American Journal of Science and Arts, Vol. XVII.

Abstractor, J. P. BATTERSHALL, PH. D.

No. 97.

On the Electrolytic Estimation of Cadmium, EDGAR F. SMITH.—Noticed elsewhere.

No. 99.

On the Chemical Composition of Triphylite, SAMUEL L. PENFIELD.—In this paper, analyses of triphylite from Norwich, Mass., and from Bodenmais, Bavaria, as well as of the allied lithophilite, from Branchville, Conn., are given.

Triphylite:

I. Bodenmais—color, light blue ; sp. gr., 3.549.
II. Norwich—color, greyish-green ; sp. gr., 3.534.
III. Grafton.*

Lithophilite:

IV. Branchville—color, light brown ; sp. gr., 3.482.

	I.	II.	III.	IV.
P_2O_4	43.18	44.76	44.03	45.22
FeO	36.21	26.40	26.23	13.01
MnO	8.96	17.84	18.21	32.02
CaO	.10	.24	.94	——
MgO	.83	.47	.59	——
Li_2O	8.15	9.36	8.79	9.26
K_2O	——	——	.32	——
Na_2O	.26	.35.	.12	.29
H_2O	.87	.42	1.47	.17
Gangue	.83	——	——	.29
	99.39	99.84	100.70	100.20

These analyses give for triphylite the formula $LiFePO_4$, and for lithiophilite the formula $LiMnPO_4$.

No. 100.

On the Presence of Chlorine in Scapolites, FRANK D. ADAMS.—The author has examined a large number of scapolites from various localities, and finds the same to contain chlorine, a fact which seems to have been hitherto overlooked by mineralogists. The amount

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* See Am. Journ. Sc., **3**, 13. 426.

ranged from 0.2026 to 2.411 per cent. The chlorine was determined by fusion with sodic carbonate, and also by Rose's method, which consists in decomposing the mineral in the cold, by hydrofluoric acid in the presence of weak nitric acid, filtering off the calcium fluoride, and precipitating with silver nitrate.

No. 101.

On the Mineral Locality in Fairfield County, Connecticut, with the Description of Two Additional New Species, GEORGE S. BRUSH and EDWARD S. DANA.

Fairfieldite usually occurs in massive crystalline aggregates. Hardness, 3.5 ; sp. gr., 3.15 ; color, white to straw-yellow. The crystals belong to the triclinic system. It is soluble in nitric and hydrochloric acids.

Fillamite occurs in granular crystalline masses. Hardness, 4.5 ; sp. gr., 3.41 ; color, wax-yellow ; crystalline form, monoclinic ; soluble in nitric and hydrochloric acids.

The authors refer to several new species previously described,* and assign to them and those mentioned in this paper the following formulæ :

Easphorite. $AlP_2O_8 + H_2Mn(Fe)O_2 + 2\ Aq$; orthorhombic.
Triploidite, $Mn_3(Fe_3)P_2O_8 + Mn(Fe)(OH)_2$; monoclinic.
Dickinsonite, $4(MnFeCaNa_2)_3P_2O_8 + 3\ Aq$; monoclinic.
Lithiophilite, $Le_3PO_4 + Mn_3P_2O_8$; orthorhombic.
Reddingite, $Mn_3(Fe_3)P_2O_8 + 3\ Aq$; orthorhombic.
Fairfieldite, $Ca_3(Mn_3Fe_3)P_2O_8 + 2\ Aq$; triclinic.
Fillamite, $3(MnFeCaNa_2)_3PrO_8 + Aq$; monoclinic.

