THE 162nd MEETING
Pittsburgh Section
AMERICAN CHEMICAL SOCIETY
THURSDAY, FEBRUARY 19, 1920, at 8:15 P. M.

AT
MELLON INSTITUTE, Thackeray Avenue and O'Hara Street

DR. W. A. NOYES
Newly elected president of the American Chemical Society and Head of the Department of Chemistry of the University of Illinois will address the Pittsburgh Section on
"The Foundations For Chemical Development."

Dr. Noyes always brings an interesting and important message. The visit to Pittsburgh is part of a plan which will include most of the local branches of the A. C. S. to bring them into closer touch with the parent society.

Let us show our appreciation of the president’s visit by having a 100% attendance.

SMOKY CITY CHEMISTS
Will have their Smoker in March
The 163rd meeting in March will be a real get together—The Annual Smoker—Everybody will be out for a big time.

Refreshments — Singing — Stunts — Surprises
Full particulars in the next issue of the "CRUCIBLE"
NEW APPARATUS DEVELOPED DURING 1919.

THE NEW "MACMICHAEL" UNIVERSAL VISCOSIMETER.

The new "MacMichael Universal" Viscosimeter, capable of testing the viscosity of any fluid ranging from ether to the heaviest glues, was first exhibited at the 36th Annual Convention of Official Agricultural Chemists, at Washington, D. C. It is the unanimous opinion of several chemists, who have carefully examined this new viscosimeter, that it will take the same relative position of importance in the laboratory as the analytical balance.

New E&A MacMichael Bulletin is now being compiled.
Old Bulletin sent on request.

THE "HORTVET" CRYOSCOPE.

This new freezing-point apparatus was also first shown at the 36th Annual Convention of the Official Agricultural Chemists. The official report on this instrument was made by Dr. Julius Hortvet, and his report is to be found in the official record of this meeting. The Hortvet Cryoscope has the following advantages:

1. It enables freezing-point determinations to be made in a short time—generally seven to eight minutes.
2. It eliminates the general inconvenience and annoyances attending the use of ordinary laboratory appliances.
3. It has proved to be a great economizer in the use of freezing material.
4. It provides for the accurate control of the freezing bath.

Hortvet Circular, E&A Bulletin No. 268, sent on request.

"AMERICAN" ROTARY HIGH VACUUM PUMP.

These are exceptionally high grade rotary vacuum pumps, with the following points for your special consideration:

1. Unusually high vacuum for a rotary laboratory pump—.00001 mm.
2. Unusually high capacity for a laboratory vacuum pump—5 cu. ft. per minute.
3. Small power consumption.
4. This is not a laboratory toy, but is built for continuous operation—24 hours a day and 365 days in the year.

'American' High Vacuum Pump Bulletin is now being compiled.

EIMER & AMEND
(Founded 1851)

New York
3rd Ave., 18th and 19th Sts.

Pittsburgh Branch
2011 Jenkins Arcade
CONTRIBUTED BY AN ADVERTISER

On page 3 of the January issue of THE CRUCIBLE, there appeared a discussion as to the advisability of continuing this bulletin. No more valuable medium, for binding together the chemists of such a very important section of the country as the Pittsburgh District, can be found than this bulletin; and Eimer and Amend through their Pittsburgh Branch, send the following interesting and useful table as their contribution, in an effort to help stimulate interest in THE CRUCIBLE. In the near future we will publish a set of tables from which can be quickly calculated the volume of a liquid in a horizontal cylindrical dish-end tank.

REQUIRED:
The volume of a liquid in a horizontal cylindrical tank.
\[ V = A \times L \]
\[ A = \pi r^2 - \frac{1}{2} \left[ \frac{\pi r^3}{90} \cos 1 \right] \frac{D - r}{r} - 2 \frac{1}{D (2r - D) (D - r)} \]
\[ A = \text{a cross-sectional area of liquid} \quad L = \text{length of tank} \]
\[ D = \text{depth of liquid} \quad r = \text{radius of tank} \]

When \( D < r \),
\[ A = \frac{1}{2} \left[ \frac{\pi r^3}{90} \cos 1 \right] \frac{D - r}{r} - 2 \frac{1}{D (2r - D) (D - r)} \]

By referring to the following carefully calculated table in which \( D \) and \( A \) are expressed as percentages of the total depth and capacity respectively, the actual contents of a horizontal cylindrical tank of any length may be quickly and accurately determined for any given depth.

