procedure in this determination is the same as that described in the preparation of the sample for the estimation of cellulose.

The amount of material extracted is determined by weighing the residue remaining after evaporation of the solvent in the air-oven at 105° C.

One-per-cent. Alkali-soluble Material.

Two grammes of air-dry sawdust (through 60- and on 80-mesh sieve), or shredded pulp, are weighed in a weighing-bottle, dried two hours and a half at 105° C., and again weighed. In the case of woods containing volatile oils it is necessary to determine the moisture separately by the Xylol method, and to use air-dry wood only for this determination. The sample is placed in a 250 c.c. beaker and 100 c.c. of 1-per-cent. sodium-hydroxide solution* added. The beaker is covered with a watch-glass and placed in boiling distilled water for exactly one hour, the height of the water in the bath being maintained level with the solution in the beaker by means of a constant level flask. The contents of the beaker are occasionally stirred with a glass rod. The undissolved material is then collected in a tared alundum crucible, washed thoroughly with hot distilled water, dilute (10 per cent.) acetic acid, and water successively, dried in an air-oven at 105° C., cooled in a dessicator, and weighed. The difference is the portion soluble in alkali.

Alkali-soluble corrected for Water-soluble or Ether-soluble.

This value is obtained by subtracting the percentage of hot water or of ether-soluble material from that of the 1-per-cent. alkali-soluble material.

Pentosans.

The estimation of the pentosans—namely, xylan and araban—occurring in wood is based on the quantitative determination of furfural formed by the action of hydrochloric acid on the material.

Two grammes of oven-dry wood or pulp are placed in a 250 c.c. flask† provided with a separatory funnel, and attached to a condenser ; 100 c.c. of 12-per-cent. hydrochloric acid (sp. gr. 1·06) are added, and the contents of the flask are distilled at the rate of 30 c.c. in ten minutes. The distillate is passed through a small filter before entering the receiver. As soon as 30 c.c. of the distillate are collected, 30 c.c. of the hydrochloric acid are added to the distillation-flask, and the distillation is continued in this manner until 360 c.c. of distillate are collected. To the total distillate are added 40 c.c. of filtered phloroglucine solution that has been prepared at least a week previously by heating 11 grm. of cp. phloroglucine in a beaker with 300 c.c. of 12-per-cent. hydrochloric acid, and, after solution has taken place, making up to 1,500 c.c. with 12-per-cent. hydrochloric-acid solution.

After addition of the phloroglucine the solution soon turns greenish-black. After standing sixteen hours‡ the furfural phloroglucide will have settled to the bottom of the beaker. If a drop of the supernatent liquid gives a pink colour with aniline acetate paper§ the precipitation of the furfural is incomplete. A further amount of phloroglucine is then added and the beaker allowed to stand overnight as before. 40 c.c. of the phloroglucine solution is usually sufficient.

The furfural phloroglucide is filtered, using a tared Gooch crucible having a thick asbestos mat, and washed with exactly 150 c.c. of distilled water. The crucible is then dried for three hours at 105° C., cooled over sulphuric acid, and weighed in a weighing-bottle. From the weight of the furfural phloroglucide so obtained the amount of total pentosans in the wood is calculated either from the tables of Krober and Tollens‖, which has a range for weights of phloroglucide between 0·030 grm. and 0·300 grm., or from the following formulæ¶ :—

For weight of phloroglucide a under 0·030 grm : Pentosans $= (a + 0{\cdot}0052) \times 0{\cdot}8949$.

For weight of phloroglucide a ranging between 0·030 grm. and 0·300 grm. : Pentosans $= (a + 0{\cdot}0052) \times 0{\cdot}8866$.

For weight of phloroglucide a exceeding 0·300 grm. : Pentosans $= (a + 0{\cdot}0052) \times 0{\cdot}8824$.

Pentosans in the Cellulose.

The method of estimation of the pentosans remaining in the isolated cellulose is the same as that described above for the total pentosans.

Pentosans not in the Cellulose.

These bodies disappear with the lignin during the process of cellulose isolation. This value is obtained by subtracting the value for the pentosans in the cellulose from that of the total pentosan content of the wood after all results have been calculated to the oven-dry weight basis of the wood.

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* The strength of the sodium-hydroxide solution is previously determined by titration with standard sulphuric acid, using phenolphthalein and methyl orange as indicators, so that correction for carbonates may be made in adjusting the solution to exactly 1 per cent. NaOH.

† The flasks are easily made by fusing an outlet-tube and separating-funnel to the tubes of the ordinary all-glass wash-bottles.

‡ Boddener and Tollens (J. Landw., 58, 232–7) have found that if the distillate containing the phloroglucine is heated to 80° to 95° C. and then allowed to stand for two hours the precipitate of furfural phloroglucide may be filtered off without waiting for the solution to stand overnight. The latter method, however, is preferable in order to use the tables for calculation.

§ The aniline-acetate paper is conveniently prepared by dipping strips of filter-paper into aniline acetate. The latter is prepared by adding acetic acid to water, drop by drop, to a mixture of equal parts of aniline and water until a clear solution is obtained.

‖ Abderhalden's "Handbuch der Biochemischen Arbeitsmethoden," vol. ii, 137, 154.

¶ Browne, P., "Handbook of Sugar Analysis," 452.