II. "Note on the Separation of the Isomeric Amylic Alcohols formed by Fermentation." By Ernest T. Chapman and Miles H. Smith. Communicated by Prof. E. W. Brayley. Received January 14, 1869.

At present we are acquainted with two amylic alcohols formed by fermentation. They were discovered by Pasteur, who observed that different specimens of amylic alcohol caused a ray of polarized light to rotate to different degrees. He succeeded in devising a separation of these alcohols, which consisted in converting them into sulphamylates of barium and recrystallizing these salts. The one alcohol is without action on polarized light, and the other rotates it. This method of separation is beset with great practical difficulties, and has, we believe, only once been repeated, viz. by Mr. Pedler. He gives no detailed account of the separation, but gives some of the leading properties of the alcohols. He found that the rotating alcohol caused a ray of polarized light to rotate 17° with a column of 500 millims. of liquid.

The following are some examples of the rotations effected by eleven different samples of amylic alcohol in a column of 385 millims. For comparison with Pedler's number, the observed numbers have been reduced in the second column to observations on 500 millims.:—

Designation of specimen.	Rotation observed on column of 385 millims.	Reduced to observations on 500 millims.
	°	°
1.	3·5	4·55
2.	3·7	4·81
3.	4	5·2
4.	3·7	4·81
5.	4·7	6·11
6.	4	5·2
7.	3·5	4·55
8.	2·7	3·51
9.	5	6·5
10.	4	5·2
11.	3·8	4·94
Pedler's rotating alcohol.....		17·0

If Pedler's number be absolutely correct, it follows that these specimens of amylic alcohol contained from 15·9 per cent. as a minimum, to 38·2 as a maximum of the rotating alcohol. The boiling-points of the whole of the samples lay between 131°·5 and 133°.

We have effected the separation of these alcohols more simply. If soda, potash, chloride of calcium, or, apparently, any salt easily soluble in amylic alcohol be dissolved in that alcohol at the boiling-point, and the saturated solution be distilled, the non-rotating alcohol will be to a great extent retained and the rotating alcohol distils off. The substance which appears to lend itself most conveniently to this operation is caustic soda.

Amylic alcohol is boiled with excess of caustic soda; when saturated,

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the hot solution is decanted into a flask and distilled from an oil-bath, the temperature of which may be allowed to rise to 200°. The alcohol distils off at first readily, after a while with greater difficulty; finally the contents of the distilling flask solidify, and it becomes extremely difficult to drive over any more amylic alcohol. On now adding water to the contents of the flask and again distilling, amylic alcohol comes over of about half the rotating power of the alcohol employed. If the power of rotation be very small, the reduction is considerably greater; thus, operating on an alcohol rotating 1°·3 on the 385 millims., by one operation we have reduced it to 0·3. By a sufficient number of repetitions of the process, it is possible to effect a separation of the alcohols, and very easy to obtain considerable quantities of the non-rotating alcohol quite pure. No valerianic acid is formed; and the soda-solution remaining in the flask after the operation is completed is barely coloured.

The separation of the alcohols may also be effected by dissolving metallic sodium in amylic alcohol, and distilling, &c., as above described, the resulting solution of amylate of soda in amylic alcohol. The process appears to present no point of advantage over that with caustic soda.

We shall shortly publish a detailed account of differences in structure of these alcohols, together with a description of some of their principal derivatives.

III. "Note on the Heat of the Stars." By William Huggins, F.R.S. Received February 18, 1869.

In the summer of 1866 it occurred to me that the heat received on the earth from the stars might possibly be more easily detected than the solar heat reflected from the moon. Mr. Becker (of Messrs. Elliott Brothers) prepared for me several thermopiles, and a very sensitive galvanometer. Towards the close of that year, and during the early part of 1867, I made numerous observations on the moon, and on three or four fixed stars. I succeeded in obtaining trustworthy indications of stellar heat in the case of the stars Sirius, Pollux, and Regulus, though I was not able to make any quantitative estimate of their calorific power.

I had the intention of making these observations more complete, and of extending them to other stars. I have refrained hitherto from making them known; I find, however, that I cannot hope to take up these researches again for some months, and therefore venture to submit the observations in their present incomplete form.

An astatic galvanometer was used, over the upper needle of which a small concave mirror was fixed, by which the image of the flame of a lamp could be thrown upon a scale placed at some distance. Usually, however, I preferred to observe the needle directly by means of a lens so placed that the divisions on the card were magnified, and could be read by the observer when at a little distance from the instrument. The sensitiveness of the