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Bulletin of American Association of Jesuit Scientists

EASTERN STATES DIVISION

VOL. XXII | OCTOBER, 1944 | No. 1

THE EDITOR'S PAGE

It was the Editor's privilege to be present at the meeting of the Maryland-New York Section of the American Association of Jesuit Scientists. We are very happy to report to those members of the Association who were unable to attend that the enthusiasm which has always been characteristic of these meetings, continues undiminished. A glance at the list of members attending will show a healthy mixture of maturity and youth. The presence and activity of the older members of the organization provided the proper tonic for the growing interest of the relatively new members, and the enthusiastic participation of our young Priests and Scholastics assured the founders that their organization remains unshaken by the partial suspension of united activity.

It was certainly encouraging to the Editor to see the interest manifested by all in the BULLETIN and their desire that it continue publication in the same manner as in the past. It may be that the publication of the present volume will end the hardest time for the BULLETIN. All at the meeting were united in their earnest desire for a joint meeting of the three Provinces next year. If then, the time and attention of the members are released from present necessities, such a meeting would revive the pride of publication. In the meantime, the submission of a larger number of articles to the Editor, and especially an increase in the News Items, detailing the happenings in our schools, would nourish the interest shown at the summer meeting.

Because common meetings have been suspended for so long the BULLETIN has lost contact with some members of the Association. Thus errors have undoubtedly crept into the mailing list and some may be without their copies, or some Issues have been sent to incorrect houses. Steps were taken at the meeting to correct such errors, and also to bring the membership list up to date. Such an undertaking requires the assistance of all members. We earnestly solicit your co-operation in this work.

The November 24th, 1944 Issue of Science announces in a three quarter column notice the establishment of an Institute of Geophysical Technology at Saint Louis University, under the deanship of DR. JAMES B. MACELWANE, S.J. According to this notice the Institute opened with forty freshmen students and a sprinkling of upperclassmen. The Fathers named as faculty members were FR. VICTOR BLUM, S.J., assistant dean, FR. GEORGE BRUNNER, S.J., FR. JAMES I. SHANNON, S.J., and FR. MARTIN WALASIN, S.J.

MINUTES OF THE MEETING OF THE AMERICAN ASSOCIATION OF JESUIT SCIENTISTS

(Maryland and New York Provinces) Held at St. Joseph's High School, Philadelphia, Penna., August 26th, 1944.

On Saturday, Aug. 26, 1944, the members of the American Association of Jesuit Scientists, who belong to the Maryland and New York Provinces held a sectional meeting at St. Joseph's High School in Philadelphia. 20 members attended; the acting president of the Association, Rev. Paul A. McNally S.J. presided. In view of the accelerated programs in the Colleges which kept many members in the classrooms for regular Saturday classes, the meeting was well attended and very successful; the stress and strain of war have not yet broken the continuity of these annual meetings. In a formal resolution, the Fathers and Scholastics who were present, expressed the hope that, if conditions warrant and superiors see fit, a meeting may be held next year for the entire Association, comprising the three eastern provinces. Such a meeting, even if it were limited to a single day, would help to preserve the continuity of the Association and offer an opportunity for the annual election of new officers.

Meanwhile the chairmen of the various sections were continued in office for another year. Fr. Edward C. Phillips, S.J., President of the Association felt obliged by the pressure of other engagements to request the appointment of a temporary President for the conduct of the meeting. An expression of gratitude and appreciation for Fr. Phillips' excellent work may be read among the resolutions listed below. By the appointment of superiors, Rev. Paul A. McNally, S.J., Director of the Georgetown Observatory, became acting President.

Fr. Gerald Hutchinson, S.J., Editor of the Bulletin, made an informal report on the present status of that publication. Some members, he said, had suggested that only one token issue should be published during the coming year. Fr. Hutchinson, however, believed that the period of greatest difficulty had passed and offered to make every effort to continue the regular issues for the coming year. Unanimously the members accepted this offer and expressed their warmest appreciation for his successful efforts during past years. Fr. Hutchinson again urged the members to write articles to insure the regular publication of the Bulletin.

Many interesting topics were discussed during the meeting, particularly; the extra year of training in the physical sciences which has been added to the regular course of studies for the Scholastics in the province of Lower Canada; specific differences in the teaching of High School and College mathematics; methods by which to attract the interest of the younger generation of Jesuits toward the physical sciences.

The treasurer, Fr. Francis W. Power, S.J. reported a favorable balance of $161.37.

The following papers were read:—

The chemistry of penicillin .... JOSEPH A. DUKE, S.J.
The kinetics of the exchange reactions between bromine and the mixed halides of methane .... GEORGE J. HILSDORF, S.J.
Pollen allergies .... JOSEPH S. DIDUSCH, S.J.
Prefrontal lobotomy in the treatment of psychosis .... PHILIP H. O'NEILL, S.J.

The following were present at the meeting:—

Rev. Paul A. McNally
Rev. Joseph Assmuth
Rev. Timothy P. Reardon
Rev. Thomas J. Love
Rev. James J. Hennessey
Rev. John S. O'Conor
Rev. Paul P. Luger (Oregon)
Rev. Thomas J. Brown
Rev. Gerald Hutchinson
Rev. Gerard J. Costello
Rev. Joseph S. Didusch
Rev. Charles G. Neuner
Rev. John F. Delaney
Rev. Philip O'Neill
Joseph A. Duke
Harry A. Boyle
George J. Hilsdorf
Joseph A. Persich
Eugene L. Tucker
Francis H. Taylor

The following resolutions were passed unanimously:—
Resolved:—

1) that the Association of Jesuit Scientists, Eastern States Division, expresses its appreciation of the constant interest shown by the three V. Rev. Fathers Provincial in their cooperation by granting the necessary permissions for holding the annual meeting at St. Joseph's Preparatory School, Philadelphia, Pa.

2) that the Association expresses its thanks to the absent president, Rev. Edward C. Phillips, S.J., for the success he has accomplished as president during the past three years, and its appreciation for the many excellent articles which he has contributed to the Bulletin.

3) that the Association expresses its thanks and appreciation for their generous hospitality to the Rector, Rev. John P. Smith, S.J. and to the Minister, Rev. Paul B. Hugendobler, S.J., of St. Joseph's Preparatory School.

4) that the Association through the Secretary, send greetings and best wishes with promise of prayers, to Rev. Richard B. Schmitt, S.J. in grateful appreciation of his many years as Editor of the Bulletin and his unfailing interest in the welfare of the Association.

5) that the Association extend its grateful thanks to Rev. Gerald Hutchison, S.J. for the excellent work he has accomplished in editing the Bulletin of the Association during these troublous times.