The Relations of the Volumes of Solutions of Hydrated Salts to their Water of Composition, RICHMOND I. SOUTHWORTH.—The object of the author's experiments was to test the theorem : *If a hydrated salt be dissolved in a given volume of water, the volume of the solution will exceed the original volume of water by a bulk equal to the bulk of saline water contained in the salt dissolved.* The weight in grams of the salt used, that contained one cubic centimeter of water in its composition, was first determined by dividing the atomic weight of the salt by the atomic weight of its saline water—the term *saline water* being used to signify all the molecules of water contained in the salt, whether combined as bases or as water of crystallization. The quantity of salt thus determined to contain 1 cc of water, was then dissolved in 90 cc of water in a

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* Am. Journ. Sc., July and August, 1878.

graduated 100-cc tube, and notice taken of the increase of volume produced. The author's experiments, which embraced a large number of salts, agree well with the above theorem.

Analysis of the Tetrahedrite from Huallanca, Peru, W. J. COMSTOCK.

S = 26.74
Sb = 9.06
As = 13.49
Ag = 3.86
Cu = 39.09
Fe = 5.46
Zn = 2.14

99.84

Berichte der deutschen chemischen Gesellschaft.

Abstractor. Prof. P. TOWNSEND AUSTEN, Ph. D., F. C. S.

On the Formation of Sulphonic Acids from Sulphones, R. OTTO (**12**, 214).—Equal molecules of sulphobenzid and monochlorsulphuryl, heated at 120°, give a *sulphobenzid-monosulphonic acid:*

$$C_6H_5SO_2C_6H_5 + SO_2OHCl = HCl + C_6H_5SO_2C_6H_4SO_2OH.$$

In the same manner, 1 mol of sulphobenzid and 2 mols of monochlorsulphuryl give *sulphobenzid-disulphonic acid:*

$$C_6H_5SO_2C_6H_5 + ClSO_2OH = C_6H_5SO_2C_6H_3(SO_2OH)_2 + HCl.$$

With three molecules no *trisulphonic* acid was formed.

On the Production of Hydrogen Sulphide in Chemico-Legal Examinations, ROBERT OTTO (**12**, 215).—If either the acid or the iron sulphide contains the slightest trace of arsenic, hydrogen arsenide will be formed, which can be detected by the Marsh test. The use of calcium sulphide or barium sulphide (Mohr) is recommended. Several other interesting points are mentioned.

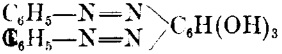
On the Action of Iodine on Aromatic Compounds with long Side-chains, R. PREIS and B. RAYMANN (**12**, 219).—Various kinds of turpentine oil have been observed to yield cymole with iodine. Authors acted on an oil, which had not been examined in this direction, with iodine in a closed tube, at a high temperature. The results were, a combustible gas probably of the methan series, hydrocarbons, distilling at 155–165° and 180–220°, a small amount of toluole (?), xylole, mesitylene, pseudocumole, and small amounts of two unknown substances. The 155–167° distillate yielded no benzoic acid on oxidation, proving the absence of propyl benzoles.

Contributions to our Knowledge of Cholesterine, R. PREIS and B. RAYMANN (**12**, 224).—Cholesterine, on careful nitrition, yielded *dinitro-cholesterine.* Fine, colorless needles, fusing at 120–121°.

Cholesteryl chloride gave colorless needles of *mononitro-cholesteryl chloride*, fusing at 148–149°.

On Some Azo Compounds, P. WEZELSKY and R. BENEDEKT (**12**, 226).

Azobenzole-phloroglucine.—Prepared by mixing very dilute solutions of 1 mol phloroglucine, 2 mols aniline nitrate and 2 mols potassium nitrite; crystallizes from alcohol in microscopic leaflets of a golden brown color. Soluble in conc. H_2SO_4 to a ruby-red. Formula is:



$$\left.\begin{matrix}C_6H_5-N=N\\C_6H_5-N=N\end{matrix}\right\rangle C_6H(OH)_3$$

Para-azotoluole-phloroglucine.—Prepared in an analogous manner. Long, fine needles, soluble in conc. H_2SO_4 to a carmine-red. It possesses a strong coloring power for wool and silk, imparting pure shades from yellow to cinnabar.

