ABSTRACTS OF PAPERS PUBLISHED IN OTHER JOURNALS.

FOOD ANALYSIS.

The Detection of Ergot in Meal and Bread. M. Gruber. (*Arch. Hyg.*, 1895, xxiv., 228; through *Chem. Zeit. Rep.*, 1895, 329.)—Contrary to the experience of most observers, the present author finds microscopic examination of bread, etc., better adapted for the detection of ergot than the chemical methods. In the case of meal, Vogel's and Hoffmann's colour reactions, nevertheless, succeed perfectly, and they are also available for bread, provided the ergot is present in considerable quantity. For detection by means of the microscope, a little of the flour, or a few crumbs of the bread, are moistened with water, placed on a slide, the cover applied, and the mass heated to the boiling-point. In this manner the starch granules are sufficiently swollen to permit the broken-down portions of the ergot to be infallibly recognised. The slide is first examined under a power of 100 to 120, when the powerful refracting power, the colour—deep violet on the edge, and greenish-yellow within—and the furrowed outlines of the ergot are all characteristic. A second examination with a power of 300 to 400 enables any doubtful particles to be identified. F. H. L.

The Iodine Number of Lard at Different Times of the Year. L. van Itallie. (*Apoth. Zeit.*, 1895, x., 694; through *Chem. Zeit. Rep.*, 1895, 329.)—After experiments lasting a twelvemonth, the author is unable to trace any variation in the iodine number of lard dependent on the different seasons of the year. F. H. L.

Detection of Fluorine in Beer. J. Brand. (*Ztschr. ges. Brauw.*, 1895, xviii., 317; through *Chem. Zeit. Rep.*, 1895, 327.)—One hundred c.c. of the beer are made slightly alkaline with ammonium carbonate, then heated, and 2 or 3 c.c. of a 10 per cent. solution of calcium chloride added. After boiling for a few minutes, the liquid is filtered through a plain (not folded) filter, and the precipitate washed slightly and dried. It is introduced into a 25 c.c. platinum crucible, moistened with 1 c.c. of strong sulphuric acid, and kept for an hour at the boiling-point. The crucible is covered with a watch-glass, the convex side of which is protected from the hydrofluoric acid by a coating of wax, in which a pattern is scratched, while the concavity contains a lump of ice to keep the cover cool, with a wick syphon to remove the melting water. In this manner 1 milligramme of ammonium fluoride may be detected in 100 c.c. of beer; and by preparing a number of watch-glasses etched by

the action of increasing amounts of the fluoride (0·5 to 5 milligrammes per 100 c.c.), the process may be rendered approximately quantitative. F. H. L.

Zinc Sulphate as a Precipitant for Albumoses. A. Bömer. (*Zeit. anal. Chem.*, 1895; *Fünftes Heft.*, pp. 562-567.)—The precipitation of albumoses by saturated salt solutions and by alcohol depends on the attraction of these reagents for water. Hence, ammonium sulphate, which is soluble in cold water in the proportion of 76·8 parts per cent., is especially suitable for this purpose. The great disadvantage attending its use is the introduction of ammonia, which must be removed before the nitrogen in the precipitate can be determined. Of other readily soluble salts, zinc sulphate appeared most promising to the author, its solubility being 135 parts in 100 of cold water, and experiments were accordingly made to determine whether it could take the place of ammonium sulphate.

The precipitations were carried out in exactly the same way as in the case of the ammonium sulphate method, the precipitate being washed with a cold saturated solution of zinc sulphate. The filter and its contents were then placed in a Kjeldahl flask, and the nitrogen determined in the usual way. In each case, before adding the zinc sulphate, 1 c.c. of dilute sulphuric acid (1·4) was added to prevent the precipitation of zinc phosphate.

