

BULLETIN  
of the  
American Association  
of Jesuit Scientists

Eastern Section  
Founded 1922



PROCEEDINGS  
of the  
Twenty-first Annual Meeting  
MARYLAND - NEW YORK, August 17  
St. Joseph's High School, Philadelphia, Pa.  
NEW ENGLAND, August 25  
Weston College, Weston, Mass.

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# Bulletin of American Association of Jesuit Scientists

EASTERN STATES DIVISION

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Vol. XX

OCTOBER, 1942

No. 1

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## THE EDITOR'S PAGE

With the publication of this Issue, the Jesuit Science BULLETIN enters its twentieth consecutive year. Due recognition of this fact and the progress of the BULLETIN during those years will be rendered in a later issue. But the editor feels, that at the very beginning of this school year, we should be mindful that the qualities of confidence in its purpose and cooperation in the fulfillment of that purpose, which made our BULLETIN possible twenty years ago, are exactly the qualities needed for its continued existence today.

At that time, only a short time after the founding of the American Association of Jesuit Scientists (Eastern States Division), this small group, in the relative obscurity of its own meeting, but with courage, born of the conviction that physical science is a potent means of spreading eternal truth and extending the Kingdom of Christ in the hearts of men, issued its first number with the prayer that it might be worthy of the Society it represented. The growth of the BULLETIN has written its own answer to the prayer of these Fathers and has provided us, of a younger generation, with the incentive to make it thrive in the fulfillment of its worthy purpose.

The past Summer has shown that this same spirit still lives in the present members of the Association. In spite of the many difficulties which are well known, and which prevented the customary joint meeting of the whole Association, the members of the Maryland-New York Province and those of the New England Province met separately, and conducted one day conventions with the same interest and enthusiasm which has characterized all former meetings. The numbers attending and the spirit of the discussions, assure us nothing will have been lost when, next year, with God's help, we have a reunion of the whole group.

Likewise, with the same spirit of confidence and courage, the two conventions faced the difficulties confronting the BULLETIN, and in spite of them, decided it was worth the work and should be carried on as near the manner and standard of the past as the present emergency permits.

This is a time of activity. Confusion is caused because so much adaptation of men and schedules must be made to meet our needs. A permanent record of such adaptations should be kept. When the emergency has passed and we can again settle down to our normal method of education, not only many of the details will be forgotten, but much of the enthusiasm of the times will necessarily and forever

be lost. Our BULLETIN can fulfill no better function at the present time, than to record for future members of the Association and for the history of achievement of our Institutions, the work, the spiritual foundation given to the men going into the Service, and finally both the professors and the students who have received our training and have now moved up to the front lines.

It may be difficult to find time to compose scientific articles, but there should be no shortage of news reports. Nor have the colleges any longer a monopoly on news in this field. The high schools are, more and more, taking their places in training students for these places in national defense. So, remembering the vote of confidence given the BULLETIN at the summer conventions, let us make this a year of history as well in content as in fact. It is in keeping with these thoughts that the Editor has been urged to reprint here the Constitutions of the American Association of Jesuit Scientists, and also the program presented at its first meeting.







CONSTITUTION  
of the  
AMERICAN ASSOCIATION OF  
JESUIT SCIENTISTS  
(Eastern States Division)

ARTICLE ONE

NAME

The name of this Association shall be "*American Association of Jesuit Scientists*," with the sub-title "Eastern States Division."

ARTICLE TWO

AIM

The aim of the Association is to promote the teaching of Science and Mathematics in our schools and colleges by mutual encouragement and stimulation, the presentation, discussion, and publication of papers.

ARTICLE THREE

MEMBERSHIP

1. Teachers of Biology, Chemistry, Mathematics, and Physics as a major branch in Jesuit Institutions, who are at the same time willing to co-operate in the work of the Association are eligible for membership. This condition shall apply to other sections of the Association that may be formed in the future. The co-operation referred to is the willingness to present a paper at the annual convention from time to time.

2. Former teachers of such major branches, and now engaged in the studies of the Society, as well as students of Science who intend to devote themselves to teaching one or the other of these branches are also eligible for membership.

3. Applications for membership will be accepted and passed upon by the Executive Council specified in Article Four.

4. There shall be no admission fee for membership. Necessary expenses of the Association shall be defrayed as set forth in Article Eight.

5. The privilege of attending the meetings of the Association is extended to non-members interested in these branches.

ARTICLE FOUR

OFFICERS

1. The officers shall consist of a President, a Secretary-Treasurer, and a Representative from each section. This Representative shall be the presiding officer of his section, and ipso facto, a Vice-President of the Association. These shall constitute an Executive Council for the government of the Association.

2. The President and Secretary-Treasurer shall be elected by the Association. The Representatives shall be elected by the respective sections.

3. The officers shall hold office for one year, or from the end of one convention to the end of the next.

4. The election of officers shall take place at the end of each annual meeting.

#### ARTICLE FIVE DUTIES OF OFFICERS

##### A.—Officers of the Association:—

###### 1. Duties of the President:

- (a) He shall preside at the general meetings;
- (b) he shall give a Presidential Address;
- (c) he shall call and preside at the meetings of the Executive Council.

###### 2. Duties of the Vice-Presidents:

- (a) They shall represent their respective sections in the meetings of the Executive Council.
- (b) In the absence of the President, that Vice-President chosen by a majority vote of the Executive Council shall preside.

###### 3. Duties of the Secretary-Treasurer:

- (a) He shall act as secretary of the Executive Council;
- (b) he shall keep a record of the membership and of all the transactions of the Association;
- (c) he shall be the editor of the Proceedings of the Association.

##### B.—Officers of the sections:—

###### 1. Duties of the Vice-President:

- (a) He shall preside at all meetings of his own section;
- (b) he shall deliver a Vice-Presidential address;
- (c) his other duties are defined above under A-2.

###### 2. Duties of the Secretary:—

- (a) He shall keep a record of the membership and all the transactions of his section;
- (b) he shall arrange the program of his section in conjunction with the Vice-President;
- (c) he shall submit a report of the activities of his section at the annual meeting.

#### ARTICLE SIX DUTIES OF THE EXECUTIVE COUNCIL

1. It shall define the general policy of the Association.
2. It shall arrange the general program of the annual meeting.
3. It shall make appointments to the Board of Editors as herein-after specified.
4. It shall meet at least once a year at the call of the President.