SCIENCE and PHILOSOPHY

A YEAR OF SCIENCE BEFORE PHILOSOPHY [1]

Note:—When it was learned that the Province of Lower Canada had added to the curriculum for our Scholastics a full year of Mathematics and the Natural Sciences between the Juniorate and their entrance into Philosophy, the Provincial, Very Rev. A. Dragon, S.J., was asked to prepare for the BULLETIN *a brief account of the plan and its results. He very kindly promised to do so and we are grateful to him for giving us the opportunity of offering to our readers the following information which we are sure will be of much interest to them. In reply to a further request for specific information on certain details of the plan and its operation, Father Laurence Pellegrino, S.J., the Socius to the Provincial, kindly forwarded the information in the catechetical form appended below.*

A surprise awaited a group of nine Scholastics at Status time, July 31, 1943. They were called upon to live at the Provincial's Residence, and to follow the classes in science with the students of Brébeuf College, which is situated opposite Reverend Father Provincial's house.

The form of education followed in French Canada explains the establishment of a scientific course in our Province. The classical course comprises eight years, six of which are given almost exclusively to the study of languages and literature. During this time, the student acquires only a few of the elements of Mathematics and of the natural sciences. The other sciences, Mechanics, Physics, Chemistry and High Mathematics are left for the last two years. They are studied at the same time as Scholastic Philosophy.

It is at this point that the problem arises for the Society. Candidates can apply for admission to the Society before finishing their philosophical studies. In the past, those who entered the Society after six years of classical studies made three years of Philosophy. During this time they also completed their scientific studies. The primary importance of Philosophy in our formation, however, often prevented Ours from giving to science all the attention it deserved.

The intensive development of science in the modern world, the importance of scientific knowledge even in view of the Apostolate, in the midst of a civilization which is becoming more and more materialistic, all this has suggested to our Superiors the institution of a new course.

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(1) The following report has been made possible for the Bulletin through the efforts of Fr. E. C. Phillips, S.J.

At one and the same time, this permitted more extensive and better organized scientific studies, while insuring the full three years necessary for the course in Philosophy. Thus, an entirely new experiment has just begun in our Province.

Here, then, is a small group of Scholastics, hardly out of the Juniorate, starting a year of purely scientific studies.

Let us point out immediately a possible danger of such a system. It may be objected, that our Scholastics might adopt a materialistic outlook, because of their prolonged contact with matter in the exact sciences. The formation of the Society, however, has forearmed them against this danger.

First of all, the Spiritual Exercises raise us above matter. We also have the rule for Scholastics: "Stilum in compositionibus diligenter exerceant humaniorum litterarum studiosi; ceteri vero, reliquo studiorum tempore, exercitationis huiusmodi ne intermittant". The habit of writing forces us to express our thoughts clearly and frees us completely from the rigidity of formulas.

It would take several pages to write a chapter of the advantages of this system. We do not pretend to expose them all in this brief paper. Rather let us select, a bit at random, some of those which appear to be among the most important.

Grouping the sciences all in one year helps the concentration of the mind. It makes the acquisition of the true scientific method easier by continued and uninterrupted work. This means that we can become more constantly interested in science without having to leave it continually in order to apply ourselves to some other study.

It is possible, therefore, for each Scholastic to centre his reading around scientific subjects. For example, certain biographies of great scientists will profitably make the rounds among the Scholastics, which would doubtless have remained unknown to them otherwise.

If we look at this experiment from the Superiors' point of view, we find that this year has been very fruitful. It gives Superiors an opportunity to discover the aptitudes, tastes and scientific talent of their men—better in some than in others. Perhaps it will be a valuable aid for the day when Superiors will have the great satisfaction of being able to put each man in the place for which he seems best fitted.

There is also another interesting point about this new experiment. Just as at the time of the first colleges of the Society, about ten of Ours are practically drowned among some fifty students in each class. One will easily understand, that from the very beginning Ours were determined to safeguard the reputation of the Society. After a brief period of adaptation they surpassed, then and there, the other students.

Can we not render homage to the Society for this success? It is an answer to those who say that the Novitiate and the repetition of literary studies in the Juniorate are an interruption in intellectual development. The Scholastics have vied with students who have almost finished their studies, and who have had the advantage of Philosophy. The results obtained might well develop in us a more conscious admiration for our Jesuit training. It is a great consolation for us and a source of confidence for the future. We know that later on we can consider ourselves at least equal to those students who enter the University tomorrow. They will have learned to respect us.

Besides this, the Scholastics enjoy a sort of privileged position with the students. They are not just students, nor are they professors. In the beginning the students were rather apprehensive about the imposing row of black habits in the rear of the class-room. Soon, however, their fear gave way to sympathy and confidence.

Now they come to the Scholastics as to class-mates, but class-mates older and more serious than they are. This gives Ours a deeper understanding of their life and their preoccupations.

Often, after class, they ask the Scholastics the explanation of an obscure point. During laboratory they go to them spontaneously if something is not precise or if they have misunderstood some detail.

The students have given evidence of their confidence in still other ways. For instance, they have insisted several times that the Scholastics join them in their games.

We must also admit that we are a mystery to them. They see us assisting at the same classes as they do each day, but they feel that our preoccupations are not theirs. Sometimes they ask what we do when we are not in class. Might not this mysterious attraction, the feeling of a happiness unknown to them, concealed by the smiling countenance of the Scholastics, become the germ of vocations? That is known only to God!

PROVINCIAL'S RESIDENCE
3215 chemin Sainte-Catherine
Cote-des-Neiges, Montreal

June 22, 1944.

Rev. Edward C. Phillips, S.J.
501 East Fordham Road
New York, N. Y.

Dear Father:
P. C.

Reverend Father Provincial Antonio Dragon has asked me to reply to your letter of June 13, in which you requested some additional information about the year of science taken by our Scholastics before Philosophy.

1. What science courses do our Scholastics take?

Ans. Physics, Chemistry, Mathematics. Formerly during vacation time, they studied genetics, biology and geology.

Physics classes begin with Mechanics and are interrupted during several weeks to give place to Cosmography.

2. How many hours of lecture and of lab. do they have each week?

Ans. The reply below will give you this information. I add the total number of hours of class during the year.

Physics	125 hours
Mechanics	80 hours
Cosmography	25 hours
Mathematics	135 hours
Chemistry	125 hours
Chemistry Laboratory	45 hours
Physics Laboratory	30 hours

3. Do they receive an academic degree, or at least, partial credit towards a future degree?

Ans. No degree is given at the end of the year of science, which year corresponds to the amount of science all classical course students must have whose baccalaureate permits their entrance into any branch of the University.

4. During this year of science do the Scholastics take any courses to satisfy the requirements of the Ordinatio "Deus Scientarum Dominus", with regard to "Scientific Questions Connected With Philosophy?"

Ans. These connected sciences are given only during Philosophy.

This year of science merely lays the necessary foundation for an understanding of the connected sciences.

I hope these answers will prove satisfactory. At any rate if you wish further information do not hesitate to ask and I will do my best to furnish it.

