erative cause in the phenomenon of cloud formation; and he utilizes the greater or less formation of cloud, in a flask like the one described, as a rough scale of measurement for the quantity of dust in the air.

From numerous and repeated experiments he found that the external air is never wholly inoperative. Great differences could be perceived, however, the cloud obtained was more or less stable; it disappeared, in many cases faster than in others. A pretty continuous rain and snow appeared to hinder the cloud formation; so did bad weather with strong winds; a moderate amount of cloud seemed not to increase the activity of the air. In summer of this year, the air was somewhat less operative than in winter, 1874.

M. Muscart, who has repeated these experiments, finds that other liquids besides water, viz.: alcohol, benzine, etc., give similar actions. He finds strongly ozonized air very operative, and in this case the cotton wool filter was not capable of robbing the air of its activity. "This action of ozonized air," he says, "cannot be explained by the experiments adduced; it proves that various circumstances may make the air active, and that this activity, though mostly depending on the mechanical action of particles floating in the air, can also be called forth by other causes."

MEANS OF DISTINGUISHING FERMENTS.

Abstract, by C. B. DUDLEY, Ph. D.

In the July number of *Annales de Chimie et de Physique*, M. A. Müntz, gives some interesting statements in reference to ferments. Assuming that fermentation is caused by two different kinds of ferments, viz.: (1). Minute organisms endowed with life, and (2). Unorganized nitrogenous substances; he gives a means of distinguishing between these. According to his statement, fermentation, which takes place as the result of the presence of minute living organisms, is completely and entirely prevented by the addition of a few drops of chloroform, while the same substance has absolutely no influence upon the action of the unorganized nitrogenous ferments. As a proof of this, ten different experiments are cited, five to establish the first point, and five the second.

(1). Five cubic centimeters of chloroform were added to 200 c. c. of milk. The liquid remained four months without thickening, and no organisms showed themselves.

(2). Two hundred c. c. of fresh urine with 2 c. c. of chloroform, remained two months at a temperature from 25° C. to 30° C., without undergoing ammoniacal fermentation, and as before, no organisms appeared.

(3). Ten grains of cane sugar, dissolved in 200 c. c. of water, in presence of chalk, cheese, and of 3 c. c. of chloroform, did not show lactic fermentation at the end of four months, and again no organisms took birth in the liquid.

(4). Flesh, gelatine, starch and other similar substances, in presence of water and a small quantity of chloroform, remained for three months without change, in spite of a temperature of about 30° C, to which they were submitted. No living being, either animal or vegetable, could be found in the liquid.

(5). The alcoholic fermentation of sugar, in presence of brewer's yeast, is completely arrested from the moment when chloroform is placed in the liquid.

To show that chloroform has no influence whatever upon the nitrogenous ferments, the following experiments are given :

(1). Two grains of dry, sprouted barley, containing originally 50 milligrams of glucose, were put into 40 c. c. of water and 5 c. c. of chloroform. At the end of 50 hours, 520 milligrams of glucose had been formed. In a parallel experiment, without chloroform, 540 milligrams of glucose were developed in the same time.

(2). Ten grains of oil-cake of bitter almonds, containing originally 6 milligrams of Prussic acid, were placed in 300 c. c. of water and 5 c. c. of chloroform. At the end of 70 hours 32 milligrams of Prussic acid had been formed. In a parallel experiment, without chloroform, 32 milligrams of Prussic acid were formed.

(3). A solution of starch, containing originally in 100 c. c. 15 milligrams of glucose, was placed in contact with saliva and chloroform in large quantity. After 15 hours, 100 c. c. of the solution contained 120 milligrams of glucose. One hundred c. c. of the same starch solution, treated with saliva, but without chloroform, yielded in the same time, 110 milligrams of glucose.

(4). Some mustard seed flour, which contained only traces of vola-

tile oil, placed in contact with water and chloroform, developed as strong an odor as that from the flour treated with water alone.

(5). One hundred c. c. of a solution of cane sugar, containing 5 per cent. of sugar, showed in a saccharimeter 33° to the right. Three grains of yeast and five drops of chloroform were added. Not a bubble of carbonic acid was disengaged, and yet, at the end of 48 hours, the liquid showed in the saccharimeter 9.5° to the left. In this experiment the yeast produced its chemical action, viz., inversion; but alcoholic fermentation did not follow.

If these experiments are to be relied on, Pasteur's theory that all fermentation is the result of the action of living organisms, would still seem to need confirmation.

A CURIOUS CASE OF MAGNETIZATION.*

By M. J. JAMIN.

A bar of steel may be magnetized to saturation by a very powerful current, and to one of the halves may be given a southern magnetization, which I shall call *positive*, and which extends to the very centre or heart of the bar. This being done, I submit the bar to a current in the reverse direction, weak at first, but gradually increasing, which produces a northern or *negative* magnetization, limited at first to the surface but penetrating afterwards to an increasing depth, always leaving, however, layers of positive polarity underneath. The effect observed is but the result of the difference of action of the two magnetizations superposed one over the other, as manifested externally. It is first positive, then neutral, and finally negative. I stop directly the change of sign is apparent.

I afterwards dissolve the steel in acid, and it is evident that I thus remove little by little, the exterior northern or negative layers, and expose the underlying southern ones; that the magnetization observed is at first negative, then diminishes, becomes neutral, and then changes the sign.

I have now to add that the southern layers are not laid bare throughout at the same time. They commence to show themselves at the end, and especially at the edges and corners as points, very sharp, and of

* From the *Comptes Rendus* of the Academy of Sciences, Paris.