

THE SIGMA ZETAN



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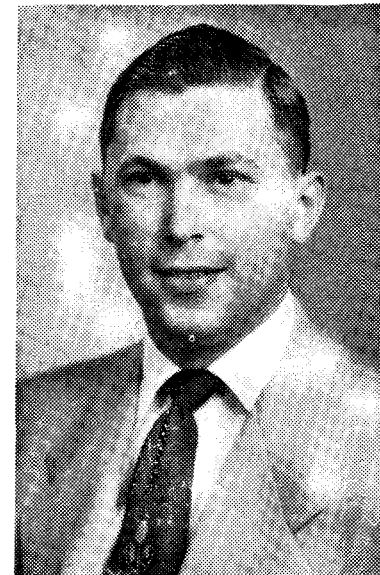
MILLIKIN UNIVERSITY

THE SIGMA ZETAN
 Official Organ of Sigma Zeta

NATIONAL OFFICERS

National President	Duane E. Deal, Xi Chapter
National Vice-President	H. William Crall, Kappa Chapter
National Recorder-Treasurer	Gilbert W. Faust, Zeta Chapter
National Historian	Donald E. Miller, Xi Chapter
National Editor	Carl Weatherbee, Pi Chapter
Past National President	John A. Buehler, Upsilon Chapter

A MESSAGE FROM THE NATIONAL PRESIDENT



Members of Sigma Zeta:

It is a pleasure to extend greetings and best wishes to you who have been honored by election to Sigma Zeta in your various schools. Election to an honorary fraternity is sometimes looked upon as merely an opportunity to display another key or pin, or something else to include under activities in the year-book, or an excuse for having your name in print in the school paper. All of these are fine, of course. We are proud of your academic achievements, and membership in Sigma Zeta is one way your school has of expressing that pride. Indeed, if anything we give too little publicity to the scholars on our campuses.

With any honor, however, goes a concomitant responsibility. Sigma Zeta honors you not only for your accomplishments of the past, but also with an expectation of accomplishment in the future.

You need hardly to be reminded that college graduates in the sciences and mathematics are highly in demand at the present time. Whether you be in the biological sciences, the earth sciences, the physical sciences, or in mathematics, you are wanted. Especially will you Sigma Zetans be wanted, for you represent

the more able of the young scientists of your schools. This may make job hunting a pleasure, but it does make more difficult another decision. I refer to the decision concerning further education.

You may well feel that at the end of your four years of college you are "educated", and ready to assume your part in the job of managing the world. But one of your chief responsibilities is to be as well prepared as you possibly can for the future. You who have a gift for the sciences are just the ones who can most benefit from attendance at graduate school and the earning of higher degrees. Give careful consideration to a continuation of your education.

Perhaps you have long since thought through this aspect of your future, and have considered various universities. The choice of a graduate school is not one to be made lightly, but faculty members at your college will be more than happy to discuss this with you. Whatever your plans for the future, however, keep in mind that society will be expecting you to use your abilities wisely and well. May success greet your efforts.

I hope that many of you are planning to attend the 1959 annual meeting of Sigma Zeta at Millikin University next April. The program is always very worthwhile—especially the papers which student members present. I shall be looking forward to meeting many of you in Decatur next spring.

Duane E. Deal
National President

November, 1958

PROCEEDINGS OF THE NATIONAL COUNCIL OF SIGMA ZETA

By Gilbert Faust

The National Council of Sigma Zeta met on Thursday evening, March 27, 1958, at Macomb, Illinois.

Mr. Miller reported for the special committee which had been appointed to consider the matter of a special Faculty membership. He moved an amendment to the constitution to provide a Faculty membership with a national initiation fee of \$2.00. Mr. Deal seconded. The motion was approved by the council with four affirmative votes. Two members were absent.

It was recommended that a committee be appointed to clarify Article IV, Section 2, of the constitution regarding qualifications for Active Membership. Particular attention should be given to the matter of grade-point qualifications and to the matter of graduate student membership. The committee is to report to the next convention.