Devotedly in Our Lord,

(*Signed*) Laurent Pellegrino, S.J.

Secretary of the Provincial

YEAR OF SCIENCE

Schedule

Monday			
	A. M.	8:45 to 9:45	Chemistry
		10:00 to 11:00	Physics
	P. M.	1:30 to 2:30	Mathematics
		2:40 to 3:40	Physics
		3:40	Physics Lab.
Tuesday			
	A. M.	8:45	Physics
		10:00	Mathematics
	P. M.	2:40	Physics
Wednesday			
	A. M.	10:00	Chemistry
Thursday			
	A. M.	8:45	Physics
	P. M.	1:30	Physics
		2:40	Chemistry
		3:40	Chemistry Lab.
Friday			
	A. M.	8:45	Physics
		10:00	Chemistry
	P. M.	1:30	Mathematics
		2:40	Physics
Saturday			
	A. M.	10:00	Mathematics

N. B. There are two half-holidays each week: Wednesday and Saturday afternoons.

BIOLOGY

POLLEN ALLERGY

By Rev. Joseph S. Didusch, S.J.

The more common allergies are, vasomotor rhinitis (hay fever), asthma, urticaria (hives), eczema, ivy poisoning and migraine (sick headache). The first two are often caused by plant pollens, the others are produced by a variety of unrelated agents. The term "allergy" is of recent origin, it was not listed in our lexicons prior to 1933. But the diseases for which it stands have been known for centuries. Asthma was of common occurrence among the ancient Greeks. Homer mentions it twice in his Iliad. It is likely that hay fever also was prevalent long before the Christian Era. But it was not recognized as a definite disease entity until 1819 when John Bostock, an English physiologist, described the seasonal incidence from which he suffered from childhood and called it "Catarrhus aestivus". Almost sixty years later (1873) Charles Harrison Blackley, of Manhattan, England, proved conclusively that the etiological factors involved in the malady are plant pollens. He performed upon himself clinical tests with nearly a hundred different kinds of flower pollens and the technical methods which he employed for the detection of pollen sensitization are, except for a few minor modifications, still in use today.

Plant pollens may be round, elliptical or irregular in shape. In size they range from seven to more than a hundred microns. Their exine shows a variety of patterns, with one or more germinal pores and sometimes furrows. The grains are specific for each genus of plants, though the external differences between the species of the same genus are not always sufficiently characteristic to constitute a reliable norm for distinguishing one species from another.

The pollens of showy and fragrant flowers are usually not allergenic. The real trouble makers are the grains produced by inconspicuous flowers. Nor does the pollen of flowers which are pollinated by insects (entomophilous pollen) cause asthma or hay fever, except by direct inhalation. Allergies are due mostly to air-borne (anemophilous) pollens.

Some patients suffer from hay fever or asthma almost all the year round. In these cases the incidence may be due to a variety of irritants, house dust, animal danders, feathers, linen, cotton and synthetic fabrics, soaps, cosmetics, etc. But in some parts of the country

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(1) This paper is a digest of a paper read at the Science Convention in Philadelphia, August 26th, 1944.

flowers are always in bloom. Even as far north as Maryland, under favorable weather conditions, roses may be found blooming in gardens as late as Christmas. At this time also, the Yellow or False Jessamine, Gelsemium sempervirens, begins to bloom and remains in flower until the end of April.

Tulips are among the first harbingers of spring and are often held responsible for the onset of vernal hay fever. But their pollens have none of the characteristics of allergens and "tulip fever" is really a misnomer for "grass fever". However, tulip bulbs sometimes cause a skin inflammation. They contain a toxic alkaloid, tulipine, which makes the hands swell if the bulbs are handled in great numbers. Florists call the allergy "tulip fingers".

Early roses, especially the wild roses, are sometimes blamed for spring hay fever or asthma. Among them are the Fragrant Sweetbrier (Rosa rubiginosa), the "eglantine" of Chaucer, Spencer and Shakespeare, the Climbing Rose (Rosa setigera), the Meadow Rose (Rosa blanda), the Dog Rose (Rosa canina), the Pasture Rose (Rosa virginiana), and the Evergreen Rose (Rosa bractiata) which has an abundance of soft, yellow flowers and is, like the Sweetbrier, cultivated extensively. Some of the leading allergists do not share the popular belief in "Rose fever". But these wild roses produce great quantities of pollen which is small and very light and is often carried a considerable distance by the wind and air currents. It is more than likely that, at least in some instances, rose pollens may prove to be real allergens.

Many of the large trees flower before the leaves appear. Among the conspicuous and attractive tree flowers in this district are those of the Flowering Dogwood (Cornus florida), the Tulip Tree (Liriodendron tulipifera), the Catalpa (Catalpa catalpa), the Princess Tree (Paulownia tomentosa), the Linden (Tilia americana), the Locust (Robinia pseudacacia), and , of course, the fruit trees. Their pollen is negative in hay fever.

The flowers of trees like the oak, hickory, black walnut, sycamore, elm, ash and some species of maple, are more conspicuous for their abundance than for their beauty. With the exception of the maples, their pollens are anemophilous. Maple pollen (Acer sp.) is occasionally allergenic. White ash (Fraxinus americana), hickory (Hicoria ovata), black walnut (Juglans nigra), the oaks (Quercus sp.), American elm (Ulmus americana) and the sycamore (Platanus occidentalis) are toxic only in certain localities.

In this region the chief offenders in spring hay fever are some of the grasses, notably Kentucky Blue Grass (Poa pratensis) and Timothy (Phleum pratense). There are ninety kinds of Blue Grass in the United States. Poa pratensis thrives best in the central States, especially in Kentucky. It begins to flower here towards the end of May. The pollen grains are round and from 28-32 microns in diameter. Since it is in great demand for lawns it is abundant in our cities and suburbs.

Timothy gets its name from Timothy Hanson who brought the seeds from New England to Maryland in 1720. It is primarily cultivated for hay but grows wild in many districts and often escapes to city lots and fields. The pollen grains are spheroidal and a little larger than those of Kentucky Blue Grass, from 32-36.5 microns.

Among other grasses that cause pollinosis (pollen hay fever) are, Bermuda Grass (Cynodon dactylon), Orchard Grass (Dactylis glomerata), Indian Corn (Zea mays), Common Rye (Lolium perenne), Bearded Rye (Lolium temulentum) and Wild Rye (Elymus sp.) of which there are ten species. Of these, Bermuda Grass claims the greatest number of victims, especially in the southeastern States where it is cultivated for pasture.

