Table V. contains the results of such a test for air as the source of ions in a brass tube of 2.95 cm. diameter and .300 mg. of radium salt as the ionizing agent placed at a distance 27.7 cm. from the electroscope and approximately 1 cm. above the slit.

TABLE VI

Thickness of Lead Over Slit	Vel. in Tube in Cm. per Sec.	Exp. Ionization in Divs. per Min.	Calc. Ionization in Divs. per Min.	Recombination Constant: α
Slit bare.....	24.8	*210	210	.0086
	19.4	150	156	
	16.6	*121	121	
	15.2	105	108	
	13.8	90	102	
.05 mm......	24.8	*98.2	98.2	.015
	19.4	68.0	68.0	
	15.2	*46.2	46.2	
	13.8	40.1	42.6	

Table VI. gives results obtained for X-rays as ionizing agent, the slit being placed 27.7 cm. from the electroscope, with an air velocity in the brass tube of 2.95 cm. diameter. Table VII. records values for an X-ray ionizing source at 125.3 cm. from the electroscope, other experimental conditions remaining the same.

TABLE VII

Thickness of Lead over Slit	Vel. in Tube in Cm. per Sec.	Exp. Ionization in Divs. per Min.	Calc. Ionization in Divs. per Min.	Recombination Constant: α
Slit bare.....	30.4	*105.5	105.5	.0088
	24.8	69.0	65.5	
	19.4	44.5	43.0	
	16.6	*32.4	32.4	
.05 mm......	31.8	*68.2	68.2	.00923
	26.3	52.4	48.0	
	19.4	*33.2	33.2	
	18.0	28.5	29.4	
	15.2	21.8	23.7	
.1 mm	21.8	*31.7	31.7	.020
	26.3	24.7	26.7	
	23.5	20.3	20.2	
	18.0	*14.9	14.9	
	16.6	13.8	13.5	
Slit bare.....	30.4	*102.5	102.5	.0080
	23.5	63.2	59.5	
	18.0	*38.8	38.8	
	15.2	27.2	30.8	

The lack of saturation in the electroscope for large ionization currents would tend to give too small a value for the recombination constant, while diffusion effects at the smaller velocities through the tube would increase it. Neither of these causes, under the experimental conditions, would appear to be sufficient to explain the larger values obtained for the recombination constant for the more penetrating radiations.

I am indebted to the Providence Gas Co. for the gas meter which was used, also for its careful calibration before and after the experiments.

P. B. Perkins

Brown University,
June 28, 1917

BOSTON MEETING OF THE AMERICAN CHEMICAL SOCIETY. III

DIVISION OF BIOLOGICAL CHEMISTRY

C. L. Alsberg, *Chairman*

I. K. Phelps, *Vice-chairman and Secretary*

The relation of the dissociation of hydrogen to enzymatic activity: Howard T. Gräber and J. W. M. Bunker. It was demonstrated that the enzyme "pepsin," in agreement with the other enzymes, invertin and catalase, has an optimum at a definite H. ion concentration and that the presence of other ions exerts an influence which is not measurable, yet not negligible. It was shown that in the case of the weakly dissociated organic acids the buffer effect of the protein added has a marked effect upon the dissociation of the acids, but that when the concentration of the H ions was made equal to that of 3 per cent. HCl by considering temperature and protein the organic acids are equal to 3 per cent. HCl as activators for peptic digestion.

On the origin of the humin formed by the acid hydrolysis of proteins III. Hydrolysis in the presence of aldehydes II. Hydrolyis in the presence of formaldehyde: Ross Aiken Gortner and George E. Holm. Hydrolysis in the presence of formaldehyde completely alters the nitrogen distribution obtained by Van Slyke's method. Black insoluble humin is formed from tryptophane and no other known amino acid is concerned in the reaction. The primary reaction of black humin formation involves only the indole nucleus and not the *a* amino group of the aliphatic side chain of tryptophane. Formaldehyde forms a soluble humin with tyrosine which is precipitated by $Ca(OH)_2$. Hydrolysis in the presence of formaldehyde causes enormous increases in the ammonia fraction, but the increase is not due to ammonia, but to volatile alkaline compounds. The detailed paper will appear in the *Jour. Amer. Chem. Soc.*

