANALYSIS OF A SOUTH AMERICAN COPPER AXE HEAD.

Very few analyses of South American copper axe heads collected in the burial-grounds of the Indians of Peru and of Ecuador have been published. One by Humboldt indicates that the hardening of the copper making it suitable for the purpose in view was accomplished by the addition of 0.4 per cent. of tin, an addition probably of accidental origin rather than of design. A South American hatchet collected by one of us (E. K. R.), and stated to have belonged to an Inca Indian (Inca Pirqua), was submitted to analysis with the following results:

The metal possessed a coppery lustre, and was tough and malleable rather than brittle. The form of the hatchet suggested that it had been hammered into a plate and the haft burred up at the edges. It contained copper, zinc, iron, and small traces of silica, whilst tin, lead, and nickel were absent.

For the quantitative analysis the metal was dissolved in nitric acid and the copper estimated electrolytically. Iron was estimated colorimetrically in an aliquot portion of the residue and the zinc precipitated as sulphide, ignited and weighed as oxide, the method and precautions adopted by Sir W. Crookes being followed and allowance being made for the small quantities of iron. The silica was present in quantities too small for accurate estimation. Duplicate analysis yielded the following results: Copper, 96.42 and 96.45; zinc, 3.46 and 3.41; and iron, 0.09 and 0.09. Total, 99.97 and 99.95 per cent.

These results are particularly interesting in the fact that they indicate the material of the axe head to be a brass and not copper. Berthelot (*Comptes rend.*, 1893, 116, 161; 1894, 118, 764; 1897, 124, 328) found that the earlier copper articles of Chaldea and Egypt (*circa* 4000 B.C.) were made of pure copper, whilst the earlier copper-tin articles have been attributed by Coffey (*J. Anthropol. Inst.*, 1901, 31, 265) to the accidental use of a tin containing copper ore, and not to foresight on the part of the maker. Brass articles have always been considered to belong to a very late period. It may be noted that there was no reason to suspect the genuineness of the axe head in question.

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