

American Association of
Jesuit Scientists

EASTERN STATES DIVISION

PROCEEDINGS
of the
FOURTH ANNUAL MEETING



HOLY CROSS COLLEGE, WORCESTER
AUGUST 12 and 13
1925

Program of the Fourth Annual Meeting

WEDNESDAY, AUGUST 12TH

10.00 A. M. GENERAL MEETING:

Call to Order.

Welcome from Very Reverend Joseph N. Dinand, S.J., President
of Holy Cross College.

Appointment of Committees.

Reports of Standing Committees.

Miscellaneous Business.

Presidential Address, "Some Aspects of Recent Scientific Con-
troversies and Our Responsibility."

3.00 P. M. MEETINGS OF THE SECTIONS:

Physics, Mathematics, Chemistry and Biology.

THURSDAY, AUGUST 13TH

10.00 A. M. SECTIONAL MEETINGS CONTINUED:

3.00 P. M. GENERAL MEETING:

Report of the Nominating Committee.

Reports of Other Committees.

Resolutions.

Miscellaneous Business.

Discussion of the Syllabus for the Province B.S. Course.

Adjournment.

PROCEEDINGS

The fourth annual meeting of the American Association of Jesuit Scientists (Eastern States Division), was held at Holy Cross College, Worcester, August twelfth and thirteenth.

The first general session was called to order at 10.00 A. M. by the President. The minutes of the previous meeting were accepted as printed in the "Proceedings, 1925." In the absence of Mr. Muenzen, Mr. Crotty was elected acting secretary. The following committees were appointed:

- Committee on Nominations: Fr. Strohaber, Chairman.
Fr. Gipprich.
Mr. Dubois.
- Committee on Resolutions: Fr. Phillips, Chairman.
Mr. Gookin.
Mr. Bihler.

After the appointment of the Committees followed the

Presidential Address

Some Aspects of Recent Scientific Controversies and Our Responsibility

REV. M. J. AHERN, S.J.

It is my privilege to present to you the viewpoint of every orthodox Christian on the relations between Science and Religious Beliefs, especially referring to evolution. What I have to say will present to you a synopsis of the matter as it is found substantially in many Catholic books and as it is taught generally in Catholic schools and colleges.

I shall view the matter first, historically. In this regard, three charges are habitually brought against the Catholic Church; first, that the Catholic Church was always opposed, officially and unofficially to the conclusions of science; second, that she condemned Galileo because of this opposition; third, that she burned Giordano Bruno at the stake because he advocated the Copernican system of astronomy. Of the first charge, the most recent propounder is an eminent astronomer, Dr. George Ellery Hale, Honorary Director of the Mount Wilson Solar Observatory. In his little work, "The Depths of the Universe," he says of the cardinals of the Inquisition: "But their minds were closed and no conclusions of science could penetrate them." He says that when Galileo first directed his telescope towards Jupiter on the night of January 7, 1610, "he literally took his life in his hands." The fact is that in the Catholic Church men have

always been as free to make scientific discoveries and propound and discuss scientific theories as anywhere else on earth. The Church has never made an official declaration on a matter of pure science. Whenever she has spoken in connection with science it has been only when some scientists used science as a weapon against religion. Even here she has spoken very rarely, the one outstanding instance is the case of Galileo.

In regard to this case, here are the facts:

First:—The prevailing scientific theory at the time of Galileo, common to both Catholics and Protestants, was that the earth and not the sun was the center of the Solar system. This theory was based on a priori reasoning from Aristotle, the universal authority in all controversies at that time, and on the apparent evidence from Scripture. I am not defending this view; but I am insisting that the standpoint of Galileo's contemporaries be recognized.

Second:—Catholics admit that the official action of the Church authorities in declaring the Copernicus theory not only "false," but also "heretical" because altogether contrary to Scripture, was a blunder.

Third:—This declaration of the Church authorities was not a pronouncement *ex cathedra*, hence it is no argument against Papal infallibility. Thus, the Protestant astronomer, Proctor, writes: "The Catholic doctrine on the subject is perfectly definite, and it is absolutely certain that the decision in regard to Galileo's teaching, shown now to be unsound, does not in the slightest degree affect the doctrine of infallibility, either of the Pope or of the Church. The decision was neither *ex cathedra* nor addressed to the whole church; in not one single point does the case illustrate this doctrine of Papal infallibility as defined by the Vatican council."