The effect of prolonged acid hydrolysis on the nitrogen distribution of fibrin, with especial refererence to the ammonia fraction: ROSS AIKEN GORTNER and GEORGE E. HOLM. Fibrin was boiled with 20 per cent. HCl for varying periods of time ranging from 1 hour to 6 weeks, the ammonia fraction increases continuously, showing a 150 per cent. increase at the end of six weeks over that obtained at the end of twelve hours. This increase in ammonia comes almost entirely from the deamination of mono amino acids. The ammonia fraction of a twenty-four- or forty-eight-hour hydrolysate can not be taken as an absolute measure of amide nitrogen, for some ''deamination'' nitrogen is undoubtedly present, the amount depending both upon the particular protein and the length of hydrolysis. The paper will appear in the *Jour. Amer. Chem. Soc.*

Comparative analyses of fibrin from different animals: ROSS AIKEN GORTNER and ALEXANDER J. WUERTZ. Fibrin has been prepared from the blood of cattle, sheep and swine and the nitrogen distribution determined by Van Slyke's method. No differences significantly greater than the expected experimental errors were found. It would thus appear that fibrin from any of these three sources can be used interchangeably in experimental work without invalidating the results. Whether or not this is true for fibrins from other sources remains still an open question.

The nitrogen distribution in protalbinic and lysalbinic acids: ROSS AIKEN GORTNER and CORNELIA KENNEDY. Lysalbinic and protalbinic acids were prepared from egg albumen by Paal's method and their nitrogen distribution, together with that of the original egg albumen, determined by Van Slyke's method. No marked difference was observed in any of the fractions, although both of the derived products show a somewhat greater apparent lysine content. This is probably due to ornithine derived from arginine. The analyses furnish no evidence as to whether or not these ''acids'' are true chemical compounds or as to whether or not their structure is more simple than is that of egg albumen. The paper will appear in the *Jour. Amer. Chem. Soc.*

On the relative imbibition of glutens from strong and weak flours: ROSS AIKEN GORTNER and EVERETT H. DOHERTY. The gluten was washed from both ''strong'' and ''weak'' flours and the hydration capacity of the colloids measured by immersing weighed disks in different concentrations of certain acids, allowing them to remain a definite length of time and again weighing. Lactic and acetic acids produced greatest imbibition, the form of these hydration curves being very different from those of hydrochloric and oxalic acids which produced much less hydration. The gluten from a ''weak'' flour has a much lower *rate of hydration* and a much lower *maximum hydration capacity* than has the gluten from a ''strong'' flour. Gluten from a ''weak'' flour changes from a gel to a sol at a much lower degree of hydration than does that from a ''strong'' flour. There is an inherent difference in the colloidal properties of the glutens from ''strong'' and ''weak'' flours and these glutens would not be identical even if the flours had originally had the same salt and acid content. The paper will be published in *Jour. Agr. Res.*

ORGANIC DIVISION

J. R. Bailey, *Chairman*
H. L. Fisher, *Secretary*

Joint Session with Physical and Inorganic Division

The composition of oil of cassia. II: FRANCIS D. DODGE. In a previous paper, the writer and A. E. Sherndal have reported the examination of the alkali-soluble portion of the oil of cassia, binding, as new constituents, *coumarin, salicylic aldehyde, salicylic* and *benzoic* acids, and a liquid acid, not identified. The writer has recently examined the aldehydes present in the oil, and has identified, as minor constituents, *benzaldehyde* and *methyl-salicylaldehyde.* The latter was isolated as the oxime, melting at 90°, and identified by conversion into methyl salicylic acid. No positive indication of the presence of *hydrocinnamic* aldehyde was found.

Molecular rearrangements in the camphor series. The decomposition products of the methyl ester of the isoaminocamphonanic acid. A new reaction involving the formation of the methyl ether of a hydroxy acid: WILLIAM A. NOYES and GLENN S. SKINNER. Several years ago L. R. Littleton and one of us were engaged upon the study of the decomposition of isoaminocamphonanic acid with nitrous acid. Cis-camphonololactone was the only product identified. We have undertaken the study of the decomposition of the methyl ester with the intention of separating the products by fractional distillation under diminished pressure. The products that would be normally expected are a methyl ester of a hydroxy (trans-camphonolic) acid with hydroxyl in place of the amino group and a methyl ester of a Δ_3 unsaturated acid containing a gem methyl. Neither of these compounds has been found, but, instead, at least six compounds involving rearrangements. Our results show that the methyl ether and methyl ester of cis-camphonolic acid and the methyl esters of lauronolic acid, 1, 2, 2, trimethyl 1-carboxy cyclopentene-4, cis 1, 2, 3 trimethyl 2-hydroxy 1-cyclopentanoic acid, and a secondary β-hydroxy acid are formed. The method of preparing the materials and a more detailed discussion of the work are reserved for publication in the *Jour. Amer. Chem. Soc.*