The results obtained with different meat extracts were as follows:

	Albumose Nitrogen determined by precipitation with	
	Ammonium sulphate.	Zinc sulphate.
Liebig's meat extract	1·17 per cent.	1·19 per cent.
Kemmerich's meat extract	1·55 ,,	1·52 ,,
,, meat peptone	5·51 ,,	5·44 ,,
Cibil's meat extract	0·96 ,,	0·92 ,,

In no case could the biuret reaction be obtained in the filtrates. In the case of the zinc sulphate filtrate the test was made in two ways:

1. The saturated zinc sulphate solution was freed from zinc by adding saturated sodium carbonate solution. The filtrate was concentrated on the water-bath, made strongly alkaline with sodium hydrate, after which several drops of a 2 per cent. solution of copper sulphate were gradually added.

2. Since zinc hydrate is soluble in excess of sodium hydrate, the test was also made directly with the somewhat diluted zinc sulphate solution.

A further advantage in the use of zinc sulphate is that the peptones, flesh bases, etc., in the filtrate may be at once precipitated with phospho-tungstic acid, which is not possible in the ammonium sulphate method, since ammonia itself is precipitated by the reagent. An equal volume of dilute sulphuric acid (1·4) should be added, and then the phospho-tungstic acid.

In the four meat preparations examined the amount of nitrogen found in phospho-tungstic precipitate was:

	Nitrogen.
Liebig's meat extract	5·31 per cent.
Kemmerich's meat extract	4·05 ,,
,, meat peptone	3·16 ,,
Cibil's meat extract	1·11 ,,

The author concludes, from these experiments, that the albumoses are completely precipitated by zinc sulphate in the case of Cibil's extract and Kemmerich's peptone. In the case of the other two, the negative results of the biuret reaction cannot be accepted as complete proof, on account of the dark colour of the solution. With regard to the behaviour of the zinc sulphate towards the ammonium salts, it would be reasonable to expect the difficultly soluble double salt—$(NH_4)_2SO_4.ZnSO_4$, $6H_2O$—to be formed; but the author found that the nitrogen usually assigned to the ammonium salts was invariably contained in the filtrate from the zinc sulphate precipitate. In the case of Kemmerich's meat extract the ammoniacal nitrogen determined directly in the original extract by distillation with an excess of magnesium oxide was 0·413 per cent., while in the filtrate from the zinc sulphate precipitate the amount found was 0·415 per cent. Hence, it is possible that the ammonia obtained by distillation with magnesia is not derived from ammonium salts, but from some other nitrogenous compounds. C. A. M.

On the Composition of Meat Extract. J. König and A. Bomer. (*Zeit. anal. Chem.*, 1895; 5th Heft, pp. 548-562.)—While there can be no doubt that nearly all the constituents of the muscular fibre which are soluble in cold water will be found in the meat extract, the presence of gelatin or other decomposition products of the nitrogenous matter is by no means a certainty. Since the extract is prepared at low temperatures, and is only at the end concentrated to the required consistency after filtration, the amount of gelatin can only be excessively small. This view receives confirmation from the experiments of E. Beckmann (Hilger's *Forsch üb. Lebensmittel*, 1894, p. 423), who could only find 0·5 per cent. of albumin and gelatin in Liebig's extract by precipitation with formalin. On the other hand, Kemmerich (*Zeit. f. Physiol. Chem.*, 1894, xviii., p. 409) endeavoured to prove that in South American meat extract there was about 6 per cent. of gelatin, and about 30 per cent. of albuminoids, in the form of albumoses, peptones, and other soluble compounds. In his analyses he employed fractional precipitation with alcohol of different strengths, as well as precipitation with ammonium sulphate and sodium phosphotungstate. By these means he found, in addition to flesh bases, the following amounts of albuminoids in this meat extract:

	Per cent.
1. Gelatin precipitated by 50 to 60 % alcohol	6·19
2. Albumoses precipitated by 80 % alcohol	14·76
Of these there were precpitated by $(NH_4)_2SO_4$	9·89
Other albuminoids soluble in $(NH_4)_2SO_4$	4·87
3. Peptones soluble in 80 % alcohol, precipitated by sodium phosphotungstate	12·31
	33·26

Since the meat extract contained 8·13 per cent. of total nitrogen, these figures gave 6·5 per cent. of this to the albuminoids, which, in the authors' opinion, was extremely improbable. They therefore critically examined the work of Kemmerich and of Stutzer (ANALYST, xx., 246), and by precipitation of the meat extracts with alcohol

of different strengths and determination of the nitrogen in the precipitates they btained results considerably lower than those of Kemmerich.