Fourth:—Galileo was never tortured or persecuted.

Fifth:—The statement that Galileo murmured under his breath, "E pur si mouve," i. e., "yet it does move," is a myth. There is no trace of it in the stenographic reports of his trial; the earlier known sources of it appears to be the Abbe Iraitlh's *Querelles Litteraires*, Paris, 1761.

A dispassionate observer would say that the Church has a rather good record in its relations with science, when the case of Galileo is the only case of its kind which has been brought against her. Huxley was certainly not biased in favor of the Catholic Church; yet he says: (*Life and Letters*, London, 1900, Vol. II, page 113) "I looked into the matter when I was in Italy and arrived at the conclusion that the Pope and college of cardinals had rather the best of it." Hale says again: "When Copernicus, years before Galileo's discovery, presented his arguments against the geocentric system, they were received with universal scorn." Against this sweeping statement here are some historical facts. Copernicus was

a canon of the Catholic diocese of Frauenburg and though not certainly ordained priest, was once nominated for the bishopric of Erm-land, and was at one time administrator of the diocese of Frauenburg. He published an abstract of his theory in 1533. Two years later Albert Willinanstodt lectured on the theory before Pope Clement the Seventh. The principal patron of Copernicus in the final publication of his work in 1542 was Cardinal Schonberg. The work was dedicated to Pope Paul III. Opposition to the work on the Catholic side only began 73 years later, occasioned by Galileo.

The work of Copernicus was not unqualifiedly forbidden by the Index in 1616. It was allowed to be printed after certain propositions held as certain by Copernicus were changed to read as being held merely probable. In this regard we must remember that the first actual proof of the heliocentric and Copernican theory was based on Newton's laws of motion in 1696. In fact, neither Galileo nor any other scientist of the time had any convincing proof of the heliocentric theory.

As to Giordano Bruno, who was an apostate Dominican monk, and one of the most irreligious of men, he was condemned for his heresy, which was a civil crime in Italy in the seventeenth century, not for his defense of the Copernican system. His attitude towards science did not enter into his condemnation at all.

As to the modern attitude of the Catholic Church toward science, there is no ecclesiastical restriction whatever upon any Catholic priest or layman, admitting any fact of natural science, or holding any theory that does not contradict a revealed truth of Catholic faith. In the latter event, of course, the author of the theory would be going out of his province to deliver judgment in the matter of religion, which, as all scientists will admit, he has no right to do, no more than a theologian has to pass judgment in science merely because he is a theologian.

What about evolution?

We distinguish three kinds of evolution, historical, physical, biological. Historical evolution is simply the history of human progress. Hence we speak of the evolution of the steamboat, of the automobile, of painting, of forms of dress, and so forth. Man has brought this kind of evolution about, often with definite intent. Physical evolution means the orderly development of the universe brought about by natural laws. Thus we speak of the evolution of the stars, and of the chemical elements.

Obviously the Catholic scientist can see no incompatibility between these two kinds of evolution and his religious beliefs.

How about biological evolution?

Briefly, we Catholics believe in an omnipotent God who created the universe and all its laws. Granting these two facts of God's existence and His creation of the world—which are facts of irrefra-

gable in science also—evolution, if also a fact, was and is God's method or mechanism in bringing the world to its present state. A believing Catholic is then free to accept evolution if he finds the evidence sufficient. This statement needs no qualification as far as the whole of the animal and vegetable kingdom below man is concerned.

Regarding man, it is a fact of the Catholic religion as demonstrable as any fact of science, that each individual human soul is created by God directly. As to the possibility of the formation of Adam's body by divinely directed evolution, until that body was infused by a soul directly created by God, thus becoming the first man and the father of the human race, I may quote Professor Windle as correctly summing up the Catholic attitude—"we find that although the advocacy of this theory has been discouraged by the Roman ecclesiastical authorities, it has not, down to the present received any public official censure from any of the Roman Congregations—still less has it been condemned as heretical through the formal definition of the opposite doctrine as *de fide*. Hence should real proof of the original evolution of man's body ever come to light—which does not seem likely at present—the Church would have no difficulty in accepting that opinion as she is not committed in any irrevocable manner to the opposite doctrine."