## ARTICLE SEVEN

### SECTIONS

1. The sections of the Association shall be: Biology, Chemistry, Mathematics, and Physics, and such others as may be formed later.

2. Each section shall elect its own presiding officer who shall be a Vice-President of the Association. The Vice-President is to be the Representative of his section on the Executive Council. Each section shall also elect a secretary.

## ARTICLE EIGHT

### MEETINGS

1. There shall be an annual meeting of the Association and its sections at a time and place specified by the Executive Council.

## ARTICLE NINE

### PROCEEDINGS

1. The proceedings of the general meeting shall consist of scientific papers of universal interest.

2. The proceedings of the sectional meetings shall consist of papers and discussions on scientific and mathematical topics. Methods of presentation and demonstration, results of research work, developments in the art of teaching, historical investigations, etc., will be proper matter for discussion at these meetings.

3. The proceedings of the Association shall be printed and published annually under the direction of the Executive Council.

## ARTICLE TEN

### PUBLICATIONS

1. In accordance with Article II, section 1, besides the Proceedings, a periodical bulletin shall be issued containing news of interest to the Association and articles on scientific topics by the members.

2. This bulletin shall be under the direction of an Editor-in-chief to be appointed by the Executive Council.

3. The board of editors shall consist of the chief editor and an associate editor from each section. This board shall be appointed by the Executive Council and shall hold office until changed by the Council.

## ARTICLE ELEVEN

### FUNDS

1. In accordance with the provisions of Article III, section 4, no admission fees are required.

2. Necessary expenses shall be defrayed by a pro rata assessment upon the members.

## ARTICLE TWELVE

### ALTERATIONS OF THE CONSTITUTION

1. This constitution may be amended by a majority vote of the members present, subject to such restrictions as arise from the special nature of this Association.

## ACTUAL PROGRAM OF THE FIRST MEETING

### A MEMORY OF TWENTY YEARS

It was twenty years ago, 1922. We had just completed the Science Summer School at Canisius College, Buffalo, N. Y. Fr. M. J. Ahern, S. J., Rector of the College, had ventured into new fields of summer courses. He invited three non-Jesuit, lay Professors from various eastern Universities to conduct a five-week summer school for Jesuit Scholastics. By common consent, it was highly successful. Perhaps something has been lost in not repeating the experiment. At the close of the summer school, the Professors of Science in the Maryland-New York Province, (New England was then included in the Province), convened for the first time. They were invited by Father Ahern to "discuss means of improving the teaching of science in our High Schools and Colleges." The roll called showed twenty-four members present. Discussions were candid and clearly indicated the need of improvement.

Fr. George H. Coyle, S. J., described to us the Science Convention of the Missouri Province and then Fr. E. C. Phillips, S. J., proposed the formation of a similar organization for the Maryland-New York Province. The enthusiasm which greeted this proposal left no doubt of its adoption as a means of advancing our Science Departments. In anticipation of a favorable vote, Fr. M. J. Ahern, assisted by Frs. H. M. Brock, E. C. Phillips and G. H. Coyle, had prepared temporary constitutions and a program for the convention. The program was carried out and thus was born the: "Association of Science and Mathematics Professors of the Maryland-New York Province of the Society of Jesus." As we know, this title was later modified to: "American Association of Jesuit Scientists," (Eastern States Division).

It was all very new to us younger members, either fresh from Philosophy or with one or two years of regency-experience. It was not easy for us to vision the years ahead and see this ambitious plan working out into reality. It was serious business. There were many difficulties to be overcome both inside and outside the Association. The aims were rather modest in the beginning. We wanted mutual help and encouragement in actual teaching problems, in laboratory methods and a medium for the diffusion of practical ideas. The early issues of the BULLETIN show how these aims were fulfilled.

This is not intended to be a history of the Association—a worthy project for an enterprising pen. But after twenty years, we can review the growth of the Association with some satisfaction. Our membership has increased, our outlook has undergone considerable change. During this period, many research articles have been published, contributions have come to us from other countries and a Department of

Science and Philosophy has been introduced. These are manifestations of changes in times and thought. While we regret the departure of many members, we rejoice in the new associates.

The first Editors of the BULLETIN wrote: "Whatever success the future may bring to the Association, too much credit cannot be given to Father Ahern who initiated the project." We echo that sentiment, adding a word of due praise to members, officers and editors. The success rightly belongs to the Association as a whole. There has been much generous cooperation and self-sacrificing activity, and it is only through such means that success can be attained. To our senior members, we owe more than we can say. They guided the infant organization in their wise experience; they inspired the younger associates by scholarly contributions and the active role they played throughout the years. Closely associated with Father Ahern were Frs. H. M. Brock, E. C. Phillips and G. H. Coyle.

On this twentieth anniversary, we feel that it will be of more than mere historical interest to reprint some of the minutes of the first meeting of the Association, in the hope that after the present crisis, we may enter on a new generation with the same enthusiasm which characterized the initiation of the American Association of Jesuit Scientists, (Eastern States Division). *Prosit.*

REV. JOSEPH P. KELLY, S.J.  
Weston College,  
Weston, Mass.

On August 21st., 1922 at 11 A. M., a meeting of the Science Teachers of the Maryland-New York Province of the Society of Jesus, was held at Canisius College, Buffalo. Rev. Fr. Ahern, Rector of Canisius, presided at the meeting and outlined in brief its occasion and purpose.

The immediate result of the convention was the formation of the "Association of Science and Mathematics Teachers of the Maryland-New York Province of the Society of Jesus", with its aim to promote the teaching of science in our schools and colleges by mutual encouragement and stimulation and the presentation, discussion and publication of papers.