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Theodore Thomas
711 Forbes St., Pittsburgh, Pa.
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EDITORIAL

With this issue of “The Crucible”, the new staff begins its work. As was noted in the January number, there has been a division of the labor connected with the local branch of The American Chemical Society. Few of us probably appreciated what the former officers were expected to do. The secretary particularly carried a heavy load. That work now, is divided among three men.

First of all, then, we wish to pay our compliments to the former officers, particularly to the secretary, who gave us each month a tasty issue of “The Crucible” though it was a task of three dimensions, as is evidenced by the fact that in the future it is to be done by a triumvirate.

It is customary upon the assumption of many offices to have an inaugural address, a sermon on the mount, or other pronouncement of policy. We wish, therefore, at the very start to declare our aims. Let us ask, What is the object of “The Crucible”? Announcements of our meetings could be sent out by postcard; news of importance in the fields of pure and applied chemistry is gotten by all of the members through chemical journals; contributions of wide importance are sent to papers of large circulation; and reading matter in other fields is to be found in abundance elsewhere. Why should we have “The Crucible?”

“The Crucible” should be a medium for conveying to the absentee members and those who live at a distance, some of the benefits of the papers and discussions. For that reason, we will aim to have in each issue a brief account of the proceedings of the last meeting. We want to make these meetings seem so attractive that every truant member will be sorry he was not present.

This leads us directly to our second aim—to boost first and always for good attendance at the monthly meetings. If our meetings are to continue interesting and grow to be more inspiring, as they should, we must have a good attendance. The proverbial “empty pew” reacts as strongly upon the audience as upon the speaker. A poor attendance at one meeting is the most likely cause of a more discouraging turnout at the next. This means, Mr. Reader, that if you think of anything at any time which will promote interest in our meetings, you are to write it up for “The Crucible.”

In the third place, we shall aim to promote a closer acquaintance among local chemists. To that end, we shall have a “Personal Mention” column, to
which we invite all readers to contribute. Help us make it a success. We want to conduct this department in such a way that every reader in time will broaden his circle of friends. Let us become more interested in each other and all will be benefited.

There is an old song which runs:
"For it's always fair weather,
When good fellows get together,
With a stein on the table
And a good song ringing clear."

In these days of prohibition, perhaps the third line should be revised, but the main idea is sound. When fellows who have common interests get together, there is an abandonment of usual cares which gives each a new grip on life. But more than that, as Ellwood Hendrick said recently in a lecture delivered under the auspices of the Phi Lambda Upsilon Honorary Chemical Society, when two chemists get around a billiard table, one may drop an idea which is just what the other needs in solving some problem. People who live to themselves these days do not often get on very far. Exchange of ideas is essential for the development of science and of industries based on science. This exchange must be made locally, nationally and internationally. That is why we have our journals and that is why we learn to read foreign languages.

"The Crucible" wishes to add its mite toward getting local men together. Send in your personal items, get to know something about the other chemists and the first thing you know every fellow will want to meet every other fellow.

"ON CHEMICAL ANALYSIS"

It is popular to regard analysis with patronizing tolerance, while research is made the idol of chemists. But such a series of papers as those we enjoyed at the January meeting call to mind very forcibly the fact that analysis is fundamental. As Mr. Johnson remarked to the manager, "That's what runs your mill!"

The chemist is, first of all, one who can recognize and identify substances, and discover exactly and in detail their ultimate composition. Synthesis without analytical control is at its best only rule of thumb dignified by nice weighings and measurements and clean apparatus.

The unscientific layman thinks that all that chemists can do is analyze. We know better. But we must not take the other mistaken extreme and overlook the essential character of accurate analytical work.

S. R. S.

OPENINGS FOR CHEMISTS

Any one interested in the following openings is asked to telephone Professor A. Silverman, School of Chemistry, University of Pittsburgh, Bell phone, Schenley 3300.

Several young men to start in a rubber laboratory as analytical chemists.

An Assistant Instructor for the School of Chemistry. An opportunity for a young man wishing to do graduate work.

THE JANUARY MEETING

At the last meeting of the Pittsburgh Section, the steel laboratories had an opportunity to "show their mettle", as it were, and the response was in no way a disappointment. Few of us have kept pace with the developments of the past three or four years in the realms of alloy steels. It is safe to say, too, that few have known of the new ceramic materials developed in Mr. Johnson's laboratory. Mr. Johnson has kindly furnished "The Crucible" with notes on several of the methods described in his address, and these will appear in this and in subsequent issues. It is hoped that "Notes for the Laboratory" may
become a permanent department in "The Crucible", and that the "Personal News" column may increase in stature and in wisdom.