What is our responsibility as Jesuit teachers of science in these controversies? We must insist that the Catholic Church alone has all the absolutely correct theological and philosophical bases for the solution of these and of every other problem. These bases we must somehow or other inject into the minds of the learned world of science. We do this, of course, by participating in controversy when there is need, such controversy being helpful for the removal of doubts from the minds of our Catholic people, and occasionally from the minds of scientists outside the Church. In regard to the latter we must remember that purely negative criticism does not effect much good in the way of producing conviction; but positive, constructive criticism does. Such criticism demands positive first-hand knowledge, and in addition, the marketing of that knowledge through the proper vehicles. All this means that we posit ourselves as specialists in some particular line, that we must have membership, active membership, in learned societies, that we must carry on and publish the results, our researches, that we must be frequent contributors to scientific magazines. Our presence and our activities in the ways outlined will be a very effective apologetic. Over twenty years' membership in several learned societies have convinced me of the truth of the above statement.

A motion was then made by Fr. Strohaber to postpone the reading of papers until 9.00 A. M., Thursday, so as to open the house at once to a discussion of the proposed B.S. Course. The motion was seconded by Fr. Love and carried. The proposed B.S. Course as out-

lined by Fathers Coyle and Gipprich was placed before the house and discussed in detail.* The discussion on the Freshman course lasted until 11.30 A. M., when a motion was made, seconded and carried to adjourn.

At 3.00 P. M. the meeting was re-opened, and the afternoon was spent in the discussion on the Sophomore, Junior and Senior courses. A motion was carried for adjournment to meet again the following morning at 9.00.

Thursday, 9.00 A. M. Meetings of the different sections.

At 3.00 P. M. the final general meeting took place. The revised B.S. Course was read, and the recommendations of the various sections in regard to it were adopted. It was also recommended by the Physics' section that, after the electives have been decided upon, there should be courses in the subjects during the Summer School. It was also recommended that the Physics' section should be divided into two parts for Summer School work; one for those just coming out of Philosophy, the other for the older regents.

Fr. Strohaber, chairman of the Committee on Nominations, submitted the report of the Committee and moved that the nominations be allowed to be made from the floor. The motion was seconded by Fr. Gipprich and carried.

Nominees for president: Fr. Phillips, Fr. Strohaber, and Fr. Ahern. Fr. Strohaber was elected.

Nominees for secretary: Messrs. Crotty, Long, and Quigley. Mr. Quigley was elected.

Next followed the report of the Committee on resolutions. Fr. Phillips read the following resolutions:

"The Association being desirous to show its gratitude for the kind reception extended to it at Holy Cross College, be it resolved:

"That the President of the Association express in its name to Reverend Father Rector our appreciation of the kind hospitality we have received during this, the Fourth Annual Meeting of the Association.

"Be it also resolved that a rising vote of thanks be extended to the President of the Association for his care and zeal in providing both for our instruction and our entertainment not only during the meeting of the Association, but also throughout the session of the Summer School."

Fr. Ahern then read a letter from Mr. Shiple. Mr. Shiple in his letter offered his own services and that of his colleagues in the mimeographing of the Bulletin during the coming year. He also offered some suggestions which would tend to facilitate the work. After the

* On January 2nd, 1926, at St. Francis Xavier's, New York, a schedule of studies leading to the degree of Bachelor of Science was proposed by the delegated professors of science and mathematics of the Province and Vice-Province. It was not thought necessary, therefore, to enter here in the "Proceedings" the detailed recommendations made during the meeting on August twelfth and thirteenth.

reading of the letter, Fr. Phillips moved, and the motion was seconded and carried:

(1) That expenses of the Bulletin be accepted "pro rata."

(2) That the suggestions of Mr. Shiple with regard to the mimeographing be adopted, and that the generous offer of the men at Woodstock be accepted.

(3) That Mr. Shiple and his co-workers at Woodstock be thanked for their past services and their generous offer.

Fr. Ahern urged the importance of the writing of papers for the Bulletin, and stressed the necessity of finding some means of getting the papers early in the year.

There was a discussion about the possibility of having the men at Woodstock, who have taught the various branches of science, attend the meetings of the Association. The executive committee voiced its approval of the suggestion.

Thanks were given to the retiring officers for their generous services.

This was followed by a seconded motion for adjournment.

Papers Read in the Various Sectional Meetings

BIOLOGY

Chairman's Address

Rhythm of Respiration

REV. C. E. SHAFFREY, S.J.