The subjoined temporary constitutions were drawn up, and the following officers of the Association elected:

President.....	Fr. M. J. Ahern
Vice-Pres. and Chairman: Biology section.....	Fr. J. Didusch
Vice-Pres. and Chairman: Chemistry section.....	Fr. G. Coyle
Vice-Pres. and Chairman: Mathematics section.....	Fr. T. Archer
Vice-Pres. and Chairman: Physics section.....	Fr. H. M. Brock
Secretary-Treasurer.....	Mr. J. J. Lynch

First Annual Meeting  
of  
The Association of Science and Mathematics Teachers  
of the  
Maryland-New York Province  
Held at Canisius College, Buffalo, N. Y.  
August 21 and 22, 1922

PROGRAM

Monday, August 21

10:00 A.M. Opening Session ..... (Chemistry Lecture Room)

REV. M. J. AHERN, Presiding

1. Election of Temporary Chairman.
2. Address: "The Meeting of the Association of the Science and Mathematics Teachers of the Missouri Province"  
REV. GEORGE L. COYLE
3. Discussion of Permanent Organization.
4. Election of Permanent Chairman and other Officers.
5. Appointment of Permanent Committees.

3:00 P.M. Afternoon Session ..... (Physics Lecture Room)

1. Address: "Radio Telegraphy as used in Astronomical Work"  
REV. EDWARD C. PHILLIPS
2. Discussion: "The Teaching of Physics in our Colleges and High Schools."

7:30 P.M. Evening Session ..... (Physics Lecture Room)

1. Discussion: "The Teaching of Chemistry in our Colleges and High Schools."

Tuesday, August 22

10:00 A.M. Morning Session ..... (Chemistry Lecture Room)

1. Discussion: "The Teaching of Biology in our High Schools and Colleges."

3:00 P.M. Afternoon Session ..... (Physics Lecture Room)

1. Discussion: "What can we do to raise the standard of Science Teaching in our Province?"
2. Discussion: "What can we do to encourage Scientific Research among ours in the Province?"
3. "The Teaching of Formulae in Courses in Physics."

REV. H. M. BROCK

6:00 P.M. First Annual Banquet of the Association.

7:30 P.M. Evening Session ..... (Physics Lecture Room)

1. Resolution
2. Adjournment



At the close of Father Coyle's address (which was received with applause), Father Phillips proposed that a similar organization, independent for the present of the Missouri organization, be started at once in this Province, and that Father Ahern appoint a Committee of three to draw up plans for the new venture. The proposal was seconded by Father Brown and carried unanimously. Father Ahern appointed Father Phillips, Father Coyle and Mr. Lynch as the Committee, the meeting then adjourning for lunch.

3:00 P.M. Afternoon Session

The report of the Committee appointed this morning, was read by Father Coyle and the temporary constitutions drawn up by them were accepted without discussion. In accordance with these constitutions, the following became charter members:

Frs. Ahern, M. J.	Messrs. Berry, E. B.
Archer, T.	Brown, T. J.
Brock, H. M.	Busam, J. F.
Coyle, G.	Butler, J. P.
Didusch, J.	Crowley, J. J.
Gipprisch, J.	Kelly, J. P.
Hohman, A. J.	Kolkmeyer, E. J.
Kelly, J. M.	Lynch, J. J.
O'Loughlin, H.	McNally, H.
Phillips, E. C.	McWilliams, R. J.
	Michaud, A.
	Murphy, J. J.
	Reith, J.
	Sheridan, R. E.

Father Kelly proposed an amendment which was immediately carried, that a Committee on Publications be appointed by the President.

Mr. Kolkmeyer moved, and Mr. Kelly seconded that a first draft of the revised constitutions be submitted by the executive council not later than January 1st.

Father Coyle proposed and Mr. McWilliams seconded an amendment that the date be changed to April 1st. The amended resolution was duly carried.

The election of permanent officers then took place.

President.....	Father Ahern
Secretary-Treasurer.....	Mr. Lynch
Chairman—Biology.....	Father Didusch
Chairman—Chemistry.....	Father Coyle
Chairman—Mathematics.....	Father Archer
Chairman—Physics.....	Father Brock

AMERICAN ASSOCIATION OF JESUIT SCIENTISTS  
EASTERN STATES DIVISION  
A—Maryland-New York Section

MINUTES of the Meeting of the Maryland-New York Section.\*

On Monday, August 17, 1942, the twenty-first meeting of the Association (Maryland-New York Section) was held at St. Joseph's High School, Philadelphia, Pa.

The Meeting was called to order at 10:45 A.M. by the President of the Association, and after the opening prayer, Rev. John P. Smith, S.J., Rector of St. Joseph's High School, a member of the Association from its earliest years, briefly addressed the Convention and extended a very cordial welcome to all.

Father Phillips then read the Presidential Address entitled: "Considerations on the 'Old' and Some 'New' Theories of Probability". This address was followed by the business meeting. In the absence of the Secretary of the Association, the reading of the minutes of the 20th Meeting was omitted. The President appointed the following committees:

Committee on Resolutions:

Rev. Joseph M. Kelley, S.J., Chairman  
Rev. Arthur A. Coniff, S.J.  
Rev. John P. Delaney, S.J.

Committee on Elections:

Rev. Thomas J. Brown, S.J., Chairman  
Rev. Francis W. Power, S.J.  
Rev. Richard B. Schmitt, S.J.

This Committee (on Elections) was instructed to study the question of the election of officers for the coming year in view of the difficulties arising from the unavoidable absence of the New England Province members who are to hold their own separate meeting in the near future at Weston College, Weston, Mass. The same Committee was also asked to consider and report on the question of publication of the SCIENCE BULLETIN during the national emergency.

The General Meeting adjourned at 11:20 A.M., to reconvene at 2:00 P.M., and the members went to their respective Sectional Meetings, the Mathematics Section meeting in common with the Physics Section.

The members reassembled at 2:00 P.M. for the second business meeting.

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\*Due to the war conditions now existing, it was decided by the Rev. Fathers Provincial that for this year the members of the Maryland-New York Province, and those of the New England Province would meet separately.



The Report of the Committee on Elections was read by its Chairman, and after a full discussion of its proposals the following measures were adopted, subject to concurrence by the New England Section:

1. By a majority vote: Let all the present officers of the Association, both general and sectional, of the Association be declared re-elected without presentation of other nominations.

2. By a majority vote: Let the President be hereby empowered to appoint temporary officers as needed, until a general meeting of all the members of the Association can be held.

3. By a unanimous vote: The members approve the policy proposed by the Committee, of continuing the publication of the BULLETIN in its present form, and on the same high level, as far as the difficulties caused by war-time conditions will allow.