Poison Ivy, Rhus toxicodendron, well known and prudently shunned for the distressing dermatitis with which it afflicts its victims, is not a hay fever irritant. Its small, greenish-yellow flowers lie close to the stem and are, for the most part, hidden by the leaves. They develop into green berries which, when mature, are white and waxy and sometimes remain on the stem throughout the winter. Birds avoid them and they are not carried very far from the plant by the wind. The plants thrive especially and altogether too abundantly in the eastern coastal States and eastern Canada. The flowers are not pollinated by insects and the pollen grains are held together in masses by the viscid oily films with which they are covered. The grains are elliptical, 30 microns long, and have a striated surface. The leaves bear on their under surface a mat of extremely fine hairs which contribute to the irritating properties of the plant. Ivy poisoning is an old allergy. The Chinese have known and suffered from it for over 2,000 years. Though the Chinese Poison Ivy, Rhus vernicifera, is of a different species from ours, its toxic effects are the same and the Chinese of today still seek relief from their dermatitis by recourse to the time-honored expedient of applying crushed crab meat poultices. The whole Rhus plant is poisonous and at all times of the year. The active principle to which the poisoning is due is an oil, toxicodendrol. Quite paradoxically, it produces no ill effects on the lining of the digestive tract when taken internally. Homeopathic physicians sometimes prescribe it as an internal specific for rheumatism.

Up to 1923 the goldenrod was blamed for the late summer and autumnal form of hay fever which is more prevalent and virulent than the spring allergy. The real offender is the ragweed which makes its appearance coincidentally with the goldenrod but attracts less attention. Of the sixty kinds of ragweed only two grow abundantly here in the east, Ambrosia elatior, the small ragweed, and Ambrosia trifida, the giant ragweed. Linnaeus, the great Swedish naturalist and originator of the binomial system of botanical nomenclature, probably intended a quip when he named the ragweed genus "Ambrosia" which to the Greeks and Latins of old, meant "the food of the gods".

Ragweed will grow almost anywhere and where conditions are especially favorable, will take possession of fields and lots to the exclusion of all other vegetation. Ambrosia elatior is from one to six feet tall, whereas the giant species sometimes attains a height of seventeen feet, though its pollen is a little smaller, 16.5 to 19.2 microns, than that of the small ragweed, 17.6 to 19.2 microns. The amount of pollen shed by the plants is enormous. It is estimated that a single plant of ragweed may produce eight billion grains per square foot of field surface. This would amount to sixty pounds on a city lot of one acre. Probably a million tons of ragweed pollen are produced in the United States each season. The pollen is anemophilous and is sometimes transported many miles from its sourse. The oil in the leaves and stems is also toxic and is capable of producing a severe skin allergy.

To add to the discomforture of those who suffer from autumnal hay fever, the unattractive cocklebur sheds its pollen at the same time as the ragweed to which it is related botanically. The genus, Xanthium, named for the yellow dye which is produced from the plants, comprises eight or nine species of which Xanthium canadense is common in this region. The pollen is anemophilous and the grains are from 16 to 30 microns in diameter.

Most of the pines, spruces, cedars and firs pollinate in the spring months. All produce large quantities of pollen which is sometimes gathered by the wind in clouds and after travelling several hundred miles, falls to the ground in showers. One of the largest of these showers on record fell on St. Louis in 1873 and the whole city was covered with a mantle of what appeared to be fine yellow dust. The pollen came from a pine forest 400 miles away. Fortunately, only two species of pine, the Yellow Pine (Pinus ponderosa) and the Scrub Pine (Pinus contorta), bear hay fever pollens and they are a menace only in certain sections of the country.

The Deodar Cedar, Cedrus libani deodara, pollinates here in October. The pollen of this Cedar of Lebanon, named from the Hindu "deodar", meaning "the timber of the gods", is not toxic and besides, there are very few of these beautiful trees in this country outside of California. The grains are large, about 61 microns in diameter, without the "wings".

The European Larch, Larix decidua, is the last of the evergreens to pollinate here. This rather rare cultivated evergreen is more attractive than our common species, Larix laricina, the Tamarack, which is abundant in the New England States. There is a marked difference in time between the pollinating seasons of these two species. The Tamarack pollinates in March and April, whereas the European Larch produces its pollen at the end of October and in November. The pollen grains of Larix decidua, like those of the cedar and pine, are "winged" and are on an average of 72 microns in diameter, without the "wings". They have a thick exine and intine and the latter expands when moist and casts off the exine. The pollen is not known to have allergenic properties.

In the fourth century before the Christian Era, Hippocrates, the "Father of Medicine", wrote the following dissertation on one of the food allergies, the toxic effects of cheese on some of his patients: "Cheese does not prove equally injurious to all men, for there are some who can take it to satiety without being hurt by it in the least, but on the contrary, the vigor which it imparts to those with whom it agrees is wonderful. However, there are others who cannot eat it at all, their constitutions are different and they differ in this respect that what in their bodies is incompatible with cheese, is aroused and put in commotion by eating it, and those in whose bodies such a humor happens to prevail in greater quantity and intensity are likely to suffer more from it. But if cheese had been pernicious to the whole nature of man it would have hurt all". The same may be said of pollinosis. The responsibility for the allergy is equally shared by the individual and the pollen.

Pollen granules contain dextrose and levulose, cellulose, starch, protein, and a ferment, diastase. The proteins are generally thought to be the elements in the granules to which patients become specifically sensitive. They are highly complex substances and consist basically of amino acids. At least twenty-two of these acids have been obtained by breaking down proteins. Not all of them are contained in any one protein, but one of the proteins, casein, yields nineteen different amino acids. Every species of plant and animal has its own kind of protein and their specific differences are believed to make one protein antagonistic to another. In other words, allergy is presumably a matter of protein sensitization.

Living cells ordinarily protect themselves from foreign bodies by producing and throwing off into the blood stream "antibodies" which combine with and neutralize the effects of foreign protein before it can reach them. This is known as "immunity". But if on account of constitutional defect the reaction activity of the cells has been altered or inhibited, they will be unable to produce antibodies and the body will become a prey to allergenic disease.

The nature and cause of this constitutional imbalance are unknown. Moreover, the role which protein supposedly plays as an etiological factor in pollinosis has been called into question by recent investigation. Pollen has been digested to a point where delicate chemical tests no longer showed a reaction for protein and yet the antigenic activity of the pollen extract was in no way impaired. There must be some other toxic substance in the pollen granule, but it seems to be present in direct proportion to the protein content.

Pollen grains are surrounded by a film of oil and wax which must be removed by a suitable solvent to reveal their surface structure. Little or no attention has been given to this film. If fresh pollen is treated with the secretions from the nasal passages, the film is digested in a few moments, while the grains themselves apparently remain intact for weeks. This reaction *in vitro* may not be paralleled by the process which takes place in the mucous membrane of the respiratory tract in the human body, but it raises the suspicion that the film may at least be a contributory factor in allergic incidence.