For South American meat extract

	Gelatin (?) precipitated by 50 to 60 per cent. alcohol.	Albumoses precipitated by 80 per cent. alcohol.
Kemmerich found	6·19 %	14·16 %
König and Bömer	1·83	4·50

These differences were too great to be accounted for by variation in the meat extracts, and must have been due to difference in method, Kemmerich having determined the amount of his precipitates gravimetrically, and not by direct estimation of the nitrogen.

The authors then made comparative determinations by precipitation with 80 per cent. alcohol and precipitation with ammonium sulphate, with the following results:

	Liebig's extract. Per cent.	Kemmerich's extract. Per cent.	Kemmerich's peptone. Per cent.	Cibil's extract. Per cent.
Total nitrogen	9·32	8·94	9·88	2·77
Precipitated by 80 per cent. alcohol	0·69	1·05	4·05	0·61
Corresponding to albumoses	4·31	6·56	25·31	3·81
Albumoses obtained by saturation with ammonium sulphate	7·32	9·71	34·44	5·97

These results, and the fact that in the filtrate from the 80 per cent. alcohol precipitation the biuret reaction was always obtained, showed that albuminoids were still present, and it was extremely doubtful whether these were to any extent peptones.

The usual method of determining the peptones is to precipitate with sodium phosphotungstate, determine the nitrogen in the precipitate, and deduct from this the albumose nitrogen previously determined.

In this determination the figures obtained were:

	Liebig's extract. Per cent.	Kemmerich's extract. Per cent.	Kemmerich's peptone. Per cent.	Cibil's extract. Per cent.
Nitrogen in phosphotungstate precipitate	6·27	5·59	8·29	2·00
Albumose nitrogen	1·17	1·55	5·51	0·96
Peptone (?) nitrogen... ...	5·10	4·04	2·78	1·04

It is obvious that so large a quantity of peptone nitrogen cannot be present—at any rate in the meat extracts, and that the flesh bases must claim a considerable amount of it. All flesh bases, together with the rest of the nitrogenous constituents, are precipitated by sodium phosphotungstate if they are allowed to stand for sufficient time, and therefore this reagent cannot give any idea of the amount of peptone present. Basing their conclusions largely on the absence of the biuret reaction in the filtrate of a meat extract, the authors believe that the extracts

examined contained either no peptone at all, or, at most. very slight quantities (2 to 3 per cent.).

They assigned the nitrogen found as follows:

	Liebig's extract. Per cent.		Kemmerich's extract. Per cent.		Ken	s peptone. nt.	Cibil's meat extract. Per cent.	
	Substance.	Nitrogen.	Substance.	Nitrogen.	Substance.	Nitrogen.	Substance.	Nitrogen.
Total nitrogen ...	9·28	100	9·14	100	10·08	100	2·77	100
1. Soluble albumin ...	trace	trace	0·08	0·87	0·06	0·59	trace	trace
2. Nitrogenous compounds insoluble in 60-64 per cent. alcohol	0·21	2·26	6·33	3·61	1·36	13·49	0·25	9·02
3. Albumoses ...	0·96	10·34	1·21	13·24	4·15	41·17	0·70	25·27
4. Peptones	0 to trace	0 to trace	0	0	0	0	0	0
5. Flesh bases ...	6·81	73·38	5·97	65·32	3·97	39·38	1·56	56·31
6. Ammonia ...	0·47	5·06	0·41	4·49	0·29	2·88	0·09	3·25
7. Other Nitrogenous compounds ...	0·83	8·96	1·14	12·47	0·25	2·49	0·17	6·15