Australopithecus Africanus

REV. JOSEPH S. DIDUSCH, S.J.

(Abstract)

The latest of the "Missing Links," *Australopithecus Africanus*, was discovered at Taungs, South Africa, towards the end of 1924. The remains consist of a rather complete fossilized skull. From the fact that the premolar teeth have just erupted, the inference is drawn that the ape was very young, perhaps three or four years old.

Dr. Raymond A. Dart, Professor of Anatomy in the University of Witwatersand, Johannesburg, South Africa, who has made a study of the skull, maintains that the ape had a higher degree of intelligence than any of the anthropoids thus far discovered, and is to be considered a man-ape rather than an ape-man. He bases his claim principally upon three factors, the facial features, the size of the brain and certain localized areas in the brain. His argument from the facial features seems to carry little weight, for in an immature ape the distinctively obtrusive simian traits are much less pronounced than in the adult. Had this young ape lived to maturity it would doubtless have in this respect differed little, if at all, from other anthropoids.

Dart supposes that the brain of a full-grown *Australopithecus* must have attained a dimension of 700cc. However, this is only about half the size of the modern human European brain. Moreover, no conclusion can be drawn from the size of the brain since many of the keenest minds of the world were stored in very small brains, while many men of large brain capacity were of decidedly low mental calibre.

With regard to brain localizations, Dart is again treading on

uncertain ground. The fact that the two sulci, the lunate and the parallel, are further apart in *Australopithecus* than in any of the other anthropoids, does not necessarily imply a nearer kinship with the human species, since these sulci and the areas or expansions (frontal, parietal and temporal) which they affect, show a considerable variation even in man. But what is more to the point, even the credulous Professor G. Elliot Smith fails to find in Dart's photograph the sulci and expansions in question, and his dioptographic tracing of the right side of the skull seems to be a mere figment of his own brain.

The proposal of Dart to create a new family of anthropoids, the *Homo-simiadae*, of which *Australopithecus* should be the first representative, has not met with general approval, nor has the status of the newly-discovered ape been settled by any means. Dart must needs furnish some real evidence before the claims which he has made regarding it can be accepted.

The Fibro-Vascular Bundle

MR. E. C. DUBOIS, S.J.

The Micro-Dissection of the Cell

MR. A. J. MACCORMACK, S.J.

The purpose of this paper was to describe briefly a new method of discovering, if possible, the structure of the protoplasm of the cell. The protoplasm has been called "the physical basis of life," since it is universally present wherever life is found. At the present time three theories of its structure hold the field. They are, the granular, reticular, and the alveolar or "foam theory." The last is the most common among biologists.

This new method seeks, by dissecting cells under the high power of the microscope by glass needles, a solution of the problem. The glass needles are drawn out to a point of invisibility, and these points angled for the different operations. At the other end, they are inserted in a holder, which mechanically moves them independently in any of three planes, desirable to the operator. The tips project into a moist chamber. The roof of this is formed by a cover-glass, on which is a hanging-drop preparation, containing the cells to be dissected. As there is nothing above the cover-glass, oil-immersion lens may be used. A special condenser is used, since much light is required.

Another branch of the method is the injection of various substances, and observing their effects on the cell. Usually these are kept outside the cell by the properties of the semi-permeable membrane that surrounds the cells. The opening of the micro-projector is

.0005 mm. in diameter, the injection being forced in by mechanical pressure. This gives instant control of the injection.

So far, the work has been on the cortex, cytoplasm, nucleus, and chromosomes and the various reactions between them, both in a normal condition, and when they are injured or disarranged by the needles. As the work depends a great deal on individual and subjective interpretations, there is, as yet, not much to be said of the results. With the advent of further workers, and the consequent checking-up of their various observations, perhaps we will come nearer the understanding of the physical make-up of protoplasm.

Some Interesting Facts About the Honey-bee

MR. G. J. KIRCHGESSNER, S.J.

The Queen-bee is astonishingly prolific. In five or six years she may be the mother of two million individuals. In all her life the queen-bee has only one mate.

The Drones have no father, i. e., they are born parthenogenetically.

The Workers are ordinarily incapable of motherhood. The eggs which they do lay on certain rare occasions never develop into anything but drones. But on the other hand, the workers are capable of performing a large number of tasks with consummate skill, e. g., gather honey and pollen, nurse the young, regulate the temperature of the hive, produce wax and build the honey-comb; for all of which they are remarkably adapted by their physical structure and psychological bent.

