OTTAWA, December 1, 1903.

Method of working on ground ginger.

The adulteration of ginger usually consists either in the addition of foreign matter (flour, starches, etc.,) or in the use of exhausted rhizomes, *i.e.* ginger from which the valuable principles have been more or less washed out.

The detection of foreign matter is made by means of the microscope; but the residue left after water extraction (as below) is better suited to the uses of the microscopist than in the raw sample.

The detection of exhausted ginger naturally depends upon a knowledge of the extracted matter yielded by the sample and a comparison of this with the normal extractive which genuine ginger yields on similar treatment.

Since the commercial extraction of ginger is made with cold water, this is the proper solvent to use in the laboratory.

Bulletin 48, (May, 1897), p. 13—records the result of four cold water extractions of genuine ginger by Mr. Babington. These gave a maximum of 16·7 and a minimum of 12·3 per cent.; with a mean of 14·7 per cent—calculated on the dry material. In the extraction of ginger by cold water, much will naturally depend upon the method of carrying out the operation. Unfortunately Mr. Babington has not recorded the method employed by him. I am convinced that the numbers obtained would have been considerably higher, and possibly more constant for genuine ginger, had mechanical agitation been used in treating with the solvent. The advantages of mechanical agitation are sufficiently apparent; the increased effectiveness, and the fact that given conditions can be exactly duplicated, are the most important. I have worked as follows:—

Moisture.—Five grammes of the sample is exposed on a watch glass to a temperature of 90°–100° in the water-oven, until constant weight is obtained. When an ordinary drying oven is used this may require 10 to 12 hours or more. With my oven, using a forced draught, 2 to 3 hours is sufficient.

Cold Water Extractive.—The dry sample is transferred by means of a dry funnel, to the centrifuge tube—of about 150 cc. capacity—and treated with 100 cc. of water. The tubes are stoppered and placed in the mechanical shaker (having horizontal motion) for 30 minutes. They are then whirled for 10 minutes, when the insoluble matter becomes compacted tightly in the bottom of the tube and the clear supernatant liquid filters readily. The filtration is made by a weighed filter paper, whose dry weight is known. The undissolved residue is treated a second time with 100 cc. of cold water in the shaker, again whirled, and the clear liquid poured through the filter. Finally, the residue is washed on to the filter using about 100 cc. water. (The exact amount is immaterial, since only negligible traces of soluble matter remain in this residue.)

Where a centrifuge is not available the filtration is very tedious, and sometimes impossible. It may be necessary, in this case, to use two or more filters, or to work on smaller amounts of the sample. In either case the liability to error is much increased.

The filters, with their contents, may be allowed to stand at the ordinary temperature over night; or they may be at once transferred to a drying oven, kept below 50° C—having a forced draught. In this case there is no danger of gelatinizing the starch, and the drying may be completed in a few hours. When approximately dry, the temperature of the oven may be raised to 90°—95° and the drying completed at this tem-

NOTE.—In order to ascertain how much extractive was taken out by the second treatment with 100 cc. water, I determined the loss of weight after one and two treatments, in sample 17957—and obtained for 1 treatment—19·6 per cent. For 2 treatments—21·4 per cent. It is evident from these figures that a third treatment would be superfluous.