The suggestions of the Committee on Resolutions were then heard, and after a discussion the following Resolutions were passed by unanimous vote:

RESOLVED: 1. That the Maryland-New York Section of the American Association of Jesuit Scientists expresses its appreciation and gratitude to Rev. Father Rector and Father Minister of St. Joseph's High School for their cordial reception and hospitality extended to it during this meeting.

RESOLVED: 2. That it also thanks Father Phillips for carrying the burden of arranging this meeting, and organizing a program under difficult war-time conditions.

RESOLVED: 3. That, having felt the disadvantages of separate meetings, it expresses regret that war emergencies have prevented a joint meeting with the New England Section; it extends best wishes to the New England members with the hope that the next meeting will find both sections united.

The general meeting was then adjourned permanently at 2:40 P.M., and the Sectional meetings were resumed. The several Sectional meetings adjourned between 4:30 and 5:00 o'clock.

## PROGRAMME

Of the Twenty-first Annual Meeting  
of the  
American Association of Jesuit Scientists  
Eastern States Division (Maryland-New York Section)  
to be held at  
St. Joseph's High School, Philadelphia, Pa.  
Monday, August 17, 1942

\* \* \* \* \*

### GENERAL MEETING AT 10:30 A.M.

Address of Welcome, Rev. John P. Smith, S.J.  
Presidential Address by Rev. Edward C. Phillips, S.J.:  
Considerations on the "Old" and some "New" Theories of Prob-  
ability.  
Appointment of Committees. New Business. Adjournment.  
SECTIONAL MEETINGS AT 11:00 A.M. AND 2:00 P.M.  
(Papers listed in order of their reception by the Committee)

### BIOLOGY SECTION

Haemoglobin and Haematin, by Rev. Joseph S. Didusch, S.J.  
Varying Opinions on the Problem of Periodicity of Mitosis, by Rev.  
Richard J. Anable, S.J.  
Preliminary Studies of Polysomaty in the Shoot of *Spinacia*, by Mr.  
Daniel F. McCoy, S.J.  
Constant Chromosome Elements in the Genus *Drosophila*, by Rev.  
Philip O'Neill, S.J.  
A Review of Recent Contributions to Early Mammalian Development,  
by Rev. Arthur A. Coniff, S.J.

### CHEMISTRY SECTION

Modern Chemistry, by Rev. Richard B. Schmitt, S.J.  
The Thermal Hystereses of Volumetric Flasks, by Rev. Francis W.  
Power, S.J.  
The Project Method of Teaching Chemistry, by Mr. Joseph A. Duke, S.J.  
The Lowry-Bronsted Theory, by Mr. Vincent F. Beatty, S.J.

### MATHEMATICS SECTION

Mathematical Requirements for the Armed Forces, by Rev. F. W.  
Sohon, S.J.  
The New Rules for the Computation of Academic Grades in the Re-  
vised *Ratio Studiorum*, by Rev. Edward C. Phillips, S.J.

### PHYSICS SECTION

Some Laboratory Difficulties, by Rev. Joseph M. Kelley, S.J.  
Mesotron Studies with Dual Telescope at Fordham, by Mr. Francis  
Benedetto, S.J.

- A Vacuum Tube Millivoltmeter, by Mr. Thomas L. Cullen, S.J.  
Physical Theory and Positivism, by Charles J. Lewis, S.J.  
Efficiency of High Frequency Method for Thermal Processing of Dielectrics in the Construction of Plywood Propellers, by Rev. John O'Connor, S.J.  
Possibilities in Teaching High School Aeronautics, by Mr. Henry A. Boyle, S.J.  
Recent Developments in Navigational Instruments, by Rev. Paul A. McNally, S.J.

#### MINUTES OF THE MEETING OF NEW ENGLAND SECTION. B

On Tuesday August the 25th, the 21st meeting of the Association (New England Section) was held at Weston College, Weston, Mass. Rev. Michael Ahern, S.J., was appointed Chairman of the Committee of Arrangements, and also, by request, presided at the meetings.

The meeting was called to order at 10.00 A.M. It was opened with prayer, after which the delegates were welcomed to Weston by Reverend Father Rector, Robert A. Hewitt, S.J.

The first business was the reading of the minutes of the convention of the New York-Maryland section which had been held a week earlier at Philadelphia. The resolutions passed at that convention and which called for the approval of the New England members of the American Association of Jesuit Scientists were discussed, and on motion, were approved unanimously. In two additional resolutions the hope was expressed 1) that the joint meetings of the entire Eastern Section of the American Association of Jesuit Scientists be resumed as soon as conditions permit and that this recommendation be made respectfully to the proper authorities, 2) that the Editor of the BULLETIN be authorized to consult with the members of the Executive Committee of the Association, if in his judgment it is deemed advisable to omit an issue of the BULLETIN, or to postpone an issue if the quality or quantity of manuscripts be less than it should be, in harmony with the present high standard of the BULLETIN.

There being no further business the morning program was presented. Fr. Ahern gave a brief outline of the origin and work of the Weston College Seismological Observatory. He then presented the Rev. Daniel Linehan, S.J. who gave an illustrated talk on the newly developed methods of seismological prospecting, with special reference to the use of equipment at Weston College. Some of these methods have already been described in the BULLETIN, and an article soon to be published will bring them up to date. The delegates were invited to inspect the Seismological Observatory, and the exhibits of equipment and publications of the department. Many availed themselves of this opportunity.

Two other exhibits were on display during the day. One was of modern forms of projection apparatus, of which Weston College possesses an extensive collection. Also, Fr. Ahern displayed a collection of Kodachromes, many of which were portraits of flowers and gardens, taken from the lecture "Thank God for a Garden", which he has given over a hundred times during the past three years.

The afternoon session was called to order at 2.30 P.M. The program consisted of a round table discussion on "War Work in New England Jesuit Colleges and High Schools." It was recognized that the difficulties experienced in New England were similar to those felt in all Jesuit Colleges and High Schools. These difficulties arose from the depletion of teaching personnel caused by the draft or enlistment of lay teachers, who can be replaced only with difficulty; and from the vast multiplication of the demands for mathematical and technical courses which our colleges were not completely equipped to offer at the outbreak of the war.

Following the completion of the afternoon program two scientific motion pictures from the U.S. Bureau of Mines were shown;

- (1) The Story of Gasoline
- (2) Sulphur.