Para-azophenole-phloroglucine. — Para-diazophenole and phloroglucine yield two compounds of the above type; one being soluble, the other insoluble, in alcohol. (1.) Red crystalline powder, soluble in conc. H_2SO_4 and alkalies, to a dark orange-red. (2.) Green metallic amorphous mass. Formula:

$$HO-C_6H_4-N=N-C_6H_2(OH)_3.$$

By mixing dilute alcohol solutions of the diazo sulphates and naphthylamine, the following bodies were obtained:

Azobenzole-naphthylamine sulphate, $2(C_6H_5-N=N-C_{10}H_6NH_2)H_2SO_4+4H_2O$. Microscopic, satiny black needles, giving a carmine-red alcoholic solution. Alkalies precipitate the base.

Para-azotoluole-naphthylamine. — Ruby-red crystals, fusing at 145°. The *sulphate* forms steel-blue needles, turning green on drying.

Para-azophenole-naphthylamine.—$HOC_6H_4-N=N-C_{10}H_6NH_2+3H_2O$. Bunched needles of an orange color, fusing at 170°. The *sulphate* forms green needles, giving a blue alcoholic solution.

Oxidation-Products of Quinine, Zd. H. Skrauss (**12**, 230).—Author finds that the formula of cinchonic acid is $C_{10}H_7NO_2$, and not $C_{12}O_{14}N_2O_4$, as given by Weidel. It fuses at 256°, and gives an HCl salt, which decomposes on drying in a vacuum. Caventon and Willm's carboxycinchonic acid he finds to be cinchonic acid. By oxidation with a chromic mixture, cinchonic, cinchonidine, cinchotenine and cinchotenidine, yielded cinchonic acid.

(Continued.)

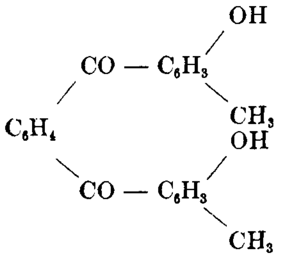
Abstractor, James H. Stebbins, Jr., S. B.

Contributions to History of Ultramarine, E. W. Buechner (**12**, 234).

On the Constitution of Phenanthrene, G. Schultz (**12**, 235).

On the Phthaleine of Orthokresole, George Fraude (**12**, 237).—The author obtained this compound by heating for eight or ten hours to 120°, 2 parts of kresole (from orthotoluidine), 3 parts of phthalic anhydride, and 2 parts of tin tetrachloride.

He thus obtains a compound having the following formula:



By the action of acetic anhydride, benzoyl chloride and bromine, on the above compound, he obtained bodies containing the acetyl radical, &c.

Contribution to the History of Glyoxyl Acid, C. Bottinger (**12**, 244).

On the Components of the Essential Oils of some Ericeae, H. Koehler (**12**, 246).

On the Heat evolved by Mixing Anhydrous Sulphate of Soda with Water, L. C. de Coppet (**12**, 248).

On the Specific Rotary Power of Isocholesterine, E. Schultz (**12**, 249).

On the Determination of the Specific Gravity of Powdered Bodies, Fr. Ruedorff (**12**, 249).

Contributions to the History of Methylcrotonic and Angelicic Acids, E. Schmidt (**12,** 252).

On the Azo Derivatives of Diphenylamine and Diphenylnitrosamine, Otto N. Witt (**12,** 258).

