

too simple for the senior students, or too elaborate for the juniors. I could instance a case in which men new to the whole subject were first of all introduced to a careful and complete description of the intricacies of embryology. Physiology, as now studied, is not so simple that it can be well taught in one course of lectures. I would say that if students were first of all grounded in the main principles—the broad established facts of physiology—there would then be some possibility of the richly-elaborated lectures now delivered at some schools being understood and useful; at present we dare not hope that they are to a large extent anything but a waste of strength. Could these simple reforms be carried out, I think we should cease to hear of the idleness of first-year men, and of the large percentage of failures at the Primary Examination.

I am, Sir, your obedient servant,
Queen Anne-street, W. A. PEARCE GOULD.

ANALYSES OF CHIAN TURPENTINE.

To the Editor of THE LANCET.

SIR,—The results of some recent analyses of samples of genuine and spurious Chian turpentine may be of interest at the present time.

The first sample I examined was probably at least ten years old; and it is possible, though not certain, that it was a portion of the very sample reported on in Flückiger and Hanburys' "Pharmacographia." If this is not the case it came from the same source of supply. I need not repeat the description given in "Pharmacographia," for this drug corresponds accurately to it, except that from age it appears to have become somewhat more brittle, though without losing its plastic character.

The specific gravity at 60° Fahr. is 1·050. When a small fragment is heated in water to the boiling-point it melts, and becoming lighter than water, floats as a clear film. It dissolves freely in hot alcohol of 60 overproof, but a portion of one of the resins separates on cooling. A small sediment of insoluble earthy matter was left. This amounted to 7·3 per cent. on the sample, and consisted almost entirely of sand, not of silica, which had been in a state of combination. A 20 per cent. solution in a tube 200 millimetres long gave a + rotation of 9° 12' for the sodium ray. It contained two different resins, one of which appears to be identical with the *Alpha* resin of mastich; the other is readily saponified, and is identical in its general characters with the *Gamma* resin of benzoin. The *Beta* resin of mastich is certainly absent. For convenience in stating the results I assume these resins to be what they appear to be.

This sample gives the following quantitative results;—

Volatile oil	9·20 per cent.
<i>Alpha</i> resin	79·00 "
<i>Gamma</i> resin	4·00 "
Benzoic acid	Traces "
Impurities	7·30 "

A 20 per cent. solution of the volatile oil separated by distillation was polarised separately, and gave a + rotation of 1° 54' in the 200 millimetre tube. The quantity at my disposal was insufficient to test the boiling point or specific gravity. This volatile oil had a very marked and pleasant aromatic smell, the odour of fennel was perceptible though very faint.

I gave a portion of this to a medical man, who was treating two cases of uterine cancer with Chian turpentine (so-called), but without effect. He used this sample instead of his own, and reports a very favourable improvement after eighteen days' use.

The second sample was purchased in London. In general appearance it was similar to the last, though somewhat less brittle. Its specific gravity was 1·043 at 60° F. The rotation in the polariscope was practically identical with the last sample, and the rotation of the distilled volatile oil was exactly identical. The analysis showed a larger proportion of volatile oil—namely, 12·1 per cent.—and barely a trace of ash. This sample was evidently a newer one, but had been collected with greater care, so that there were smaller proportions of mineral impurities.

The third sample was also purchased in London from a wholesale firm, and was obviously spurious. In appearance it closely resembled Canada balsam. The smell was less pleasant, and the odour of fennel much more marked. It had an unpleasant taste. It was perfectly transparent, of a yellowish tint, and just sufficiently fluid to drop from the end of a glass tube. Its specific gravity was 1000, or identical with water at 60° F. A 20 per cent. solution gave a + rotation of 6° 15' in a tube 200 millimetres long for the sodium ray—i.e., about two-thirds of the rotation of the genuine sample.

There was no difference worthy of note as to its solubility in alcohol, ether, chloroform, petroleum-spirit, naphtha, bisulphide of carbon, or turpentine, which would serve to distinguish it from the genuine sample. The proportions of volatile oil, &c., were, however, very different. This gave—

Volatile oil	26·00 per cent.
<i>Alpha</i> resin	70·00 "
<i>Gamma</i> resin	3·00 "
Benzoic acid	None
Ash	Trace
Impurities, woody fibre, &c.	"

The *Alpha* resin in this case, although separated in precisely the same way, was obviously a different resin. In appearance it very closely resembled common colophony resin, and from my examination I am of opinion that, at any rate, it contained a very large admixture of that resin, which had probably been dissolved in, or mixed with, one of the fluid turpentines. The volatile oil of this sample was entirely different in character, offensively rank instead of pleasant in smell. In the polariscope it gave a + rotation for a 20 per cent. solution of 3° 36', or nearly double that of the genuine samples. This volatile oil appeared to consist of at least two entirely distinct oils.

The fourth sample was a new supply just sent to this country, of which I obtained a few ounces. It is evidently a much more recent specimen, but, though from this cause softer and more plastic, the brittle character is as strongly marked as in the old sample. Its optical rotary power is, under the same condition as before, 7° 46', or lower than the old sample, and the rotary power of the volatile oil is precisely the same. Its specific gravity is 1·052, or higher than the old sample. It is very free from mineral impurities. This, when analysed, gave—

Volatile oil	9·20 per cent.
<i>Alpha</i> resin	81·00 "
<i>Gamma</i> resin	6·00 "
Benzoic acid	Traces "
Impurities, ash	1·40 "
Insoluble	2·00 "

From its general characteristics and the source from which it was procured, I have no doubt of the genuineness of this sample, and the difference between the analysis and the first will show what may be the natural variations of the turpentine itself or the changes it undergoes by lapse of time.

A fifth sample, also a recent importation, proved to consist of 60 per cent. of Chian turpentine and 40 per cent. of Canada balsam and turpentine resin. This sample had a specific gravity of 1025, and contained 16·3 per cent. of volatile oil, a large proportion of which was not the true volatile oil of Chian turpentine.

The practical test which results from all these facts is the specific gravity. Genuine Chian turpentine should float in a solution containing 8 per cent. by weight of concentrated sulphuric acid, and should sink as soon as this is diluted. On the other hand, the adulterants used being lighter than water, the spurious samples will float in this acid even after it has been diluted, say to three times its volume, and will sometimes even float in pure water. This test is perfectly easy to apply.

I trust Professor Clay will be able to say which of these is identical with that he has been employing, especially as it is noteworthy that although he quotes the description in "Watts' Dictionary," one word appears to have escaped his notice. Watts calls Chian turpentine *viscid*. Now this would correspond with the spurious sample, but not with the genuine ones, which are brittle.

I am, Sir, yours obediently,

G. W. WIGNER

Laboratory, Great Tower-street, May 19th, 1880.