5. The temperature in the coal during an official volatile determination was measured and the composition of the official volatile matter determined.

6. A modification is suggested of Dulong's heat value calculation for coal based on experimental results showing the distribution of oxygen between hydrogen and carbon.

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## NOTES.

*A Characteristic Test for Hippuric Acid.*—Hitherto no easily-applied, characteristic test for hippuric acid in urine has been at hand. For the reason that its detection in urine is of little or no clinical value, the lack of a convenient practical method for its detection has not been felt. On the other hand, for purely scientific purposes, the methods now in use involve inconveniences that are surprisingly great when compared with the methods available for the detection of other constituents of urine. As a matter of fact, the detection of hippuric acid has necessitated the concentration of the urine, the extraction with organic solvents and either a melting point determination of the residue or its transformation into more easily recognized nitro or benzaldehyde derivative.[1]

The following test for hippuric acid can not only be applied directly to urine but it yields definite results in solutions so dilute even as hundredth-normal. A few cubic centimeters of the urine in a test tube are first treated with a quantity of sodium hypobromite solution, just sufficient to decompose the urea and to impart to the mixture a permanent yellow color. The solution is then heated to boiling; an orange or brown-red precipitate is formed, if hippuric acid is present. When present only as a trace the solution appears smoky and faintly red in color; when present in larger quantities the solution is rendered opaque and orange or brown-red in color. In either case after standing for some time the solution clears up and a light, finely divided precipitate settles. It consists of white "earthy phosphates" intermixed with the amorphous orange or brown-red solid[2] about to be described.

When a 0.1 *N* solution of hippuric acid is boiled with the sodium hypobromite solution, a deep brown-red color is formed at once and on standing settles to the bottom of the tube as an opaque, red, closely-adhering

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[1] Spiro, *Z. physiol. Chem.*, **28**, 117. For quantitative methods, vide, Wiener, *Arch. exp. Path Pharm.*, **40**, 314; Blumenthal, *Chem. Centr.*, 1900, II, 447.

[2] Application of the hypobromite test to aqueous solutions of other constituents of urine gave no color effects. The following were tested: uric, benzoic, oxalic and fatty acids, creatinine, acetone, acetacetic ester, glucose, glycogen and leucine.

scale, which cannot be washed from the tube by simple decantation with water. With 0.01 *N* or even more dilute solutions, the red, adhering mass is easily observed when the liquid contents of the tube are removed.

It must be remembered that continued boiling decomposes the substance, thereby giving rise to phenylisocyanide and other products. For this reason the red substance is best prepared as follows. A concentrated solution of sodium hippurate is prepared and treated at ordinary temperatures with the hypobromite solution. After a few moments the mixture becomes red and after a few hours the precipitation is complete. It is free from the odor of phenylisocyanide and appears as a sticky, blood-red, semi-solid substance. It is insoluble in water but is soluble in most organic solvents. Its alcoholic solution is easily precipitated by the addition of water. Its solution in carbon bisulphide darkens and on evaporating leaves a green-black precipitate.

The substance contains carbon, hydrogen, nitrogen and bromine. Limpricht and Uslar[1] heated hippuric acid to 240°-250° and obtained benzoic acid, benzonitrile and resin. With sodium hydroxide and chlorine, Stecker[2] and Gössmann[3] obtained benzoylglycollic acid. The red substance obtained is not analogous to any of these. Its composition and the action of sodium hypobromite on benzamide, *p*-phenylenediamine and other nitrogen and hydroxyl aromatic compounds is being investigated.

WILLIAM M. DEHN.

SEATTLE, WASH., June 23, 1908.

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*An Automatic Siphon Pipette.*—Some sixteen years ago[4] Prof. G. E. Patrick devised and used at the Iowa Experiment Station, "An Automatic Acid Measure" which had several advantages over the usual forms of self-filling pipettes found on the market. It required neither suction nor pressure for its operation, and having duplicate measuring vessels there was no waste of time waiting for the apparatus to refill after each discharge. Recently we have made a modified form of the Patrick pipette, and as it has met with such hearty commendation from all those who have used it, the following sketch and brief description are published in the hope that others may find it a time-saver worthy of adoption.

The accompanying figure is almost self-explanatory: the two bulbs, $H_1$, $H_2$, of any desired capacity, are connected alternately, with solution supply and delivery by a rather unusual form of four-way cock, so that while the one is filling the other is emptying. The tube *F* which forms the core of the stopcock must be long enough so that there is no dan-

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[1] *Ann.*, **88**, 133.

[2] *Ibid.*, **68**, 54.

[3] *Ibid.*, **90**, 181.

[4] *Bull.* **19**, *Iowa Agr. Expt. Sta*, Nov., 1892.