Recent statistics show that there are approximately 6,000,000 victims of hay fever in the United States. The estimated number of asthmatics ranges from 600,000 to 3,500,000. About 3,000,000 patients suffer from recurrent sick headache, 4,000,000 from either intermittent or continuous hives and the same number from indigestion due to an allergy. The number of those who are afflicted with ordinary allergic eczema is about 600,000, but if the occupational skin diseases are included, it would probably be ten times as great.

Since the turn of the century science has learned definitely to recognize the symptoms of this strange malady and in many instances to offer at least palliative assistance. But assured immunity and permanent recovery from all forms of allergenic diseases are cherished boons still to be hoped for.

Stereopticon photomicrographs were presented to show the characteristics of thirty-four of the most common pollen grains.

"Chemistry, therefore, is highly worthy of our knowledge and attention, not merely for its own sake, because it increases our knowledge, and gives us the noblest display of the wisdom and goodness of the author of nature; but because it adds to our resources by extending our dominion over the material world; and is therefore calculated to promote our enjoyment and increase of power.

"No study can give us more exalted ideas of the wisdom and goodness of the Great First Cause than this, which shows us everywhere the most astonishing effects produced by the most simple, though adequate means; and displays to our view the great care which has everywhere been taken to secure the comfort and happiness of every living creature."

THOMAS THOMSON, A System of Chemistry, 1818.
Introduction, Pg. 18.

CHEMISTRY

THE CHEMISTRY OF PENICILLIN[1]

By Joseph A. Duke, S.J.

The fact that some bacteria produced substances which were injurious to other bacteria was first noted by Pasteur in 1877.[1] These antibiotics, the term is Pasteur's own, were first used medicinally in 1899 by two investigators, Emmerich and Lowe. They used bacillus pyrocaneus as an antibiotic and treated anthrax and diphtheria cases with it. Their results however were not very satisfying and work in the field lapsed.

The interest in these mould produced antibacterial substances which has been so universal within the last five years began remotely in 1929 at St. Mary's hospital in London. A Doctor Fleming in his research on Staphlococcus, a bacteria causing infection, had the "misfortune" of having his culture contaminated with a mold spore from the air. He noticed this mould was causing the Staphlococcus to die so he decided to follow this new avenue in his researches. It is a tribute to his scientific alertness that he recognized the significance of his discovery at the time he made it. Doctor Fleming cultivated the mold and studied its effects on many diseases bearing an infectuous bacteria and found the results far beyond his expectations. It possessed powerful antibacterial properties but was harmless to animals and left the white blood cells unaffected. He gave this new drug the name "Penicillin".

Doctor Fleming's discovery was further examined by Doctors Clutterbuck, Lowell and Rastrick in 1°32. In their report they offered no very promising hopes for the usefulness of Penicillin as too many difficulties had been met in attempts to purify it. They grew the mold on purely synthetic media and extracted the Penicillin with ether but any attempts to evaporate the ether to obtain the free substance resulted in the inactivation of the Penicillin. Their conclusion therefore was that Doctor Fleming's discovery was of no immediate value.

The beginning of the sudden interest of our day in Penicillin has its source in the work of Doctors Florey and Chain in the Oxford School of Pathology in 1939. These men decided to make a systematic investigation of antibacterial substances which were produced naturally. They chose B. pyrocaneus (the substance of which mention has been made in connection with Pasteur) and Penicillin. The instability of this last was a deterring factor but it was chosen because it was so powerful in its action against the common injurious bacteria and was stable

(1) Paper read at Science Convention in Philadelphia August 26th, 1944.

enough, at least in cultures, to lend itself to laboratory investigation. A test was devised for the activity of Penicillin which gave a ready assay of the potency of the material. The mould "Penicilium Notatum" which had been found to be the organism producing Penicillin was successfully grown in large vessels in spite of the fact that the colonies are easily contaminated. Finally a method was developed of purifying the crude Penicillin by transferring it from the ether extracts to water by adding the correct amount of alkali to the extracting water. It was discovered that the new substance was an acid which was stable about the neutral point and whose activity was easily lost.

The preparation of Penicillin is usually carried out in a liquid culture medium with which much care must be exercised lest contamination result.[2] Ten or eleven days is the usual time of growth to obtain the yellow droplets of crude Penicillin on the mycelia of the mould. Adding the previous culture fluid to the culture medium in the hope that there might be growth factors present in the former has given favorable results and decreased the time of production by half.[3] The acidity rise in the medium as the growth progresses is counterbalanced by the addition of mixed phosphate buffers (mono- and dihydrogen).

The extraction may be carried out by adjusting the medium to a pH of 3 to 4 and saturating it with ammonium sulphate.[4] The active portion is extracted with chloroform and is in turn removed from the chloroform extract by the use of a phosphate buffer at pH 7.2. This procedure is repeated and the less acidic portion is separated from the more active portion by the use of chloroform extracts of varying acidities. The Penicillin may then be obtained from the concentrated extracts by precipitation as the free acid from a medium of petrol ether or as the ammonium salt by saturating with dry ammonia gas a chloroform-benzene solution of the pigment.

The crude Penicillin appears as yellow droplets on the mycelia of the mold while after extraction from ether it is a brown water soluble powder. It has been most extensively studied in three forms, the free acid, the strontium salt and the barium salt. It is these three substances which we shall treat in our paper.

The free acid is produced by the extraction described above, i. e. using chloroform to extract the crude substance and then a water solution with a phosphate buffer at pH 7.2 to extract the Penicillin from the chloroform and finally petrol ether to obtain the free acid.[5] The acid appears as thick yellow crystals which are inactivated in solution but in vacuo have a marked stability. The ammonium salt is yellow and microscopic in size. This salt is peculiar in that acetylation or benzoylation increases the activity of the Penicillin while the free acids from these acyl derivatives have the same activity as the parent substance.

An analysis of the free acid yields the formula $C_{14}H_{19}NO_6$ or $C_{14}H_{17}NO_5H_2O$. The nitrogen atom is present even after chromotographic adsorption or charcoal treatment. It is strongly d-rotatory and has an absorption maximum of 2750 A°.

The strontium salt is prepared by the use of a different procedure than that outlined above. The main principle employed is that of chromatographic adsorption and it seems that there occurs both 'chemical' and 'partition' chromatography.[6] Ether or amyl acetate as the organic solvent is poured through a column containing some water retentive support such as silica gel with which is associated an inorganic base. The latter is either the hydroxide of the carbonate of an alkali or alkaline earth metal which is applied as a water solution or precipitated on the carrier before use. This absorption separates the constituents of the crude substance according to their relative acid strengths as well as adsorption affinities. In the column the differences in adsoption affinity are made more pronounced by successive elutions and adsorptions while differences in acid strengths are increased by repeated neutralizations and acidifications.

The Penicillin as the strontium salt is then dried in a vacuum at 60° to 100°. An analysis yields the formula $C_{24}H_{34}O_{11}NSr$. The conclusion that the acid has two acid groups and that they are not adjacent arises from the fact that in the electrometric titration an equivalent of 249 was obtained and the smooth curve resulting had only one inflection. It is a yellow salt with an absorption band at 265μ Aluminum amalgam has no effect on the salt and it has no optical activity.

