or lowered at will. When in use *B* is filled to two-thirds of its capacity with manganese dioxide, large lumps alone being used, as powdered mineral may easily cause a stoppage of the connections. *E* is filled with hydrochloric acid and raised to a level slightly above the top of *B*. Water is poured into the funnel *A* until it is nearly full, and a lamp is placed under *C*. As soon as the temperature has reached about 80°, a very small flame suffices to maintain the activity of the generator. When the exit from *B* is open, the acid enters and the evolution of chlorine continues until checked by closing the tap, when the acid is driven back into *E*. A slight agitation of the latter before opening the tap serves to prevent the accumulation of a stratum of weak acid at the bottom. It is advisable to lower the reservoir *E* when a current is not required, so as to avoid pressure and any possible escape through minute leaks. In practice it is also found desirable to connect the opening of *E* by a flexible tube with a bottle of caustic soda solution, the tube terminating at the surface of the solution. This prevents any escape into the surrounding air of chlorine, with which the contents of *E* are soon saturated. When thus arranged a current of the gas can be taken at will from the generator, the sole condition being the maintenance of a small flame beneath *C*. The manifold advantages of such a device, especially for the lecture table, will be appreciated by all who attempt an extended series of experiments with chlorine. As described above the generator can be readily constructed from pieces of apparatus ordinarily found in a well equipped laboratory. I have found a generator in which the reservoir *B* contains 1500 cc., a very convenient size for use in the lecture room.

MINERAL CONSTITUENTS OF THE WATERMELON.

By George F. Payne.

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THE watermelon is not a crop that is widely grown even in this country with great success. It is this very reason which makes it a desirable crop to handle in Georgia, as the watermelons in this state attain finer flavor, crispness, juiciness and sweetness than anywhere else in the world.

Upon analysis of two medium-sized watermelons cut up and mixed together, we found them to contain just one-third per cent. of pure ash, calculated as free from carbonic acid. The exact figures were 0.3338, which in our calculations we will round off into an even one-third, which it practically is.

The composition of watermelon ash is as follows:

	Per cent.
Sulphur trioxide	4.41
Calcium oxide	5.54
Magnesium oxide	6.74
Potassium oxide	61.18
Sodium oxide	4.31
Silicon dioxide	2.15
Phosphorus pentoxide	10.25
Chlorine	4.94
Iron sesquioxide	0.48
Total	100.00

A good average crop of watermelons is considered to be about one-half carload to the acre, though much larger crops than this are sometimes made. Large watermelons are also considered desirable, hence in considering what is carried off from the land by the removal of the crop, it is well to consider how much would be taken off by a large crop, as it is the large crops which we desire to produce. We have before us a report of a crop of watermelons upon an acre of land which is an unusually large one, but which was weighed up in the presence of disinterested witnesses and sworn to by them as being honestly grown upon an acre and correctly weighed. This crop weighed 39,766 pounds. One-third per cent. of such a crop would be pure ash, and consequently the mineral plant food taken out of an acre of land by such a crop would be as follows:

	Pounds.
Sulphur trioxide	5.85
Calcium oxide	7.34
Magnesium oxide	8.93
Potassium oxide	81.09
Sodium oxide	5.71
Silicon dioxide	2.85
Phosphorus pentoxide	13.59
Chlorine	6.55
Iron sesquioxide	0.64
Total	132.55

In the crop mentioned above to replace the phosphoric acid and potash carried off from one acre by the melons alone, not taking into account the vines and roots, would require:

	Pounds.
Acid phosphate (thirteen per cent. P_2O_5)	100
Muriate of potash (fifty per cent. K_2O)	160

A fair crop of melons upon good land, however, is usually considered to be about one-third of the above large crop or about one-half carload. If we estimate then the amounts of phosphoric acid and potash required for an average crop of fair character, such a crop will take from the soil materials to replace which will require about:

	Pounds.
Acid phosphate	$33\frac{1}{3}$
Muriate of potash	$53\frac{1}{3}$

This will give about four and one-half pounds of available phosphoric acid to an acre, and about twenty-seven pounds of pure potash to an acre. The usual goods on the market guarantee about ten per cent. of available phosphoric acid and about one per cent. of potash. The use of 300 pounds of such goods upon each acre of watermelons, furnishes thirty pounds of available phosphoric acid, or about six and one-half times as much as is needed to replace what is carried off by the watermelons. It also furnishes about three pounds of potash, which is only one-ninth of what is carried off by the crop removed. This being the case it shows with what advantage and economy the watermelon grower can replace a large proportion of his phosphoric acid with potash.

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A MODIFIED FORM OF THE EBULLIOSCOPE.

BY H. W. WILEY.

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THE determination of the alcohol in wines and beers, from the temperature of the vapors given off on boiling at atmospheric pressures, has long been practiced. The instrument by means of which this determination is made is known as the ebullioscope or ebulliometer. The use of this instrument