The synthesis of certain terpene homologs from 1, 4-diisopropyl cyclohexane: M. T. Bogert and C. P. Harris. Three new homologs of the terpenes have been prepared from 1, 4-diisopropyl cyclohexane. These new terpene bodies contain two olefin side chains in para position and represent hydrocarbons of a somewhat different type from any hitherto described. One is a derivative of an ordinary benzene nucleus, one of a dihydro- and the other of a tetrahydro benzene nucleus. Various properties of these substances are described.

Further studies of o-uraminobenzoic acid, benzoylene urea and related compounds: M. T. Bogert and G. Scatchard. Experiments are recorded with 5-nitro anthranilic acid, o-uranimobenzoic acid, dinitro uranimobenzoic acid, benzoylene urea and various derivatives of the above.

The synthesis of certain substituted pyrogallol ethers derived from syringic acid: M. T. Bogert and J. Ehrlich. These new compounds include a dimethoxy phenacetine whose physiological properties are now being studied at the College of Physicians and Surgeons, and which is at least no more toxic than ordinary phenacetine, and possibly less so; and also a homoantiarol, which is of interest from the fact that it is a homolog of the so-called antiarol isolated from antiaris toxicaria.

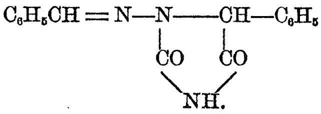
A substance which in the liquid phase exhibits a minimum of solubility in an unstable region: M. T. Bogert and J. Ehrlich. A study of the solubilities in water of monohydrate of 2.6-dimethoxyacetphenetidide discloses the interesting fact that the liquid hydrate is unique in that it exhibits a minimum of solubility in an unstable region.

The identity of cyanuric acid with the so-called "tetracarbonimide": E. H. Walters and Louis E. Wise. The so-called "tetracarbonimide" prepared by Scholtz by the oxidation of uric acid in alkaline solution with hydrogen peroxide is in fact cyanuric acid. A nitrogenous compound isolated from a number of soils and believed at first to be tetracarbonimide has been shown to be cyanuric acid. Cyanuric acid has been isolated from the following soils: (1) 12 samples of sandy soils taken from different locations in Florida; (2) Norfolk sandy loam from Virginia; (3) lawn soil from the grounds of the U. S. Department of Agriculture, Washington, D. C.; (4) Elkton silt loam from Maryland; (5) Scottsburg silt loam from Indiana; (6) Caribou loam from Maine, and (7) a Susquehanna fine sandy loam from Texas. It is apparent that cyanuric acid or its precursor is widely distributed in soil.

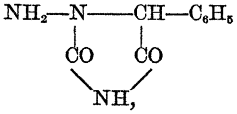
Use of prussic acid in glacial acetic acid: J. R. Bailey and R. H. Pritchett. Preparation of benzalhydrazinophenylacetonitrile, $C_6H_5CH = N—NHCH(C_6H_5)CN$, by treatment of benzalazine, $C_6H_5CH = N—N = CHC_6H_5$, in glacial acetic acid with solid KCN. Benzalhydrazinophenylacetamide, made from the nitrile, adds on HCNO, giving benzalcarbamylhydrazinophenylacetamide,

$$C_6H_5CH = N—N(CONH_2)CH(C_6H_5)CONH_2,$$

which can be converted to 1-benzalamino-5-phenylhydantoin,



By eliminating benzaldehyde from the latter substance 1-amino-5-phenylhydantoin,



is obtained.

Testing of nitrocellulose materials: H. C. P. Weber. A report of work done at the Bureau of Standards in connection with the stability, particularly on cellulose plastics (such as celluloid, pyrolin) although reference is made to explosives. The limits of decomposition, its rate and character, the products resulting, inflammability, explosiveness are taken up with a view to defining the conditions under which such materials become a source of danger. Charts showing the results graphically are given. With the exception of a report published some time ago in a foreign country, very little comprehensive work on this particular phase is available. A government bulletin covering this matter is in preparation.

(*To be continued*)