It is possible to split the molecule by the action of dilute acids. alkalis and moist organic bases and upon fission it yields three main products, an acid, a yellow pigment and acetaldehyde. A small amount of an α B unsaturated aldehyde with the formula $C_7H_{12}O$ is also liberated. The significance of the aldehydes has been questioned. An observation worthy of note is that there is no CO_2 among the degredation products of Penicillin.

The acid liberated is completely water soluble but its hydrolysis products may be separated into two classes which are a function of their solubility in ether. Of the part which is insoluble in ether positive results have been obtained in the nin-hydrin reaction a fact which argues to the presence of a simple peptide structure.

The pigment gives the formula $C_{16}H_{20}O_6$ or $C_{16}H_{18}O_5$. H_2O. Two color reactions show the localization of the Penicillin on the absorption column. Firstly with strong nitric acid a transient red color results and secondly a permanent deep red is obtained with dilute solutions of sulfuric acid in glacial acetic acid. The pigment has adsorption bands at 261μ and 397μ. Therefore the evidence is that the substance is not a quinone. Since it titrates as a monobasic acid and gives indications of being enolic in structure. The possibility of its being a tetronic acid has been noted.

The action of Aluminum amalgam on this substance gives no color reactions and yields insoluble products upon hydrolysis which are colorless and have the formula $C_{10}H_{20}O_5$ an indication that reduction has occurred.

The pigment may be made to undergo ozonolysis to yield acetaldehyde and some other products which have not yet been identified. The action of an alkaline permanganate upon the pigment yields three molecules of oxalic acid.

The third form in which Penicillin has been extensively studied has been as the barium salt. The preparation of this salt has been by the fractional extraction of the Penicillin from amyl acetate into water then a chromatographic adsorption on an alumina column and the treatment of the active portion on the column with aluminum amalgam and subsequent chromatographic separation until the column is homogeneous.[7] The salt contains nitrogen but the Dumas and Kjeldahl determinations were not in agreement until the salt was subjected to severe conditions in the Kjeldahl. The method used was to subject the purest material to the action of boiling concentrated sulfuric acid.

The results of the analysis are listed in the following table:

C: 44.3%	H: 4.85%	N: 4.13% Dumas
C(Me): 11.6%	Ba: 22.0%	4.2% Kjeldahl

P, S, O(Me), N(Me)—none.

This gives the formula $C_{24}H_{32}O_{10}N_2Ba$. However the investigation does not exclude the possibility of the C_{23} and the C_{25} formula.[8]

A further publication[9] states that it is the salt of a dibasic acid with pK values or 2.3 and 3.5. It possesses one carbonyl, one latent carboxyl, two acetylatable, and at least five carbon methyl groups and no easily reducable double bond.

It is strongly l-rotatory in solution and from its absorption spectrum no aromatic rings are evidenced. This last note has been questioned by other investigators.[10] These last have noticed that a color results from the action of hydrogen peroxide and sodium hydroxide at room temperature on several compounds including Penicillin. Their contention is that the requirement for this test is a phenolic grouping (3 and 5 positions) and therefore Penicillin must also contain this structure.

Hydrolysis of the barium salt yields one molecule of carbon dioxide and other products including a water soluble volatile acid and a second substance which gives rise to a slightly soluble picrolonate and flavionate and aurochloride.

A consistent note found at the conclusion of these papers dealing with the barium salt of Penicillin is that there is no evidence of their having been a pure substance obtained.[11]

The conclusions of these investigations is of necessity vague regarding the actual chemical constitution of the new antibacterial substance called Penicillin but at least they give us a picture of what work is being done along the lines of chemical analysis and acquaint us with the data upon which the true conclusion of the chemical constitution of Penicillin shall rest.

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2. *Penicillin*; Karl Meyer, et. al.; Science, *96*: 20.
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4. Cf #2.
5. Cf #2.
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7. *Purification of Penicillin*; E. P. Abraham, E. Chain; Nature, *149*: 328.
8. *Nitrogenous Character of Penicillin*; E. P. Abraham, et. al.; Nature, *149*: 356.
9. *Purification and Some Physical and Chemical Properties of Penicillin*; E. P. Abraham, E. Chain, E. R. Holiday; British Journal of Experimental Pathology, *23*: 103-20.
10. *A Color Reaction for Natural Pigments and Phenols*; H. Tauber, S. Laufer; Journal of the American Chemical Society, *65*: 736-7.
11. Cf. 3 and 8.

IS IT STILL TRUE?

"Among the improvements devoutly to be wished, is some regular system of nomenclature, less abstruse than the present one; for if every student of chemistry and minerology hereafter is required to be a profound Greek scholar, I fear the votaries of this most engaging science will be often deterred from the pursuit: and we shall be inundated elsewhere as we are threatened to be in this country, with theories fabricated not in the Laboratory but the Lexicon."

THOMAS COOPER, M. D., in the Preface to
A System of Chemistry by THOMAS THOMSON,
Published, Philadelphia, 1818.

MATHEMATICS

AN INTERESTING CURVE

(Part II)

REV. HENRY J. WESSLING, S. J.

The present article, which is an expansion of the one published in the Bulletin (Vol. XXI, No. 4, July 1944), deals with the Butterfly Curve and the Mechanical Trisector.

BUTTERFLY CURVE

DERIVATION OF THE CURVE

Construct the angle AOC which is angle θ in Fig. IV. Through C, the end of unit radius draw CD parallel to OA. Draw OF so that angle FOA is equal to one-third of angle COA. It follows that angle CFO equals angle FOA and that angle COF equals twice the angle FOA and two-thirds the angle COA.

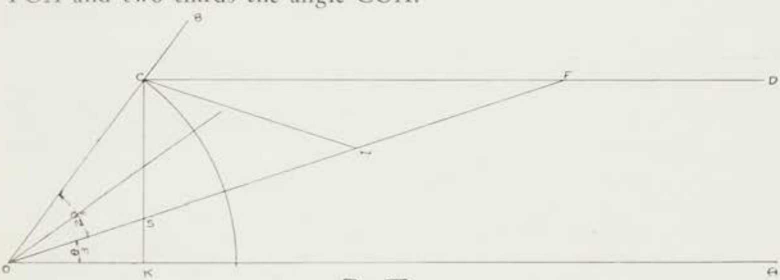


Fig. IV

Hence, $CF : \sin \angle COF = CO : \sin \angle CFO$

or, $CF : \sin \frac{2\theta}{3} = 1 : \sin \frac{\theta}{3}$

or, $CF = 2 \cos \frac{\theta}{3}$

Hence, $\overline{OF}^2 = \overline{CO}^2 + \overline{CF}^2 + 2\, CO \cdot CF \cdot \cos \angle OCF$

or, $\overline{OF}^2 = 1 + 4 \cos^2 \frac{\theta}{3} + 4 \cos \frac{\theta}{3} \cos \theta$

Substituting the value of Cosine θ in terms of $\cos \frac{\theta}{3}$, we obtain:

(1) $r = 4 \cos^2 \frac{\theta}{3} - 1$, which is the length of the radius vector which trisects the angle θ, intercepted between the parallels OA and CD.