CHEMISTRY

Chairman's Address

Activated Carbon

REV. GEORGE L. COYLE, S.J.

Research in Chemistry for Ours

REV. M. J. AHERN, S.J.

(Abstract)

The National Research Council has asked the colleges to cooperate in solving some problems of chemistry, which, it appeared to the speaker, offer a good opportunity to Ours to do some simple, but very effective research. The Council has a number of substances of which the boiling or melting points are not accurately known. They

would have to be first purified. The procedure would be then to ascertain the correct constants through a series of determinations, that require care and a search through the literature, (which can be done in any public library), but which do not require elaborate apparatus. Any one of our college laboratories has the necessary glassware and porcelain ware. The most necessary instrument is an accurate thermometer or two, one that is calibrated accurately by the Bureau of Standards, and from which any number of laboratory instruments can be corrected. The determinations described make admirable subjects for theses written with a view to the Master's Degree.

The Problem of Supply

REV. G. F. STROHAVER, S.J.

The Photographic Equipment of the Science Department

MR. J. A. BLATCHFORD, S.J.

The paper dealt briefly with the importance and usefulness of proper photographic equipment in the various scientific courses in a college, stressing mainly, however, the means to accomplish it. Numerous plans for various types of developing rooms and their equipment were thoroughly explained. The very important topic of suitable ventilation and at the same time the rigid exclusion of white light were carefully explained. A number of illustrations showing how to overcome the difficulties were demonstrated. The lecture was illustrated with about fifty lantern slides taken chiefly from the publications of the larger photographic firms, e. g., Eastman Kodak Co. and la-ko Co.

Some Applications of Metallic Properties in Dentistry

MR. V. A. GOOKIN, S.J.

(Abstract)

The relief of suffering and prevention of decay is due often to applications of metallic properties. From 15 to 20 metals are commonly used. Gold used because of its malleability and ductility. Easily burnished, its edges are strong and not brittle. Silver fillings are alloys. The standard base is 65 per cent Ag. and 35 per cent Sn. These are amalgamated. The first expands on setting with Hg. and the second contracts, and the proportion allowed means a good control of expansion. Manufacturers vary the other metals in amount. Cu. when added seems to prevent decay, although this is uncertain, and there is no explanation of the reason. It blackens the alloy because of formation of CuS. after contact with Saliva. Au. added sometimes to give edge strength. Zn. hastens setting, and its sulphide, if formed, whitens the entire filling. These, when used, are in proportions of less than 5 per cent. Several other metals have been tried in the alloy, but the brittleness of edges is a great defect. This

breaking of the edges allows ingress for food particles and bacteria. Dental cements are oxides of zinc mixed at time of use with phosphoric acid. Other oxides are mixed in to vary the color. Ammonia present in the Saliva as salts has a solvent effect on cement filling. Copper oxides resist this when mixed with some other oxides, but the cement is a brown color, and its use is limited to posterior teeth. A "white copper" cement of zinc oxide (95 per cent) and copper (ous) oxide (5 per cent) has had some success. Artificial enamels are oxides of Beryllium and Silicon. Like other cements they are mixed with phosphoric acid. Phosphates of Al. and Zn. are sometimes added. Other uses of metals are for solders and dies. The solders are gold, german silver, etc. In making dies Babbitts metal is often used. One metal (Richmonds metal) is interesting. It is as hard as Zinc, melts at 150, and can be poured into a plaster impression without generating steam. Gives a good die. Sn. 20% Pb. 19% Cd. 13% Bi. 48% is mixture formula. Platinum is used for pins to be cemented into teeth to sustain bridgework and crowns. Its resistance to corrosion is well known. If Iridium is alloyed with it the pin has a "spring" that yields to pressure and prevents fracture. The pressure of the jaws ranges from 100 to 150 pounds, and strength coupled with some flexibility is necessary. Resistance to chemical changes that are brought about by the elements present in the Saliva is also needed. Alloys and cements with less defects than those now used and yet with permanent color are the objects of research in this field.

The Future of High School Chemistry

MR. H. J. BIHLER, S.J.

