This is one of the most important questions to be decided and for the present we recommend the use of hydrochloric acid (1:1) as a solvent in the determination of iron and alumina.

In some experiments conducted by Dr. F. B. Carpenter, of the Virginia-Carolina Chemical Company, it was found that the length of time in which the solution is boiled makes a material difference in the results of iron and alumina and for that reason they have adopted a definite amount of acid (1:1) to 2 g. of rock, boiled for one hour on the hot plate.

CONCLUSION.

It should be remembered that our main object is to agree upon uniform methods to be used in settlement analyses. Regarding the reports received as expressions of opinions by the chemists named, it becomes evident in the case of phosphoric acid, which method should be selected. The results of the volumetric and the Gladding methods are excellent, but at this time there are not sufficient reasons for substituting either of these for the present official method.

In the case of the methods for iron and alumina, the results indicate that the methods most generally used are those employing a KOH solution in the separation of the iron from the alumina, *viz.*, the Smith and the Gladding methods. In the other methods, the iron and alumina was determined by weighing the combined phosphates. Of these the acetic and the Glaser methods are the most important, and it is our opinion that some modification of the acetate method could be worked out which would be extremely satisfactory, as it appeals to chemists on account of its simplicity as compared with other methods. The close agreement of the reports on iron and alumina is noticeable, excepting a few results and those in which aqua regia was employed.

We recommend that for referee work the Official Gravimetric Method be used for phosphoric acid, and that in the methods now in use for iron and alumina, the solvent be hydrochloric acid (1:1) until the question of the effect of pyritic iron in acidulating can be definitely solved. The methods for iron and alumina will be investigated further with a view to the adoption of one of the methods as standard for our work.

We believe that a strict adherence to uniform details in these methods will yield very much better results and that it is essential for our fertilizer chemists to agree upon these details. We are, therefore, preparing a set of methods to include moisture, the official gravimetric method for phosphoric acid, and the various methods for iron and alumina, which will give complete details as far as possible. These methods will be submitted to all the chemists who previously worked on the samples, with the request that the work be gone over again, following in detail the instructions given. With these additional results at hand, we shall be able to submit a definite proposal concerning the adoption of Association methods.

In the preparation of these methods we shall welcome the suggestions of those interested in this subject.

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A TEST FOR SKIN PULP IN TOMATO CATSUP.

During an investigation of several different brands of tomato catsup for artificial color, a peculiar result was noticed on the addition of lead subacetate. Some catsups became absolutely solid while others formed only a slight flocculent precipitate. It was thought at first that some adulterant was the cause of the large precipitate, but a thorough investigation failed to detect any. Accordingly, tests were made on tomatoes, both green and ripe, fresh from the garden. It was found that whole tomato pulp, after cooking, normally yields a dense white precipitate with lead subacetate while the skins, carefully freed of pulp and boiled with water, yield no precipitate with the same reagent. Tests were then made on commercial pulps of known composition. In every case, whole pulp yielded a dense precipitate. In some samples, supposed to be skin pulps, a certain amount of precipitate was formed, probably due to careless peeling of the original tomatoes, not enough, however, to convey the impression that whole pulp exclusively had been used. The method adopted was as follows: A small quantity of the sample was diluted with three times its volume of water and filtered. The filtrate was treated with a few drops of lead subacetate solution, sp. gr. 1.25. Whole pulp yielded a dense white precipitate, while skin pulp gave only a slight flocculent precipitate. Knowing well the variations possible in the original tomatoes, it is not claimed that any quantitative estimation of the proportion of whole and skin pulp used can be obtained from the volume of the precipitate. However, it is believed that the test furnishes a reliable guide as to the quality of any catsup. The absence of any precipitate is proof of the use of skin pulp.

H. W. COWLES, JR.

THE COMMITTEE ON ANALYSIS OF FATS, SOAPS AND GLYCERINE.

A few weeks before the New Haven meeting of the American Chemical Society (June 30 to July 2, 1908) a subcommittee was appointed by Dr. W. F. Hillebrand, chairman of the Committee on Uniformity in Technical Analysis, for the purpose of developing standard methods for the analysis of fats, soaps and glycerine. The committee thus appointed consists of: W. D. Richardson, chairman; J. W. Loveland, secretary; R. E. Devine, D. Wesson, A. C. Langmuir, B. T. B. Hyde, W. H. Low, and Ernest Twitchell. The first meeting of the committee was held at the Graduates Club, New Haven, Conn. June 30, 1908. It was decided that the scope of the committee for the present be limited to the consideration of the analysis of such materials as are commonly bought and sold. It was further decided that the immediate attention of the committee should be directed toward the analysis of the following products for the constituents named, definitions to be decided upon when necessary: Fats and oils, moisture and volatile matter, free fatty acids, titer, unsaponifiable matter, metallic soaps, gross impurities; Cotton Seed Fats, total fatty acids and resinous matter, moisture; Cotton Seed Black Grease, free fatty acids, moisture, resinous matter, unsaponifiable matter; Cotton Seed Fats Soap, total fatty acids, moisture, combined alkali, free alkali, matter insoluble in alcohol, sodium chloride, unsaponifiable matter; Crude Glycerine, glycerol, organic impurities; Dynamite Glycerine, specific gravity, organic residue, sodium chloride, ash, fatty acids, silver nitrate test; Chemically Pure Glycerine, con-

sideration of methods postponed for the present. The following special committees were appointed to consider the various subdivisions of the main subject: Fats and Oils, Mr. Loveland, chairman, and Mr. Richardson; Cotton Seed Fats and Cotton Seed Black Grease, Mr. Wesson, chairman, and Mr. Twitchell; Cotton Seed Fats Soap, Mr. Low, chairman, and Mr. Wesson; Crude and Dynamite Glycerine, Mr. Langmuir, chairman, Mr. Devine and Mr. Hyde. The general plan of procedure includes the consideration of the best methods at present in use for the various determinations and co-operative work on standard samples by analysts skilled in the various lines of work using the methods selected; the formulating of definitions of words requiring definition; and the drawing up of standard methods of analysis.