In like manner the point F, for any value of angle θ, can be determined and its distance from 0 will always be expressed by the equation (1).

If we now call the vectorial angle ϕ, the equation:

(2) $r = 4 \cos^2 \phi - 1$, represents the locus of the point F, which determines the position of the trisecting radius vector of the angle θ as θ passes through all values from 0° to 360 degrees.

Discussion of the Curve

Changing to Cartesian coordinates, equation (2) becomes

$$(3) \quad X^6 + Y^6 + 3X^4 Y^2 + 3X^2 Y^4 + 6X^2 Y^2 - 9X^4 - Y^4 = 0$$

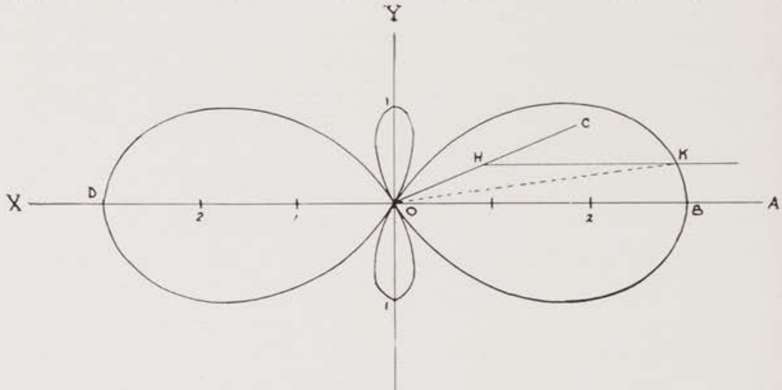


Fig. V

The locus of the equation is represented in (Fig. V). It is a curve of the sixth degree, having four branches and a quadruple point at the origin. It is symmetrical with regard to both axes. Its intercepts on the axis X are (+ 3, & — 3) at which points the tangents of the curve are parallel to the axis of Y. Its intercepts on the axis of Y are (+ 1, & — 1) and the tangents at these points are parallel to the axis of X. The adjacent branches of the curve have a common tangent making angles ± 60 degrees with the axis of X.

To trisect any angle by means of this curve we construct the angle with the vertex at 0 in such a manner that one of its sides coincides with the axis of X. The other side of the angle OH, (Fig. V), is made equal to unity. We now draw a parallel to the axis of X, through the point H. The point K at which this parallel intersects the curve, determines the position of the trisecting radius vector OK. As the angle changes in value from 0 degrees to 360 degrees, the radius vector traces out the branch of the curve beginning at B and passing thence through K, and O, and D and thence through the fourth quadrant back to O. Hence, whenever the line drawn parallel to the axis of X through the point H of the moving radius HC intersects several branches of the curve, the point K will always be that point of intersection which lies on the branch BKODO.

Proof: $OK = 4 \cos^2 \phi - 1$

$OH = 1$

$\angle HKO = \angle KOA$

Hence: $HO : \sin \angle HKO = KO : \sin \angle KHO$

$1 : \sin \phi = (4 \cos^2 \phi - 1) : \sin \angle KHO$

$\sin \angle KHO = \sin \phi\, (3 - 4 \sin^2 \phi) = 3 \sin \phi - 4 \sin^3 \phi$

But: $\angle KHO = 180^\circ - \angle HOA$

$\sin KHO = \sin (180^\circ - \angle HOA = \sin HOA$

$\sin HOA = 3 \sin \phi - 4 \sin^3 \phi$

$\sin HOA = \sin 3 \phi$

Or: $\angle HOA = 3 \angle KOA$

Since the radius vector which trisects the angle makes a maximum angle of 120 degrees with the axis of X, when the angle to be trisected is 360 degrees, it follows that the trisecting radius vector will be negative when the point K, which determines the direction of this radius vector, lies on those parts of the curve which are situated below the axis of X. When the angle to be trisected is 180 degrees or 360 degrees, the line drawn through the end of the moving radius, parallel to the axis of X, passes through the origin and the point K coincides with the point O. An inspection of equation (2) shows that the position of the radius vector for these points is determined by the two tangents to the curve passing through its quadruple point.

THE MECHANICAL TRISECTOR

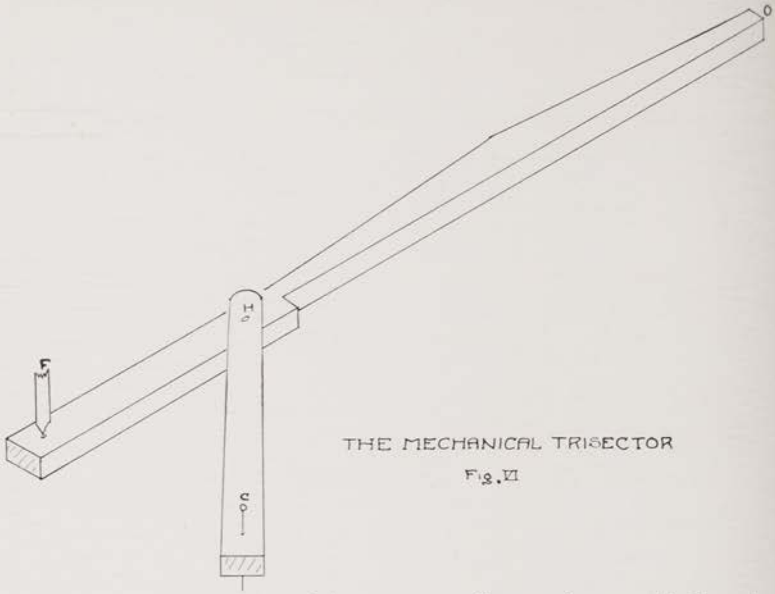
An inspection of Fig. IV. shows us the possibility of constructing a Mechanical Trisector, represented in Fig. VI.

If we turn out attention to Fig. IV. we see that the point F at which the trisecting radius OF cuts the parallel CD is distant from C by a quantity, $2 \cos \frac{\theta}{3}$. If now we draw CK, the sine of $\angle \theta$, it will cut the radius OF in the point S.