The speaker began with a refutation of some of the charges usually leveled against High School Chemistry on the score of its inefficiency and uselessness. He made no attempt to hide its defects, or to defend everything in High School Chemistry. But he did urge that many of the objections raised against it were due to the present lack of standardization in our High Schools. These, he contended would disappear largely when the newly proposed "Standard Minimum High School Course" was universally adopted, as it bids fair to become. To substantiate his remarks, he cited the improvement and benefits that resulted when the present College course was standardized and standardized text-books were universally used. The same results might logically be expected once the High School course were similarly standardized.

He outlined what he considered the future of High School Chemistry, and contended that its real scope should be, or at least could be made to be, of a preparatory nature. If it were made this, the way would be open at least to a better College course, and it might be, to a more extensive course in the higher branches of College Chemistry.

For then the College professor would know exactly what to suppose and build on. The speaker saw in the new text-book on Second Year Inorganic Chemistry the proper one to begin with in Freshman B.S. course; presupposing, of course, the student has had the standardized course in High School.

He ended by reading the Committee Report on the "Standard Minimum High School Course in Chemistry," and deprecated the tendency of College teachers to minimize and undervalue the worth and importance of High School Chemistry for themselves.

MATHEMATICS

Chairman's Address

Recent Developments in Wireless Longitude Work

REV. C. E. PHILLIPS, S.J.

The address outlined the great improvements that had been effected in the reception and automatic recording of wireless time signals in recent years and gave some account of the rapidly maturing plans for completing the international net of astronomical and radio stations which will encircle the globe. A description was given of the radio recording apparatus used at the Woodstock College Observatory, and samples of the automatic records of the Arlington time signals secured on the Observatory chronograph were exhibited. The apparatus used at Woodstock is a simplified form of that used at the United States Naval Observatory where signals are recorded daily both from American and from European stations. With regard to the international longitude net, attention was called to the fact that one station of that net has been entrusted to the Society by the French Government; this station will be in China and will be conducted by the French Jesuits who have done such excellent work in meteorology and astronomy at their observatories near Shanghai, namely at Zi-ka-wei and Zo-see.

On the Discriminant Method of Determining Envelopes

REV. C. E. PHILLIPS, S.J.

In this paper a brief outline was given of the application of the application of the discriminant of an algebraic equation to the determination of the envelope of a one-parameter family of curves. The method is not a new one and can be found in almost any text-book on Differential Equations, but as the method is not usually given in the text-books on Calculus it was thought that the presentation of the problem from this aspect would be of interest to those who had followed the course in Calculus given during the Summer School.

College Algebra

MR. G. A. O'DONNELL, S.J.

**Observations of the Total Eclipse of January 24, 1925, by the Electric
Light Companies of the City of New York**

MR. E. J. NUTTALL, S.J.

PHYSICS

Chairman's Address

The Vacuum Tube Amplifier and Some of Its Applications

REV. H. M. BROCK, S.J.

Diffraction Gratings

REV. J. L. GIPPRICH, S.J.

Possibilities in the Radio Field

REV. D. H. SULLIVAN, S.J.

Membership of Association 1925---1926

General Officers

PRESIDENT

Rev. George F. Strohaber, Holy Cross College, Worcester, Mass.

SECRETARY-TREASURER

Thomas H. Quigley, Holy Cross College, Worcester, Mass.

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Rev. A. J. Hohman, Boston College, Boston, Mass.

Rev. C. E. Shaffrey, St. Joseph's College, Philadelphia, Pa.

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Rev. H. M. Brock, Weston, Mass., *Editor-in-Chief*

Secretaries of Various Sections, *Sub-Editors*

EDITOR OF PROCEEDINGS

Thomas H. Quigley, Holy Cross College, Worcester, Mass.

MEMBERS AND SECTION OFFICERS

1925—1926

Note:—The figures at the end of each entry indicates the year in which member was admitted into the Association.

HONORARY MEMBER

Mr. George C. Jenkins, 1924, Baltimore, Md.

BIOLOGY SECTION

OFFICERS (1925-1926)

- President, Rev. Clarence E. Shaffrey, St. Joseph's College,
Philadelphia, Pa.
Secretary and Sub-Editor of Bulletin, Harold L. Freatman,
St. Joseph's College, Philadelphia, Pa.