It is expected that, at some future meeting, the program will deal with the metallurgical and metallographical aspects of Steel. So, even if you were not able to attend the first steel "reunion", prepare to be present at the coming meetings, for a surprise may be in store.

T. C.

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PERSONAL NEWS

(We solicit items for this column)

The Student Chemical Society of The University of Pittsburgh held a luncheon January 28. Mr. R. M. Howe, of Mellon Institute, spoke on "Refractories."

"The Chemistry Teachers' Club of Pittsburgh" has been organized by the teachers of the City High Schools.

Word from St. Louis conveys the sad news of the death, by influenza, of Dr. D. S. Pratt and that Mrs. Pratt is very sick. Dr. Pratt formerly was Professor of Organic Chemistry in the University of Pittsburgh, and more recently one of the directors of the Mellon Institute.

On January 17th, Professor and Mrs. Silverman entertained the faculty of the School of Chemistry of the University of Pittsburgh. The oldest chemist present was Dr. Phillips, and the youngest, Miss Shirley Wescott, who arrived on this mundane sphere a few weeks ago, her first stopping place being the home of Mr. Blaine B. Wescott.

Mr. Ralph F. Brenner, sometime Second Lieutenant, C. W. S., is now chemist for the Bartlett-Collins Glass Company, Sapulpa, Oklahoma.

Chairman Tillotson will be one of the lecturers on Ceramics at the Short Course given at the University of Illinois in March, delivering a series of lectures on the physics and chemistry of glass.

Mr. A. D. Bell of the Aluminum Company, has transferred his headquarters to Badin, N. C. for several months, where he will be engaged on experimental work for the company.

MELLON INSTITUTE

Mr. F. H. Garner, M. Sc., Birmingham University, England, has entered the Mellon Institute where he will do research work on lubricating oils. Mr. Garner holds an 1851 Exhibition Research Scholarship, these scholarships being endowed from funds received from the 1851 Exhibition held in England.

Mr. H. G. Elledge, who recently returned to the Institute from a two weeks' business trip through the Central Western States, contracted the "flu" and was taken to the Passavant hospital. Mr. Elledge's family is now in Florida, having made the trip there in the interest of the children's health. Here's hoping for a speedy recovery of you and yours, "Harry".

Mr. E. S. Stateler, University of Kansas, has entered the Mellon Institute, where he will take up work in connection with the "Bread Fellowship".

Mr. F. W. Hightower, University of Texas, has undertaken work in connection with the "Metals Research Fellowship".

Dr. Henry R. Curme, has severed his connection with the Mellon Institute and is now with the American Borolux Company, Cleveland, Ohio. He is doing research work on artificial silk.

Dr. H. A. Morton, has left the Institute to become Director of Research with the Miller Rubber Co., Akron, Ohio.

Mr. J. L. Crawford, University of Illinois, recently with the Westinghouse Lamp Co., has entered the Institute to undertake work in connection with the "Silicate Fellowship".
Kipp Generators: A good supply on hand in sizes: 500 cc, 1000 cc, 2000 cc.

Condensers: Liebig's for rubber connection, Liebig's with sealed in tube, Liebig's with inner glass coils, Allihn's with inner glass bulbs.

Repairs on glass apparatus made quickly, efficiently at reasonable prices.

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The Crucible

BUREAU OF MINES

The Research club of the Bureau enjoyed two good talks in the last month. E. A. Holbrook, Supt., spoke on "A New Reaction in Fuels", and the Trend reaction was discussed in detail. Alan Leighton talked on the geophone and its application to approximate underground surveying and mine rescue work.

Mr. Isaac Guest left the Bureau on January 15th. He went with an aluminum company in northern New York.

Orders have gone out that anybody with any symptoms of the flu must go home and stay there until cured. Whether this can be construed as an excuse for a wholesale vacation remains to be seen.

Mr. A. C. Fieldner was on the sick list for a day but not having the flu, he had to return to work.