Hence in the right angle triangle SCF

$$\frac{CS}{CF} = \tan \frac{\theta}{3} = \frac{\sin \frac{\theta}{3}}{\cos \frac{\theta}{3}}$$

or $CS = 2 \sin \frac{\theta}{3}$ and $SF = 2$



THE MECHANICAL TRISECTOR

Fig. VI

In passing it may be of interest to call attention to this last deduction, since SF = 2, the moving radius OF will always trisect the angle COA, when it has swung around to such a position that the segment SF, intercepted between the parallel CD and the Sin $\angle \theta$, CK, is equal to 2. Having found the value of SF to be 2, it at once follows that CH = SF/2, because C must necessarily be on the semi-circle described on SF.

Hence, OC = CH = HF = 1.

In the lines CH and OF we see our Mechanical Trisector. If we take a long arm OF and pivot a moving arm CH on it and make the length of the pivoted arm equal to the distance between the pivot H and the end of the fixed arm F and make both of these equal to the unit radius OC, we have our Mechanical Trisector. To trisect any angle COA we lay off OC equal to the length of the moving arm of the trisector and through C draw a line CD parallel to OA, the other side of the angle. With a pin we fix the end of the moving arm to the point C and placing a pencil point in the end of the fixed arm at F, we move the jointed system around C as center, while at the same time we keep edge OH of the fixed arm in contact with a pin placed at O. As the system moves subject to these conditions, the pencil point at F will describe a curve cutting the line CD. When the point O is joined to this point of intersection, we have OF the trisecting radius vector of the angle θ. In constructing a trisector of this kind, it must be borne in mind that the edge HO of the fixed arm must coincide with the line passing through the center of the pivot at H and the center of the pencil point at F.

PHYSICS

LINE FUNCTIONS IN A UNIT CIRCLE

By Joseph A. Persich, S.J.

A method of determining the position of the line functions in a unit circle is needed in order to see which functions are represented in the same quadrants as their angles, and which are moved 180° away because of their signs. Two tables are required: one showing the signs of the ordinate and the abscissa in each quadrant, and the other the signs of the various functions in each quadrant together with the coordinate (ordinate or abscissa) which represents each line function. These two tables are compared. Where the signs of the tangent and the ordinate agree, the tangent is represented in the same quadrant as its angle. Where they disagree, the tangent is moved 180° away. The same system is used with the cotangent and the abscissa. The secant is always coterminal with the tangent, while the cosecant is always coterminal with the cotangent.

Fr. Paul McNally, S.J., brought out the following memory aids. The tangent always slides on the right side of the circle, being at the right top for the first and third quadrants, and at the right bottom for the second and the fourth. The cotangent always slides along the top of the circle, being on the top right for the first and third quadrants, and at the top left for the second and fourth. The secant and the cosecant are always represented by the terminal side of the angle when they are positive, and by the extension of the terminal side through the origin in the opposite direction when they are negative.

TABLES FOR LINE FUNCTIONS IN A UNIT CIRCLE

Table I. Signs in the four quadrants.

	I	II	III	IV
ORDINATE	+	+	—	—
ABSCISSA	+	—	—	+

Table II. The signs of the functions in the four quadrants.

	I	II	III	IV	ALWAYS
SIN	+	+	—	—	ORDINATE
TAN	+	—	+	—	
COS	+	—	—	+	ABSCISSA
COT	+	—	+	—	

NEWS ITEMS

CANISIUS COLLEGE CHEMISTRY DEPARTMENT

The Chemistry Department of Canisius College is offering the following Special courses for men and women in industry and the Professional and Business fields, beginning September 18th, 1944.

Chemistry for non-Chemists. Monday, 7:30 to 9:10 P. M. Two terms.

Techniques of Industrial Chemistry.
Lecture: Wednesday, 6:30 to 7:30 P. M.
Laboratory: Same night 7:30 to 9:30 P. M. Two terms.

Introduction to Photography
Monday 7:30 to 9:30. Two terms.

Electronics
Lecture: Monday, 7:30 to 9:10 P. M.
Laboratory: Wednesday, 7:30 to 9:30 P. M. Two terms.

Chemistry of Plastics
Lecture: Monday, 6:30 to 8:10 P. M.
Laboratory: Wednesday, 6:30 to 10:30 P. M. Two terms.

Plastics (Introductory)
Lecture: Wednesday, 6:30 to 7:30 P. M.
Laboratory: Same night, 7:30 to 9:30 P. M. Two terms.

HOLY CROSS CHEMISTRY DEPARTMENT

F. Leo J. Guay received the Doctor of Philosophy degree in Chemistry from Clark University in Worcester on June 2, 1944. At the same commencement, Prof. Thomas Malumphy received the Doctorate in Biology. Fr. Guay then helped out in the Chemistry Department here for a time during the summer and departed for Bagdad in Iraq about the middle of August. Fr. Joseph A. Martus came from Cranwell Preparatory School to work in the department and then took leave for Kingston, Jamaica. Both are M.S. alumni from this department.

The number of students using the different laboratories of the department during the past year probably broke all records. At one time there were 102 students taking organic chemistry; at another time we had 331 taking inorganic chemistry. On August 19, 1944, three assistants were graduated with the Master's degree, probably the last of the graduate assistants for the duration.

On January 19, 1944, Dr. O. L. Baril addressed a chemistry group at Clark University on "Aromatic Dicarboxylic Acids": on January 26, 1944, Prof. J. J. Tansey addressed the same group on the "Identification of Carboxylic Acids": on December 22, 1943, Fr. Fiekers addressed the same group on the "Illustration of the Gas Laws, a Dynamic Model for Statistical Phenomena", and on May 10, 1944, on "Error in Volumetric Analysis". The first of these lectures was repeated before the Worcester Chemists' Club Meeting held at Holy Cross on January 27, 1944 at which about 150 people attended. It was also given before the Sixth Summer Conference of the New England Association of Chemistry Teachers, on August 25, 1944, at Connecticut College, New London, Connecticut. Fr. Joseph A. Martus was Treasurer of the Conference.

A "definition of liberal education", originating in this department in connection with the Holy Cross May Conferences on Liberal Education, appeared in the College Newletter, 7 no. 4, p. 2 (May 1944) published by the College Department of the National Catholic Educational Association. The Author Index of Chemical Abstracts for 1943 lists 9 publications by alumni graduated with the M.S Chem. degree since 1927. This brings the total of publications for this group up to 87 items, many of which are patents. Book publications include the "Principles of Metallurgy" by Fred L. Coonan, Lieut Commander, U.S.N.R., Harper, N. Y., 1944. Dr. Coonan is an alumnus and former member of this staff. He is teaching at the Naval Academy at present.

An abstract of Dr. O. L. Baril's dissertation appears in the Clark University Bulletin, (Dissert. & Theses Abstracts) 15, 3-8 (1943), entitled: "An Evaluation of Waters' Theory of the Gattermann Reaction."

The department had several occasions to come to the rescue of Father Minister recently by taking over the bottling and mailing of St. Ignatius water after many requests for it had come in from outlying towns. It was a pleasure to cooperate with the Mission Band in this zealous project.