MEMBERS

- Avery, Rev. Henry C. 1923. Ateneo de Manila, Manila, P. I.
Busam, Rev. Joseph F., 1922. Woodstock College, Woodstock, Md.
Didusch, Rev. Joseph S., 1922. Shadowbrook, W. Stockbridge, Mass.
Dubois, Evan C., 1924. Boston College, Boston, Mass.
Freatman, Harold L., 1924. St. Joseph's College, Philadelphia, Pa.
Frisch, Rev. John A., 1924. Canisius College, Buffalo, N. Y.
Kirchgeßner, G. J., 1925. Fordham University, N. Y. City.
MacCormack, A. J., 1924. Holy Cross College, Worcester, Mass.
McCauley, David V., 1923. Woodstock College, Woodstock, Md.
McWilliams, Raymond J., 1922. Woodstock College, Woodstock, Md.
Pollock, John A., 1923. Woodstock College, Woodstock, Md.
Pouthier, Rev. Edward S., 1923. Woodstock College, Woodstock, Md.
Reardon, Francis X., 1925. Ateneo de Manila, Manila, P. I.
Reith, Joseph, 1922. Woodstock College, Woodstock, Md.
Shaffrey, Rev. Clarence E., 1923. St. Joseph's College, Philadelphia,
Pa.
Tondorf, Rev. Francis A., 1923. Georgetown Univ., Washington,
D. C.

CHEMISTRY SECTION

OFFICERS (1925-1926)

- President, Rev. Arthur J. Hohman, Boston College, Boston,
Mass.
Secretary and Sub-Editor of Bulletin, Hugh J. Bihler, St.
Joseph's College, Philadelphia, Pa.

MEMBERS

- Ahern, Rev. Michael J., 1922. St. Joseph's College, Philadelphia,
Pa.
Bihler, Hugh J., 1925. St. Joseph's College, Philadelphia, Pa.
Blatchford, John A., 1923. Loyola College, Baltimore, Md.
Brosnan, Rev. John A., 1923. House of Phil., Weston, Mass.
Brown, T. Joseph, 1922. Woodstock College, Woodstock, Md.
Butler, Thomas P., 1922. Woodstock College, Woodstock, Md.
Coyle, Rev. George L., 1922. Georgetown Univ., Washington, D. C.

Fay, Rev. T. August, 1923. Woodstock College, Woodstock, Md.
 Gisel, Eugene A., 1925. Ateneo de Manila, Manila, P. I.
 Gookin, Vincent A., 1923. Georgetown Univ., Washington, D. C.
 Hohman, Rev. Arthur J., 1922. Boston College, Boston, Mass.
 Langguth, Rev. Aloysius B., 1923. Poughkeepsie, N. Y.
 MacLeod, Henry C., 1924. Canisius College, Buffalo, N. Y.
 Martin, Rev. Richard, 1923. Fordham University, N. Y. City.
 McCullough, Henry B., 1923. Woodstock College, Woodstock, Md.
 McLoughlin, Rev. Henry W., 1922. Mount Manresa, Staten Island,
 N. Y. City.
 Muenzen, Joseph B., 1923. St. Louis University, St. Louis, Mo.
 Power, Francis G., 1924. Fordham University, N. Y. City.
 Schmitt, Rev. Richard B., 1923. Ateneo de Manila, Manila, P. I.
 Shiple, George J., 1923. Woodstock College, Woodstock, Md.
 Sohon, Frederick W., 1923. Valkenburg, Limburg, Holland.
 Strohaber, Rev. George F., 1922. Holy Cross College, Worcester,
 Mass.
 Sullivan, Rev. Joseph J., 1923. Loyola High School, Baltimore, Md.
 Tivnan, Rev. Edward P., 1923. House of Phil., Weston, Mass.

PHYSICS AND MATHEMATICS SECTION

OFFICERS

Physics—President, Rev. J. L. Gipprich, Georgetown Univ., Wash-
 ington, D. C.
 Secretary and Sub-Editor of Bulletin, Thomas L. McLaugh-
 lin, Boston College, Boston, Mass.
 Mathematics—President, Rev. Edward C. Phillips, Georgetown Univ.,
 Washington, D. C.
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Archer, Rev. Peter, 1922. Boston College, Boston, Mass.
 Berry, Edward B., 1922. Woodstock College, Woodstock, Md.
 Brock, Rev. Henry M., 1922. House of Phil., Weston, Mass.
 Carasig, Rev. Paul, 1923. Woodstock College, Woodstock, Md.
 Codaire, George A., 1924. Brooklyn College, N. Y. City.
 Crawford, Rev. William R., 1924. Loyola College, Baltimore, Md.
 Crotty, Edward M., 1925. Canisius High School, Buffalo, N. Y.
 Crowley, John J., 1922. Woodstock College, Woodstock, Md.
 Dawson, Rev. James F., 1923. Woodstock College, Woodstock, Md.
 Delaney, Rev. John P., 1923. Woodstock College, Woodstock, Md.
 Deppermann, Rev. Charles E., 1923. St. Ignatius College, San Fran-
 cisco, Cal.