All analysts who are interested in the work or who are willing to co-operate in it are invited to correspond with the chairmen of the special committees, or with the chairman of the subcommittee.

W. D. RICHARDSON.

QUOTATIONS.

CHILEAN NITRATE FIELDS.

(From *Daily Consular and Trade Report*, No. 3327, Nov. 10, 1908.)

The following report concerning the nitrate fields of Chile, and the manner of producing nitrate of soda and iodine, is furnished by Consul Rea Hanna, of Iquique:

The Camarrones Valley, in latitude 19° south, marks the northern limit of any appreciable deposits of nitrate, and Carizal Valley, in latitude 26° south, marks the southern limit. Within this zone, which has a length of some 500 miles, deposits of salitre, or nitrate of soda, have been discovered in five different districts as follows, running from north to south: (1) The pampa of Tarapacá, included between south latitudes $18^{\circ} 30'$ and 21° , with the ports of Iquique, Caleta Buena, Junin, and Pisagua, and a railway running from Iquique, to Pisagua, connecting all the important nitrate plants; (2) the pampa of Toco, on the banks of the small river Loa, which furnishes power for some of the plants, in latitude 22° south, with the port of Tocopilla, and a railway to the principal nitrate works; (3) the pampa of Antofagasta, in latitude 23° south, traversed by the railway from Antofagasta, the port, to Oruro, Bolivia; (4) the pampa of Aguas Blancas, in latitude 24° south, with the port of Caleta Coloso; (5) the Taltal Pampa, between south latitudes 25° and 26° , with the port of Taltal.

Crystallized nitrates appear in very small quantities only, being found in commercially valuable amounts in a mixture of chlorides, sulphates, and other salts, together with earth and rock, commonly called caliche.

In technical works on this subject, the local names of the strata are usually employed. The accompanying sketch gives an idea of the average formation in the Pampa of Tarapacá, which is the most important of the nitrate fields.

STRATA IN WHICH NITRATE IS FORMED.

The "chuca" is a loose layer of from 8 to 16 inches in thickness, and is composed, generally speaking, of decomposed volcanic rock.

The "costra" is a mixture of feldspar and other similar rocks or the clay and sand products of their disintegration, together with sulphates of calcium, sodium, and potassium,

and chloride of sodium, and is from 3 to 10 feet in thickness. It is never less than 1 foot thick and never more than 18 or 20 feet. It is composed of the same materials as the chuca, with the addition of salts which act as cement, making it very hard in places. The composition is principally of clay, salt, nitrate of soda, and sulphates of magnesium, calcium, and sodium.

The caliche, with the exception of very rich layers, is, like the costra, a mixture of detritus united by a cement of salts. The insoluble constituents of caliche are fragments of volcanic rock and quartz gravel, from the size of fine sand to pieces as large as a human head. Caliche is a general term applied to all classes of materials containing nitrate, and varies greatly from a chemical standpoint; it is the customary term for the material taken from the strata rich in nitrate.

GROUPS AND COMPOSITION.

On account of its formation and origin it may be classed under four headings:

(1) In the form of deposits in strata, in veins, and in pockets resting on loose material and quaternary detritus, and covered with a layer of conglomerate salts, gravel, and loose earth, these strata measuring from 8 inches to 26 feet in thickness.

(2) In the form of impregnations which the nitrate and its accompanying salts have left in the decomposed surfaces of volcanic rock.

(3) In the form of fillings in chalky deposits.

(4) In the form of efflorescence on the surface of salt fields.

Of these four groups the first one is the only form having importance in the production of nitrate.

There is a great variation in the composition of caliche as well as in the appearance, and the nitrate of soda contained runs from 15 per cent. to 65 per cent. of the total weight, the average running from 25 per cent. to 35 per cent. Chloride of sodium is always present and at times is found in banks as pure crystalline salt.

IODINE, CONGELO, AND COBA.

Iodine is the important by-product and occurs as iodate of calcium, called "laurita," and a double salt composed of iodate of calcium and chromate of sodium, called "dietzeita." These are the most important forms; the iodides do not appear. The existence of chromic acid gives the caliche an orange color and indicates a high lay of iodine. The proportion of iodine runs from 0.06 per cent. to about 5 per cent., 2 per cent. being considered a favorable amount.

The "congeló" is found in varying quantities in all districts, and consists of a substance containing compact crystalline masses of chloride of sodium, of iodine, or of sulphates.

The "coba" is, as a rule, loose earth slightly moist, mixed with small rocks or pebbles. Salitre and other salts are contained in very small quantities. The coba rests on volcanic rock, and in places has a thickness of 300 feet.

The nitrate district is situated in the rainless belt, and although heavy fogs are often present it seldom rains.

EXTRACTION OF NITRATE OF SODA.

Before beginning actual work in the calicheras, or areas of deposit of the caliche, an exploration is made by means of drilling to find the limits of the area of ground rich in