Tropaeoline Y. is the acid soda salt of oxyazobenzole-sulphonic acid :

$$NaSO_3\overset{1.4.}{C_6H_4}N = N\overset{1.4.}{C_6H_4}OH.$$

Tropaeoline O. is the acid soda salt of metadioxyazobenzol :

$$NaSO_3\overset{1.4.}{C_6H_4}N = N\overset{1.2.4.\,OH}{C_6H_4}OH.$$

Tropaeoline O O. is the potassic salt of phenylamidoazobenzole-sulphonic acid :

$$NaSO_3\overset{1.4.}{C_6H_4}N = N\overset{1.4.}{C_6H_4}NHC_6H_5.$$

Tropaeoline O O O. No. 1, is oxynaphthylazophenyl-sulphonic acid:

$$HSO_3\overset{1.4.}{C_6H_4}N = N\overset{\alpha}{C_{10}H_6}OH.$$

Tropaeoline O O O. No. 2, is the corresponding soda salt of β naphthole.

$$NaSO_3\overset{1.4.}{C_6H_4}N = N\overset{\beta}{C_{10}H_6}OH.$$

Tropaeoline O O O O. is an isomer of the two last ones, and is obtained by the action of diazobenzole on naphthole-sulphonic acid under peculiar circumstances.

The author calls all orange and orange-red colors (formed by affixing the sulpho group [HSO_3] to the amido, or oxyazo bodies), tropaeolines..

These colors are distinguished in commerce, according to their shade, by using the letters Y for yellow, and O for orange.

The prettiest of all these dyes, is tropaeoline OO., which dyes silk and wool of a fine golden-yellow color; it contains all the basic properties of amidoazobenzole, permitting it to be used with dilute acids.

The starting point of this body is phenylamidoazobenzole, which is prepared as follows :

17 gms of diphenylamine are dissolved in 100 cc of alcohol. This solution is then cooled off to 0°, and then is added 14 gms of diazobenzole chloride, in 50 cc of alcohol. The mixture thus obtained is cooled off, and then an alcoholic solution of trimethylamine is added.

This mixture is then poured in water, which precipitates the phenylamidoazobenzole, in the shape of a dark brown oil. The formula of this substance would be:

$$C_6H_5 - NH - C_6H_4 - N = N - C_6H_5.$$

If this be treated with amylnitrite and acids, it goes over into the corresponding nitrosamine, which has, as formula:

$$C_6H_5 - NNO - C_6H_4N = N - C_6H_5.$$

If diphenylamine be acted on by the sulpho-acid of diazobenzole, instead of diazobenzole, we would obtain tropaeoline OO.

If tropaeoline be reduced, sulphanilic acid and amidodiphenylamine are formed.

The author is still studying this reaction, and promises to publish the results of his experiments on some future occasion.

A new universal Stand for using the Pocket Spectroscope, T. v. LEPEL (**12**, 263).

In regard to the Chemistry of Chondrine, R. PETRI (**12**, 267).

On the Direct Combination of various Metal Groups with Benzole or Toluole, H. H. FRIEDEL and CRAFTS (**12**, 289).—These chemists had formerly performed several syntheses by means of metal chlorides, especially with the aid of aluminum chloride (Bull. Soc. Chim., **29**, Nos. I and II).

They obtained thus, by the action of chloride of cyanogen on benzole, a mixture of organic acids, mainly benzoic and phthalic acids:

$$CNCl + C_6H_6 = HCl + C_6H_5CN,$$

also by the action of methyl chloride on benzole, durole or tetramethyl benzole (Bull. Soc. Chim., (**29**, 50).

MR. CHAS. GIRARD (**12**, 290).—(Bull. Soc. Chim., **29**, 50.) This chemist obtained, by the action of baric hydrate on violaniline, a mixture of ammonia and rosolic acid. The sulpho-acid of roseaniline blue yields ammonia and rosolic acid; methyl blue yields methylaniline and rosolic acid; lastly, sulphanilic acid yields pyrocatechine.

Preparation of Divaleryl, T. W. BRUEHL (**12**, 315).

On the Succinyl Compounds of Toluidine, G. v. BECHI (**12**, 320).—The author obtained several new bodies by the action of succinic acid on the toluidines, either ortho, meta or para.

Action of Dehydrating Bodies on Camphoric Acid and its Amide, M. BALLO (**12**, 324).