As regards the chemical examination of meat extracts, the authors remark:

1. Precipitation with 80 per cent. alcohol is of no value in determining the kind of nitrogen.

2. Albumoses should be determined by salting out with ammonium sulphate or zinc sulphate.

3. The filtrate from the ammonium or zinc sulphate precipitates should be decolorized with animal charcoal, and tested for peptones by the biuret reaction.

4. A determination of the ammonia by distilling an aqueous solution of the extract with ignited magnesia is valuable.

5. When peptone has been proved to be absent, the nitrogen in the phosphotungstate precipitate, after deducting the nitrogen derived from gelatin, albumoses, and ammonia may be ascribed to the flesh bases. The precipitate should stand at least one day.

6. The difference between the total nitrogen and the nitrogen in the form of gelatin + albumoses + flesh bases + ammonia gives the amount of nitrogen present in compounds not precipitated by phosphotungstic acid. C. A. M.

The Estimation of Gelatin in Meat Extracts and Commercial Peptones. A. Stutzer. (*Zeit. anal. Chem.*, 1895; 5th Heft., pp. 568-570).—The chief difficulty in the examination of these articles is the determination of the nitrogen present in the form of gelatin. Since his last communication (see ANALYST, xx. 248), the author has found that the best process for estimating this constituent is as follows: From 5 to 7 grammes of dry, and from 20 to 25 grammes of fluid preparations are weighed into a tinfoil basin, and sufficient hot water added to dissolve the extract. Ignited sand, which has been freed from fine dust by a sieve, is then added in sufficient quantity to absorb the whole of the fluid, and the basin is placed in the water-oven until the weight becomes constant. The sand and extract are then ground in a mortar, the tinfoil cut into small strips, and the whole placed in a beaker, where it is extracted four times with 100 c.c. of absolute alcohol, the supernatant fluid being each time removed by filtration through an asbestos filter.

The residue is now treated with a mixture of alcohol and ice-water, prepared by mixing in a large flask 100 grammes of alcohol with about 300 grammes of ice, and adding sufficient distilled water to bring the total weight up to one kilogramme. This flask and four beakers (*b*, *c*, *d*, and *e*) are placed in a bath filled with broken ice. Into the beaker *a*, containing the sand, peptone, etc. (which is also placed in the ice bath), about 100 c.c. of the alcoholic ice-water are poured, care being taken that the temperature of the mixture does not exceed + 5° C. After stirring with a glass rod for about two minutes, the supernatant liquid is poured into beaker *b*, a piece of ice being added at the same time. The extraction in beaker *a* is then repeated with a fresh portion of alcoholic ice-water, the liquid being decanted into beaker *c*; and this process is continued until the liquid above the sand is completely colourless. Upon each repetition the fluid is poured into a fresh beaker, and the extraction is generally complete after this has been done four times.

In order to filter the extracts, three asbestos filters are used. These consist of a funnel about 7 centimetres in diameter at the top, in which a perforated porcelain disc about 4 centimetres in diameter is placed, this being covered with long-fibred asbestos. The first filter receives the liquid in beaker *a* and the insoluble residue, with the exception of the sand. The contents of beaker *b* are poured upon the second filter, while the third filter is used for *c*, *d*, and *e*. After being well washed with the alcoholic ice-water, the whole of the asbestos filters (including the one used in the treatment with absolute alcohol) and the sand in beaker *a* are repeatedly boiled with water in a porcelain dish, the filtrate concentrated by evaporation, and the residue used for the determination of the gelatin nitrogen.

When carried out in exact accordance with these details the estimation presents no difficulties. A Bunsen's water-pump may be used to accelerate the filtration through the asbestos, but should be very gradually applied. C. A. M.