The following statement prepared by Mr. Gould and Mr. Shelley regarding graduate membership was presented and was accepted by the Council. "Election of graduate students is not forbidden though Sigma Zeta is primarily an undergraduate organization. When graduates are elected, it should be on the basis of their whole collegiate record, and not in the basis of the graduate record only."

It was recommended that the present system of travel rebates to chapters represented at the convention be extended to next year. It was also agreed to recommend that \$50.00 be appropriated to the host chapter to help meet the expenses of the convention.

The appointment of representatives to visit chapters during the year was discussed, but no action was taken.

Mr. Miller moved that the charter of Omicron Chapter, Wilson Teachers College, Washington, D. C., be revoked. Mr. Deal seconded. Motion carried.

It was suggested that an arrangement might be made to permit the reading of some student papers by title only. This would permit their publication in the SIGMA ZETAN, but would cut down on the time required at the convention.

The remainder of the session was devoted to the appointment of the committees which were to serve during the convention. For the personnel of these committees, see the minutes of the convention.

MINUTES OF THE TWENTY-NINTH ANNUAL CONVENTION OF SIGMA ZETA

March 27, 28, and 29, 1958

By Gilbert Faust

The twenty-ninth annual convention of Sigma Zeta was held at Macomb, Illinois, with KAPPA Chapter as host. Some of the sessions were held at Western Illinois University and some at the Hotel Lamoine. The convention was called to order at 8 30 a. m., March 28, by John A. Buehler, National President of Sigma Zeta. Roll call of the chapters showed that there were 39 delegates from eight visiting chapters. A list of registrants is appended to the official copy of these minutes.

Mr. Billy Williams, president of KAPPA Chapter, presented Dr. William E. Lipsey, Dean of the University, who gave the official welcome to the delegates. In his talk, Dr. Lipsey mentioned something about the size, physical plant, growth, and curriculum of the University.

Duane E. Deal, National Vice President of Sigma Zeta, responded in behalf of the organization. This was followed by the traditional display and description of the gavel.

The minutes of the 1957 convention were reviewed and were approved as published.

The following committee were announced: AUDITING — James W. Beach, NU; Barbara Saum, XI; Richard L. Levy, EPSILON. FOUNDERS' CUP AWARD — John A. Buehler, UPSILON; Gilbert W. Faust, ZETA; Janet Walmsley, PI. RESOLUTIONS — James H. McCloy, EPSILON; William C. Bacher, ZETA; James R. Bann, BETA. NOMINATING — Walter H. Eller, KAPPA; Howard W. Gould, NU; Eugene Wheatley, KAPPA; Howard Simpson, BETA; Joe Brown, PI.

The National Officers gave brief reports to the convention.

The proceedings of the National Council meeting of the previous evening were reported to the convention, so that delegates would have time to consider among themselves the items which would be considered at the Saturday morning business session.

The proposed constitutional amendment was presented, along with the announcement that a motion for its adoption would be on the next day's agenda.

The business session was adjourned until the next day. The remainder of the morning was devoted to the presentation of student papers. On Friday afternoon the delegates had a choice of several field trips which had been arranged by KAPPA Chapter. The evening banquet featured an address, "Sputnik and the Tower of Babel," presented by Dr. Clarence J. Overbeck, Professor of Physics at Northwestern University, and President of the American Association of Physics Teachers.

The Saturday morning session opened with the presentation of additional student papers, followed by a lecture by Dr. Reece Jones, Head of the Geography Department of Western Illinois University. In a talk entitled "Challenges to Mankind" he spoke of some of the problems facing the world because of changes in population.

When the business session resumed, Mr. Miller moved that the constitution be amended to provide a separate class of active membership for faculty members, and that the national initiation fee for faculty members be \$2.00. Mr. Gould seconded the motion.