Both of these were talking pictures of 16mm width, and were sincerely appreciated by the convention.

The delegates expressed their appreciation to the Father Rector and the faculty of Weston College. The convention adjourned at 4.45 P.M. Fifty-one delegates and guests were present. Institutions represented were, Boston College, Boston College High School, Fairfield College Preparatory School, Cranwell Preparatory School, Holy Cross College, Cheverus High School and Weston College. Father Henry Brock, S.J., Rector of Holy Trinity Church, Boston was present. Father Brock is one of the Charter members of the Association. Fr. Thomas J. Smith, S. J. was present from the Provincial's Residence, where he is residing while completing the work for his Doctorate in Physics at Massachusetts Institute of Technology.



**ABSTRACTS OF PAPERS DELIVERED AT SUMMER  
MEETING OF MARYLAND-NEW YORK SECTION**

**BIOLOGY**

**THE FORMED ELEMENTS OF THE BLOOD**

*Abstract*

REV. JOSEPH S. DIDUSCH, S.J.

The formed elements in the circulatory tissue are, red and white corpuscles and platelets. The so-called "blood dust" or hemoconia, is not a formed element but probably consists of loose colloidal particles suspended in the plasma.

The clotting of blood removed from blood vessels is due to the conversion of the soluble protein, fibrinogen, into the insoluble protein, fibrin, by the nucleoprotein, thrombin. The reaction is not clearly understood. According to Howell, a number of blood constituents is concerned, fibrinogen, antithrombin, prothrombin, calcium salts and heparin. When the blood is shed the platelets disintegrate and cephalin or a cephalin compound is liberated. This combines with heparin and possibly antithrombin which, in the presence of calcium salts, is converted into thrombin. The thrombin changes the fibrinogen into fibrin.

Thrombin and other clotting agents are absent from the circulating blood, otherwise blood would normally clot within the body. These agents are thought to be formed or liberated by the platelets. Platelets are small, spherical bodies, varying from 1.5 to 3 micra in diameter and have no nuclei. They are found only in mammalian blood. Their number is estimated to be from 300,000 to 800,000 per cubic centimeter of blood fluid. They are seldom found in mounted blood unless their disintegration has been arrested by deterrents, such as osmic acid. Platelets disintegrate rapidly in contact with foreign substances, as glass, metal instruments and injured tissues, or by the addition of extracts of animal tissues. These extracts also cause clotting of the blood of fishes, amphibia, reptiles and birds, the red corpuscles of which are nucleated.

Clot-forming substances which are liberated from platelets and injured tissues are known as thromboplastins. Cephalin belongs to this category and has been identified as a phosphatide. It is thought to neutralize the effect of heparin which prevents the conversion of prothrombin into thrombin. Heparin has been prepared from liver and other organs and presumably maintains the normal fluidity of the blood.

The clotting of blood is not due to the exposure of blood to the air. It will clot as usual if collected directly from a blood vessel in a vacuum tube or under mercury without contact with air.

As far as the formed elements are concerned, the blood of hemophiliacs does not seem to differ from normal blood. The defect may be due to abnormal factors in the plasma.

Among the anticoagulants are oxalates, citrates, fluorides, peptone, hirudin and heparin. Most of them produce their effect by converting the ionizable calcium in the blood into less ionized or completely insoluble calcium salts.

The blood vascular system of necessity develops very early in the vertebrate embryo. In the human species the first vessels appear in embryos of 1.5 mm., just before the formation of the first somites. "Blood islands" in the extra-embryonic areas of the blastoderm are the first formative blood tissue. By growth and anastomosis these originally isolated vascular units are connected into a plexus of blood vessels on the yolk sac, body stalk and chorion of the embryo. The intra-embryonic blood vessels are not continuations of these vessels but originate independently within the embryo.

According to the monophyletic theory of hemopoiesis all types of blood cells originate from a common mother cell, the hemocytoblast. The polyphyletic theory postulates several stages of differentiation. First, megaloblasts are formed which have a nucleus but very little hemoglobin. For the first six weeks these are the only red cells in the blood of the human embryo. They multiply by mitosis but after the third month disappear from the blood stream. Some of these megaloblasts are transformed in the liver to normoblasts which have small, dense nuclei and a greater amount of hemoglobin. They also multiply by mitosis and are the predominant red cells in embryos of three months, but disappear in the sixth month. Lastly, erythroplastids, red cells without nuclei, develop from the normoblasts. They are the permanent red cellular elements of vertebrate blood. It is not known how they have lost their nuclei.

The primitive blood cells in the "blood islands" also serve for the differentiation of the white corpuscles, granular and non-granular leucocytes and lymphocytes. However, after the third month of fetal life, all types of blood cells are derived from red bone marrow, supplemented by the lymphoid organs and fixed connective tissue cells which are the principal sources of lymphocytes and monocytes. The blood platelets arise, as cytoplasmic processes, from large lymphocytes, the megalokaryocytes.

Hemoglobin, the red compound to which blood owes its color, is a conjugated protein. The non-proteid component is hematin, a brown, amorphous substance composed of carbon, hydrogen, oxygen and iron. The proteid is globin. It is colorless and constitutes 94% of the hemoglobin. It consists principally of carbon and oxygen, with smaller amounts of hydrogen, sulphur and oxygen.

Various techniques are employed for obtaining crystalline hemo-



globin from the blood. A series of photomicrographs was presented to show crystals formed from the blood of a number of vertebrate species. No two crystalline patterns are identical.

Hemoglobin crystals vary not only according to the genus from which the blood is derived but also according to the species. However, these specific differences are due not to the hematin but to the serum proteins which are present in small quantities in the crystals. These proteins are specific for each animal species.

## PRELIMINARY STUDY OF POLYSOMATY IN THE SHOOT OF SPINACIA

(Abstract)

DANIEL MCCOY, S.J.

When the somatic cells of an organism have more than the diploid number of chromosomes, the organism is called a polyploid form. Polyploid cells in some organisms especially plants may be merely scattered throughout diploid tissue. To describe this latter condition, the term polysomaty is used. Polysomaty was first found in the root tip of *Spinacia* in 1910. It has been observed to be present in the roots of other plants also. The first report of the presence of polysomaty in the shoot seems to have been made by Ervin in 1940; he found it in the stem of *Cucumis melo*.