NEW MEMBERS

Carvalho, J. B. de M., Carnegie Institute of Technology, Pittsburgh, Pa.
Darbaker, L. K., 7025 Hamilton Ave., Pittsburgh, Pa.
Doubles, Leonard E., 500 Cherry Ave., Box 272, Punxsutawney, Pa.
Monroe, R. J., Black Lick, Pa.
Morse, Max, P. O. Drawer 861, Morgantown, W. Va.
Riggs, Cecil O., 516 University Driveway, Morgantown, W. Va.
Rodgers, Paul S., 1409½ Eighth Ave., Altoona, Pa.
Ross, Harold J., Mellon Institute, Pittsburgh, Pa.

NEW MEMBERS BY TRANSFER

Buck, Willard K., 1038 Leischman St., New Kensington, Pa.
Hightower, F. W., Mellon Institute, Pittsburgh, Pa.
Stateler, Ernest S., Mellon Institute, Pittsburgh, Pa.

CHANGES OF ADDRESS IN SECTION

Allison, C. F., To 1009 Sheffield Ave., Woodlawn, Pa.
Bakken, H. E., To Box 223, New Kensington, Pa.
Drites, Dean O., To Trenton Ave., Swissvale, Pa.

Dittmer, Joseph C., 1221 Ridge Ave., Coraopolis, Pa.
Duval, Alexander L., To 284 S. Main St., Washington, Pa.
Fair, Frederick C., To 4412 Butler St., Pittsburgh, Pa.
Jenkins, Russell L., To 1025 Murrayhill Ave., Pittsburgh, Pa.
Miller, A. Logan, To Arnold, Pa.
Mooney, William F., To Y. M. C. A., Steubenville, Ohio.
Moore, Charles S., To East Butler, Pa.
Morris, Paul R., To 300 E. 9th Ave., Tarentum, Pa.
Morse, Withrow, P. O. Drawer 861, Morgantown, W. Va.
Rowell, Harry E., To 503 John St., Carnegie, Pa.
Trostel, Louis J., To 153 Pearl St., Pittsburgh, Pa.
Underwood, Clarence L., To 78 Beverly Ave., Morgantown, W. Va.
Weinstock, Max, Wilson, Pa.
Weiss, Morris, To 1196 Donation Ave., Youngstown, Ohio
Weitz, A. H., To 235 North Rebecca St., Pittsburgh, Pa.
Wilson, Edwards F., To Box 849, Irwin, Pa.

MEMBERS LOST BY TRANSFER

Bell, Hubb., To Pittsburgh Testing Laboratories, N. Y. City
Hou, T. P., To 528 W. 123rd St., New York City
Kran, J. B., To 318 West 84th St., New York City
Morton, Harold A., To Miller Rubber Co., Akron, Ohio
Weintraub, George, To Cleveland Wire Division, General Electric Co., Cleveland, Ohio

DETERMINATION OF PHOSPHORUS IN PLAIN STEEL, VANADIUM STEELS, AND FERRO-VANADIUM BY THE USE OF A FAINTLY AMMONIACAL AND WATER SOLUTION OF AMMONIUM MOLYBDATE

by

Charles Morris Johnson,
Director of Research Dept. of Crucible Steel Co. of America. Chief Chemist of Park Works

Owing to the threatened scarcity of Molybdic Acid at the outbreak of the war, we decided to begin the manufacture of Molybdic oxide for our own
laboratory use. As with our equipment it was more convenient to make Ammonium Molybdate, some experiments were made with a view to precipitating phosphorus from nitric acid solutions of steel with a faintly ammoniacal water solution of Ammonium Molybdate. After an extended series of experiments, the following method was adopted:

The Molybdate solution is made by dissolving 220 grams of Ammonium Molybdate in water with slight excess of ammonia, using heat to aid solution when dissolving Molybdate in casseroles, warming and stirring until all but some light floating matter, which floats but does not settle rapidly on stirring, is dissolved. Using two glazed earthenware 50 oz. tea pots of 1800 cc. capacity or casseroles, put 110 grams Ammonium Molybdate, 100 grams ammonium nitrate, and 120 cc. (1-1) ammonia into each. Dilute to approximately 1500 cc. with distilled water, and heat moderately until all white salts are in solution. Stir occasionally with a glass rod. Solution should be alkaline to litmus, otherwise, more ammonia is necessary. Transfer the contents of the two containers to a large bottle, dilute to 4000 cc. with distilled water, stopper and let stand overnight. Filter on a large funnel, using paper pulp, into a clean 4 liter bottle; the reagent is ready for use and keeps indefinitely in a stoppered bottle. The solution now smells faintly of ammonia. It should not be filtered until it has stood overnight to permit impurities to separate out completely. The residue on the filter should not be washed, as it has a tendency to run through. The advantages of this method, are that the solution is non-corrosive, saves operator’s clothes and hands, and table tops, and keeps its strength indefinitely, always having the same precipitating strength. It precipitates the phosphomolybdate in a form that is readily filtered and does not dissolve in the wash water. 1.63 grams of steel are dissolved in the usual way in 45 cc. 1.13 nitric acid. After oxidizing with permanganate of potash solution and clearing the excess of permanganate with a ferrous sulphate solution, the solution is boiled a few moments, and 10 cc. excess of concentrated nitric acid are added to the boiling solution; same is removed from fire and precipitated immediately with 50 cc. of the faintly ammoniacal water solution of ammonium-molybdate. Then stir for a few minutes when the phosphorus is ready to filter.

For Vanadium, the only difference is that 40 cc. of concentrated nitric acid are added just before adding the molybdate solution to prevent interference of vanadium. This simple precaution prevents interference of vanadium in steels containing as much as 2.50% Vanadium. After adding this 40 cc., the solution is again brought to boil before removing from fire to add to molybdate solution.

For Phosphorus in Ferro-Vanadium, the ferro is dissolved in nitric acid, evaporated low, leaving an excess of at least 10 cc. of concentrated nitric acid. Nearly all of the V₂O₅ separates at this point as a red residue. This residue is filtered off on a thin pad of asbestos. It is washed with concentrated nitric acid (V₂O₅ dissolves in water or dilute acid wash); wash it with concentrated nitric acid 10 or 15 times allowing each washing to drain off before the next washing is poured over the V₂O₅. This filtrate and washings are evaporated to 10 cc., and any V₂O₅ that separates out again, is filtered out and washed as before. This second filtrate and washings being now nearly free from V₂O₅, is finished for phosphorus as described for vanadium steel. This method gives twice the amount of phosphorus obtained by the method of precipitating phosphorus from reduced vanadium solution with all of the vanadium present. It gives the true phosphorus as has been proven by analysis of known amounts of phosphorus added to ½ gram of V₂O₅, and put through all operations.
WE have excellent facilities for blowing and grinding all kinds of Chemical Glassware, and would appreciate your blue prints or samples for anything special you may require.

We also repair broken Apparatus, Burettes, Separatory Funnels, Etc., very satisfactorily.

Send us your broken Apparatus and have it repaired.

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LABORATORY AUTOCLAVE
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20530. Autoclave, for operating at pressures up to 200 lbs. per square inch. With retort 8½ inches deep by 5 inches diameter, with a working capacity of 1500 ml., made of a solid grey iron casting machine smoothed inside for convenient cleansing and qualitative recovery. Stirring device with driving pulley requires 1/20 H.P. Provided with pressure gauge reading to 200 lbs., petcock, safety valve and a closed thermometer tubulation reaching to bottom of retort. Specially adapted for fusions with caustic soda, sulphonations, or nitrations, with or without pressure. This Autoclave has been used for fusions of beta naphthol over a direct flame without the observance of any carbonized material, due to the perfect agitation during the process; also for the fusion of amidonaphthol disulphonic acid, and alpha naphthylamine trisulphonic acid, and for amidation. Recommended as a laboratory size reproduction of the larger installations for commercial manufacturing. With special gas burner, but without thermometer $254.55.

ASCARITE

A Sodium Hydrate Asbestos Absorbent for use in the determination of carbon in steel by the direct combustion method according to Stetser and Norton.

When used in connection with the Stetser and Norton Modification of the Midvale Absorption Bulb, results can be obtained in from three to four minutes; twenty seconds being required for the start or burning of the steel drillings, one minute for actual burning, and two minutes for washing the gas out of the train.

With one filling, the bulb can be used for at least four hundred determinations, using a one-half factor weight with carbon .05%.

Per Pound ........................................ $4.50

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The American Chemical Society - Pittsburgh Local Section

**Spring, 2017**

Dr. David Gallaher, Department Chairperson (project lead)
Dr. Monique Hockman, Professor of Chemistry
Dr. William Kowallis, Assistant Professor of Chemistry
Mr. Michael Martucci, M.S., Assistant Professor of Chemistry

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