Doucette, Bernard F., 1925. St. Joseph's College, Manila, P. I.
 Gipprich, Rev. J. L., 1922. Georgetown Univ., Washington, D. C.
 Hearn, Joseph R., 1925. Loyola High School, Baltimore, Md.
 Higgins, Patrick J., 1923. Woodstock College, Woodstock, Md.
 Kelley, Rev. Joseph M., 1922. Boston College High, Boston, Mass.
 Kelly, Joseph P., 1922. Woodstock College, Woodstock, Md.
 Kennedy, William W., 1923. Boston College High, Boston, Mass.
 Kolkmeier, Rev. E. M., 1922. Woodstock College, Woodstock, Md.
 Logue, Louis R., 1923. Woodstock College, Woodstock, Md.
 Logue, Rev. William G., 1923. Fordham University, N. Y. City.
 Long, John J., 1924. Georgetown Prep., Garrett Park, Md.
 Love, Rev. Thomas J., 1923. Canisius College, Buffalo, N. Y.
 Lynch, Rev. Daniel J., 1923. Boston College, Boston, Mass.
 Lynch, John J., 1922. Valkenburg, Limburg, Holland.
 Mahoney, Rev. Daniel P., 1924. Holy Cross College, Worcester, Mass.
 Mahoney, Rev. James B., 1925. Ateneo de Manila, Manila, P. I.
 McAree, Rev. Joseph F., 1923. Woodstock College, Woodstock, Md.
 McCormick, Rev. James T., 1923. Boston College High, Boston, Mass.
 McGarry, Rev. William J., 1923. Woodstock College, Woodstock, Md.
 McLaughlin, Thomas L., 1923. Boston College, Boston, Mass.
 McNally, Herbert P., 1922. Woodstock College, Woodstock, Md.
 McNally, Rev. Paul A., 1923. Poughkeepsie, N. Y.
 Merrick, Joseph P., 1923. Woodstock College, Woodstock, Md.
 Miley, Rev. Thomas H., 1923. St. Joseph's Coll., Philadelphia, Pa.
 Moore, Thomas H., 1923. Georgetown Univ., Washington, D. C.
 Murphy, John J., 1922. Woodstock College, Woodstock, Md.
 Nuttall, E. J., 1925. Georgetown Univ., Washington, D. C.
 O'Connor, John S., 1923. Fordham University, N. Y. City.
 O'Donnell, George A., 1924. Georgetown Univ., Washington, D. C.
 O'Loughlin, Rev. Francis D., 1923. Fordham University, N. Y. City.
 Phillips, Rev. Edward C., 1922. Georgetown Univ., Washington, D. C.
 Quigley, Thomas H., 1925. Holy Cross College, Worcester, Mass.
 Rafferty, Rev. Patrick, 1923. Davao, Mindanao, P. I.
 Risacher, Rev. John A., 1923. Holy Cross College, Worcester, Mass.
 Roth, Albert C., 1923. St. Francis Xavier High, N. Y. City.
 Roth, Charles A., 1923. Ateneo de Manila, Manila, P. I.
 Sheridan, Robert P., 1922. Woodstock College, Woodstock, Md.
 Slocemeyer, Rev. Hugo F., 1924. St. Louis Univ., St. Louis, Mo.
 Smith, Rev. John P., 1923. St. Peter's College, Jersey City, N. J.
 Smith, Thomas J., 1925. Ateneo de Manila, Manila, P. I.
 Sullivan, Daniel H., 1923. Poughkeepsie, N. Y.
 Tobin, Rev. John A., 1923. Woodstock College, Woodstock, Md.
 Toolin, Francis J., 1925. St. Joseph's College, Manila, P. I.
 Walsh, Joseph B., Posillipo, Naples, Italy.
 Wessling, Rev. Henry J., 1923. Boston College High, Boston, Mass.