An investigation of the shoot tip of *Spinacia oleracea* was made in a search for polysomatic cells. Young plants were cut and treated with the Craff fixative; sectioned at 10 microns in sagittal sections and stained with either gentian violet or iron-alum haematoxylin.

The infrequency of metaphase plates made the application of secondary criteria necessary. These were (1) cell size, (2) nuclear size, (3) the number and size of nucleoli and (4) the number and size of satellites. Secondary criteria are easily applied to resting nuclei to determine the degree of polyploidy present.

Three regions of the shoot were separately examined. These were the germ layer region, the older apical meristem and the leaf primordia. Plants were divided into two age-groups; the younger plants had the two cotyledonous leaves and one pair of leaf primordia and the older plants had four pairs of leaf primordia in addition to the cotyledonous leaves.

The germ layers were composed of three layers and in some individual plants a fourth. Only the criterion of nucleolar number was applicable and very few polysomatic cells were found. In the older apical meristem polysomatic cells were more numerous than in the germ layers and more frequently seen at distances farthest from the apex. These cells were recognized in most cases by means of the number of satellites. In the leaf primordia, a combination of cell size, nuclear

size and the number and size of nucleoli used together as a standard showed the presence of polysomaty. Tetraploidy was the highest degree of polyploidy found.

According to the indirect criteria of nucleolar number and size, and the satellite number polysomaty occurs in the shoot of *Spinacia*. Tetraploid cells occur in the promeristem (germ layers), the apical meristem and the leaf primordia. Polysomatic cells were more numerous in the apical meristem.

## VARYING OPINIONS ON THE PROBLEM OF PERIODICITY OF MITOSIS

(Abstract)

RICHARD J. ANABLE, S.J.

The problem of periodicity of mitosis and of elongation seem to be so intimately linked that evidence for the one may serve as evidence of the other. Despite the number of investigators, there is no conclusive evidence as to whether or not periodicity is found in any given species. The weight of evidence seems to indicate that plants undergo a daily wave or waves of mitotic activity but this evidence is not strong enough to constitute a final answer. The reason for this variance of opinion lies either in the absence of any periodicity or in the environmental changes of food, light, temperature, etc., under which the various experiments were carried out.

## PHYSICS

### EFFICIENCY OF HIGH FREQUENCY METHOD FOR THERMAL PROCESSING OF DIELECTRICS IN THE CONSTRUCTION OF PLYWOOD PROPELLERS

(Abstract)

REV. JOHN S. O'CONNOR

This paper described a recent installation of the Formica Insulation Co., of Cincinnati, Ohio, which has speeded up the production of plywood propellers by more than a factor of ten.

The ordinary method of processing plywood is by means of a steam press. Heat is transferred by conduction to the stacks of material to be bonded and large temperature gradients result, making optimum conditions for bonding difficult to obtain.

The new method consists in placing the material to be heated between the plates of a condenser, connected through suitable coupling to a high frequency generator. The polarizing action produced by the high frequency electrostatic field on the molecules of the non-conducting material is accompanied by what we may term molecular friction, resulting in heat "losses" which in this case are turned into

heat "gains". This heat is produced uniformly and simultaneously throughout the entire material between the plates. Thus both the efficiency and speed of the process is increased enormously. As the dielectric constant is a function of temperature the oscillating circuit may be so arranged that variation in this constant, of the treated material, changes the capacity of the circuit and the frequency of the oscillator, so that after standardization, the proper moulding or bonding temperature may be read from the calibrated scale of a wave meter.

#### POSSIBILITIES OF THE NEW HIGH SCHOOL COURSE IN AERONAUTICS

(Abstract)

HENRY A. BOYLE, S.J.

The new high school course in aeronautics is not only extensive in its subject matter, but involves some very complex applications of principles from Physics. Hence, if the students have not had a course in Physics (and perhaps even if they have), some care should be taken to explain these principles in their simpler manifestations first.

#### POSITIVISM AND PHYSICAL THEORY

(Abstract)

CHARLES J. LEWIS, S.J.

Logical Positivism attempts to eliminate metaphysics as meaningless by the logical analysis of significant propositions. Since significant propositions are restricted to the empirical,—to describe phenomena—metaphysics is easily eliminated from Positivistic systems. But such systems have not been proved to be the only systems of significant knowledge. Positive science is autonomous in the Positivistic scheme. However, with the acceptance of a metaphysic, a science of the "absolute", Positivistic scientific theory is seen to be essentially incomplete, a science of the "relative". If positive science is then restricted to the correlation and synthesis of phenomena it would seem to follow that some form of the physical theories of the Logical Positivists would be acceptable in the realm of positive science, but it would also follow that positive science is essentially incomplete in the adequate explanation of reality, and needs the complement of metaphysics.

# PHYSICS

## PRE-FLIGHT AERONAUTICS IN SECONDARY SCHOOLS

REV. JOSEPH A. MARTUS, S.J.

"Since October, 1935, Germany has decreed the teaching of aviation from kindergarten through secondary school . . . A series of text-books on the fundamentals of aviation and allied topics have been prepared and are being studied by all pupils in the German schools. Such teaching has been carried on in other countries, including Italy and Japan. It will not be an easy task for the schools in the United States to catch up with this extensive program, but not only must we catch up with it, but we must surpass it and subsequently redirect it from military to social purpose." From "Education for the Air Age", a preliminary statement for teachers and school administrators, prepared by the staff of the Aviation Education Research Project.

Under the direction or the inspiration of the above-mentioned committee, the Connecticut State Department of Education conducted a "Workshop in Aviation Science" at the Teachers College of Connecticut, New Britain, from June 22-24, 1942. The meeting was open to all science teachers and the purpose was to give to all high-school science teachers an appreciation of the fundamentals of aviation science and acquaint them with the need of instilling in students a knowledge of pre-flight aeronautics.

