On the Waxy Substance Coating on the Cuticle of the Bamboo Joints.

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Phyllostachys, Edulis A., and C. Rivière, the largest stem species of the bamboo grown in Japan, has a white powder-like waxy substance on the cuticle of its joints. This substance is scraped off from the bamboo nodes with finger-tips and tested. It melts at 80°-81° C., and does not dissolve in ethyl alcohol, methyl alcohol, carbon tetrachloride, and ether at the room temperature, and also scarcely soluble even being heated, however, somewhat soluble in chloroform and carbon disulphide at the ordinary temperature, and more readily when heated. It does not give the Liebermann's cholesterol reaction like those waxes of grape or apple.

The most part of the soluble substance in cold chloroform consists of a higher paraffin, which being isolated in a pure state by distillation at a diminished pressure. The substance thus obtained seems to be a hydrocarbon of methane series, having a melting point of 63°-64° C, being identical with that of nonacosane; and by its analysis and the molecular weight the substance is found to be very likely same as nonacosane:

<table>
<thead>
<tr>
<th>Analysis</th>
<th>found</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>85.12%</td>
<td>14.67%</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>84.65%</td>
<td>14.65%</td>
</tr>
<tr>
<td>Nonacosane</td>
<td></td>
<td>C</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>85.29%</td>
<td>14.71%</td>
</tr>
<tr>
<td>Molecular weight</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>found</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>395</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>385</td>
<td></td>
</tr>
</tbody>
</table>

The insoluble part of the wax in chloroform at room temperature is saponified with 5% Na-alcoholate, and CaCl₂ is added as to make a Ca-soap. Then the alcohol is evaporated off, and the residue is extracted with hot chloroform in order to remove the wax-alcohol and hydrocarbon present. After the resulted substance is decomposed by boiling with dilute HCl, a certain fatty acid is formed, and it is decolorized, and recrystallized from ethyl alcohol, and finally is crystallized in a fine needle form. Its melting point is 78° C., which is almost identical with that of melissic acid, which melts at 78.5°-79° C. The result of analysis, and the molecular weight are as follows.
Waxy Substance of Bamboo Joints.

Analysis: found (1) C = 79.06% H = 13.20%
(2) C = 79.76% H = 13.14%
Mellissic acid C_{30}H_{6}O_{2} Calc. C = 79.65% H = 13.27%
Molecular weight found (1) 432
(2) 453
C_{30}H_{6}O_{2} Calc. 453

The above extracted portion of the saponified substance is separated into the two parts:—the wax alcohol and the hydrocarbon, by the method of Leys, (J. Pharm. et chim. 5, 277, 1912), and the part of wax alcohol is several times recrystallized from ethyl alcohol, and finally is made in a needle crystalline form, which has a silky lustre, melting at 85°C–87°C. The author believes this substance should be melissyl alcohol, which melts at 86°C–88°C. The figures of the analysis, and determination of the molecular weight are shown below.

Analysis: found C = 82.19% H = 13.97%
Melissyl alcohol C_{61}H_{6}OH Calc. C = 82.19% H = 14.16%

The result of analysis of the acetate of the alcohol is as following.

Analysis: found C = 80.02% H = 13.57%
C_{61}H_{6}COOCH_{3} Calc. C = 80.00% H = 13.33%

Besides those three compounds, the portion that is soluble in cold chloroform contains a crystalline substance which can be dissolved in acetic acid, and so it is obtained by extracting it with 80% acetic acid. When the extract is concentrated to about half its volume the substance is crystallized out itself. It is soluble in chloroform, hot ethyl alcohol, and acetic acid. It contains a certain mineral matter, and melts at 240°C–250°C with decomposition. The yield of the substance is so poor that the author could not study further more.

The mother liquid contains some resin which is soluble in most organic solvents and can be burnt readily giving a characteristic smell resembling that of terpentine.

Quantities of those substances were as follows.

Nonacane C_{29}H_{61} 55%
Mellissic acid and Melissyl alcohol 20%
(C_{3}H_{6}O_{2} + C_{3}H_{6}OH)
unknown crystalline substance 2%
resin 4%