The workshop comprised five sessions, treating aerodynamics, meteorology, navigation, mechanics, flying aids and safeguards, and plans for the coming year. From a verbal report of the meeting, given me by one of the high-school science teachers who attended, the lecturers placed most emphasis on initiating this program by integrating the principles of aeronautics into the science courses already established in high-schools. The physics and mathematics courses would most easily receive the burden of this integration. Integration was advised for the present, rather than the introduction of a separate course on pre-flight aeronautics, though this latter seems to be the final object of school administrators, and no doubt will be introduced this coming year in some of the larger city high-schools. Until such a complete course can adequately be taught, physics teachers, for example, were recommended to illustrate the principles of physics with suitable matter drawn from aerodynamics. It was not urged even that a chapter on aerodynamics should be inserted into the regular course, but rather the more difficult thing for the teacher, of adding or interweaving examples drawn from aviation science. In this way not only will the



student be introduced to the language and ideas of aeronautics, but will also receive fundamental instruction in the science. Aerodynamics is but one of the many branches which can be emphasized in a physics course.

In trigonometry some of the older navigation problems can be taken aloft. This includes the type that will suffer merely a change in context, and some that are peculiar to aviation. Included in the latter we have "finding the angle of bank, the height of a cloudbank, the component of gravity in a glide, the pitch of a propeller, etc." The chemistry course can treat of the gas laws and their use in meteorology. In algebra the distance, rate and time problems can undergo a bit of face-lifting. The foregoing suggestions are, by no means, intended to be complete, for they represent but a skimming of the surface of the literature, currently published by the A. E. R. P.

Should any of our teachers be interested in making a further study of the "air-conditioning" going on at present, they can best write to the "Aviation Education Research Project", N. L. Engelhardt, Director, 525 West 120th St., New York, N. Y. This is a central office of planning and education for pre-flight aeronautics in secondary schools, set up under the C. A. A., and has made available course plans, suggestions, information, bibliographies or books and film-strips. Their largest publication up-to-date is "Pre-flight Aeronautics in Secondary Schools — a Guide for Teachers and School Administrators." Any of their publications can be had for the mere asking.

## NEWS ITEMS

### CANISIUS COLLEGE Department of Biology

The department again occupied a laboratory at the Marine Biological Laboratory, Woods Hole, Mass. Father Frisch continued his studies on the adaptation of *Paramecium* to sea water and the effect of sea water on the physiology of this animal. He now has the animals living in 65 per cent sea water. He was assisted by E. Randolph Kielich, graduate laboratory assistant. John L. Blum, Instructor in Biology, made an algological study of about 150 ponds on Cape Cod and the adjacent islands of Naushon, Nonamasset, Penikese and Martha's Vineyard, from which he collected over 30 species of *Spirogyra*, two of which are new to science. A paper on this work is in preparation. To date Mr. Blum has prepared pen and ink illustrations of 21 species of *Spirogyra* as part of a projected, larger work on this genus, to be forthcoming in about two years. He also collected and pressed over 300 seed plants and 100 marine algae. Samuel Shea, senior student, attended the course in Embryology at Woods Hole during the first semester, and the course in Ecology at the Duke Marine Laboratory, Beaufort, N. C., during the second semester of the summer. John Zerkowski, senior student and Don PoChedley, who graduated last June, also attended the course in Ecology at Duke. PoChedley has accepted a graduate student assistantship at Duke, paying him \$500.00 a year.

His doctorate studies will be in Ecology. Besides the botanical specimens collected, a number of invertebrates, previously missing from our Woods Hole collection, a dozen marine fishes and several large dogfish heads were brought back; also a fine collection of embryological material in the form of complete series of *Squid* and *Fundulus* eggs, from the unfertilized egg stage to the hatching stage; also early cleavage stages of *Starfish*, *Sea Urchin* and *Sand Dollar* eggs, and cell lineage stages of *Crepidula*.

The students at Duke collected and brought back 131 different species of marine invertebrates of the Beaufort region, several odd fishes, two snakes and a collection of insects. Our collection of marine invertebrates from the Woods Hole and Beaufort region is now quite complete and is the only one of its kind in Western New York.

Two new courses, one in Bacteriology and one in Human Anatomy and Physiology, will be given this year in response to a request from the City Hospital to help in the training of their nurses. We expect about fifty nurses to be enrolled in each course. The classes will be conducted on the campus.



## **CANISIUS COLLEGE** **Department of Chemistry**

On Tuesday, September 8th., a dinner was held at Canisius College for the professors, graduates and students of Jesuit Universities and Colleges attending the 104th Meeting of the American Chemical Society.

The number attending the dinner far exceeded the expectations of Rev. T. Joseph Brown, S. J., Chairman of the Department of Chemistry, who arranged the innovation. Fifty-five were present including representatives from Georgetown, Fordham, Holy Cross, St. Joseph's, Loyola, Baltimore, Md., Xavier, Cincinnati, University of Detroit, Brooklyn Preparatory and Canisius College.

Very Rev. Timothy J. Coughlin, S. J., President of Canisius College welcomed the group and Dr. F. O. Rice, Head of the Department of Chemistry, a graduate of St. Francis Xavier's College, Liverpool, England, spoke on "Chemical Education." Suggestions were made at the close of Dr. Rice's talk as to the method of continuing the group dinner at future meetings of the American Chemical Society and Rev. Francis W. Power, S. J., and Father Brown were appointed to act as a committee for the next meeting at Indianapolis, Ind., April 12 to 16, 1943.

The "News Edition" of the American Chemical Society for August 25, 1942, besides carrying the announcement of the group dinner for Jesuit Universities and Colleges, printed an invitation to members of the ACS and their guests to inspect the facilities of the Horan-O'Donnell Science Hall and a quarter-page picture of the main building at Canisius.

Many members and their guests visited the Department of Chemistry during the meeting and were impressed by the design and equipment of this modern physics and chemistry building.

## **HOLY CROSS COLLEGE** **Department of Chemistry**

At the spring commencement at Clark University, Worcester, Mass., Rev. Bernard A. Fiekers, S. J., received the degree of Doctor of Philosophy in Chemistry.

Professor James J. Casey, B.S. '39, M.S. '40 returned to Holy Cross this year to take the place of Dr. E. T. Mitchell who has gone into industry. Professor Casey comes to us with research experience at the Squibb Institute. He will take over the glass blowing course as well, and expects to go on for the doctorate with others in the department at Clark University, Worcester.

In July, Father Fiekers and Professor O. L. Baril took the gas decontamination course given at Worcester Polytechnic Institute under

the auspices of the Worcester Chemists Club, the Institute, and the local civilian defense office. It seems that the public will hear much more of this type of defense, in the coming autumn and winter.

Father Leo Guay, who has come to this department from tertian-ship, represented the college at the Summer Session of the New England Association of Chemistry Teachers, held at the University of New Hampshire in August, the Buffalo meeting of the American Chemical Society in September was attended by Father Fiekers.

Text changes for the year to come, include the introduction of Conant's revised book in organic chemistry, the use of Adams and Johnson's organic laboratory manual and that of Shriner and Fuson in the qualitative organic chemistry course.

The year at Holy Cross will be divided into a Fall Term: September 12th to October 16th; a Winter Term: October 22nd to February 13th, 1943; and a Spring Term from February on. It is hoped that the burden of adjusting to speeded-up schedules will be practically relieved at the end of the Fall Term. From that point on, schedules look much smoother.

The total registration at Holy Cross was given as 1162 students in the middle of September. This is somewhat below the figure for other years. Some departmental registration tallies are as follows: cultural chemistry 14; inorganic chemistry 90; chemical problems 27; organic chemistry 90; qualitative organic 10.

Elective cultural chemistry has an extraordinary low registration figure. This may be ascribed to war-time demand for physics. More laboratory space has thus become available. Experimentation in colloidal chemistry will be conducted in the general laboratory. The old colloid laboratory will be used as a research laboratory for professors and graduate assistants.

Six graduate assistants have started work for the year. The unique arrangement of offering them board, room, tuition, etc., in lieu of the usual graduate stipend, seems to be popular with all of them. Even the local candidates are pleased to reside at the college. In making this arrangement the college reserved the right to revert back to the old fellowship stipend system.

Industry and the armed forces took their toll of appointees on the original list of graduate fellows. The survivors and alternates have sufficient draft-deferment to continue their studies. Most of them come to us after having foregone more attractive opportunities. The citation of recent occupational bulletin number ten in letters to local boards had some effect in filling up the quota.

This year a minor library economy, that might be worth noting, was introduced. Annual volumes of Chemical Abstracts are to be bound without including the annual indices. The latter will then be kept available until the decennials appear. They may then be stored or disposed of, and thus shelf space for one rapidly growing journal is minimized.

## WESTON COLLEGE Chemistry Department

Father Joseph J. Sullivan gave a lecture with a demonstration on Glass-blowing on the subject "REPAIR AND CONSTRUCTION OF LABORATORY GLASSWARE" before the New England Association of Chemistry Teachers during their Summer Conference at the University of New Hampshire, Durham, on August 14th, 1942.

On September 7th, we started a course in Chemistry to train emergency Chemistry Assistants as part of the War Program here.

## WESTON COLLEGE Seismological Observatory

A recent and very valuable loan to the Weston Observatory was the Spindler-Hoyer Seismograph Clock belonging to Holy Cross College. This loan was made possible through the kindness of the Rev. J. R. N. Maxwell, S. J., Rector of Holy Cross. This clock was originally purchased in 1909 from Spindler-Hoyer, Gottingen, to supplement the Wiechert 80kg seismograph Holy Cross purchased from that Company. In recent years it has not been in operation at Holy Cross, but at present is in running condition at Weston.

A 0.5 second timing unit developed and built by the Waltham Watch Company was recently presented to the Observatory. This unit operates from four flashlight cells (6v) with an average current drain of 10 milli amperes. It is composed of an electrically driven balance wheel and relay, and has a fairly high efficiency in a temperature range from 0° to 120° F. We shall find such a timing unit very valuable in portable work, where the 0.01 second timing apparatus we ordinarily use is too fast. Such work would consist mainly in timing large quarry blasts.

The dark-room, Bosch-Omori and Wiechert vault, the Battery room, and the Radio room and workshop, were completely renovated and painted during August, just in time for the Convention. Messrs. Blais and Weeks are entirely responsible for the improvements.

After three years absence Mr. Edward R. Powers (Md.Ny.) returns as seismologist to Weston Observatory. Due to his efforts during the summer, back numbers of the Preliminary Station Bulletin have been brought up to date.

A group of papers published under the auspices of the Committee on Geophysical Research at Harvard University on the New Hampshire Earthquakes of 1940, and published in the April, 1942 number of the Bulletin of the Seismological Society of America contained the author names of Revs. J. J. Devlin, S.J., L. C. Langguth, S.J., and D. Linehan, S.J., of Weston.



During the August Convention of the American Association of Jesuit Scientists (New England) the Observatory was open for inspection to visitors. Besides the instrumental display in the various vaults, there was also a photographic display of the portable apparatus and Department Publications in the Office. Father Linehan gave a brief talk at the Meeting on some of the seismic field work done by the Department.

This year Seismology is being offered as a "Cursus" in the Weston College Catalog.

### **CHEVERUS HIGH SCHOOL**

Three new schools were either opened or taken over by the Society in our two Provinces this Fall. We, at Cheverus High School, have, perhaps, a different problem from most of our schools. The industry of the City of Portland is centered almost completely around the shipyards built for what some consider the second best harbour in the world. The importance of this, even in the field of education, cannot be over emphasized, especially at the present day. A large number of the boys look forward to occupations which are connected with these shipyards, either immediately after high school, or after completing their education elsewhere. At present there are three courses taught in the school, a strictly classical course, which comes closest to our ideal of education, a business course which trains the boys adequately for that field after graduation, and a general cultural course. It is under consideration at present to transform the last of these into a science course which would have for its purpose the laying of a foundation for a technical training for those desiring positions in the various fields at the shipyards. Such a course would include the three fundamental sciences, four years of mathematics and the modern languages.

At present Chemistry is the only science taught. The facilities are of the compact type which has both the laboratory and the class room in the same room. This room has been used for Chemistry for only two years so all the equipment is new. There is laboratory space for twenty-four boys. This year we have twenty-nine taking the course.

### **CRANWELL PREPARATORY SCHOOL**

#### **Chemistry Department**

Father Joseph Martus is the new chemistry teacher at Cranwell Prep, replacing Father Gerald Landrey, who went to Fairfield Prep.

A course in Pre-Flight Aeronautics will be given by Father Martus as an elective to Seniors. Present plans call for a course of two hours per week for the entire year. The hours of class will be added on to the Seniors' regular schedule, as no time will be deducted from other classes to make room for the aeronautics course.