In the discussion, Mr. Miller pointed out that in some schools it was the policy to require all members of the science and mathematics departments to join Sigma Zeta. Thus, an additional financial demand was placed on a new instructor just at a time when he is least able to meet it. In addition, the faculty member's service to the organization extends over a considerable number of years, and in total, the demands on his time and energies can be considerable.

Mr. Eller pointed out that it was not primarily an economic matter; that most faculty members would not object to paying five dollars. He pointed out that membership in Sigma Zeta is primarily an honor for the student, whereas for the faculty member it involves responsibility that extends over a considerable period of time, and that the services of interested faculty members are necessary for the successful operation of a chapter.

A number of speakers opposed the amendment, including Mr. Bell, Mr. Pierson, and Mr. Safford. They pointed out, among other things, that the situation Mr. Miller described was apparently unique with XI Chapter, and that they felt that faculty members generally were in a better position to meet a \$5.00 fee than were students. Mr. Safford suggested that a faculty membership with no fee could be established.

A brief recess was called to permit delegations to determine how to cast their votes. When the question on the adoption of the amendment was put, seven of the chapters present voted no. The motion was declared lost, since an amendment must be approved by two-thirds of the active chapters.

Mr. Hegland then moved that the Council consider an amendment to create a faculty membership without an initiation fee. Mr. Davison seconded the motion, which was carried.

In line with the Council's recommendation, reported on Friday, Mr. Davison moved that a committee be appointed to review Article IV, Section 2, of the constitution, regarding qualifications for membership; the committee is to report to the next convention. Mr. Safford seconded. Motion carried.

In a general discussion regarding future convention programs, several suggestions were made:

- (1) All papers should be presented in one section, so that all the delegates can hear all of the papers. There should be time for discussion of the papers. Perhaps a committee should review them ahead of time and select those to be presented at the convention. There should be a time limit placed on the papers. Perhaps there should be some sort of a quota system established, limiting the number to be presented by each chapter.
- (2) A period during the convention should be reserved for a discussion of chapter programs and procedures. Many worth-while suggestions can be picked up in such a discussion.
- (3) Some consideration should be given to extending the convention beyond its present day-and-half.

Mr. Safford moved that the present system of rebates to chapters attending the convention be extended for next year. Mr. Kopplin seconded. Motion carried.

Mr. Davison moved that \$50.00 be appropriated to KAPPA Chapter to help meet the expenses of the convention. Mr. Hegland seconded. Motion carried. In discussing the location for the 1959 convention, Mr. Drenan indicated that

PI Chapter is interested in having the convention. However, he was not in a position to offer unqualified invitation. PI Chapter presented its tentative invitation, to be verified later. Mr. McCloy moved that the invitation be accepted. Mr. Hansen seconded. Motion carried.

The Auditing Committee reported that it found the treasurer's books to be in order. The Resolutions committee presented its report, a copy of which is appended to these minutes. The Founders' Cup was awarded to TAU, chapter in a presentation by Miss Walmsley. A copy of the citation is appended to these minutes. The Nominating Committee reported its slate of offices, as listed below. The reports of all these committees were accepted by motions duly made, seconded, and carried.

The following officers were declared elected:

National President	Duane E. Deal, XI Chapter
National Vice President	H. William Crall, KAPPA Chapter
National Recorder-Treasurer	Gilbert W. Faust, ZETA Chapter
National Historian	Donald E. Miller, XI Chapter
National Editor	Carl Weatherbee, PI Chapter
Past National President	John A. Buehler, UPSILON Chapter

As the final order of business, Mr. Buehler presented the gavel to Mr. Deal. In accepting it, Mr. Deal said that he appreciates the honor which is his in accepting the office of National President, that he is aware of the responsibilities which face him in the office, and that he is thankful for the vote of confidence his election indicates.

The convention was adjourned at 12:12 p. m. on Saturday, March 29, 1958.

Guests at the convention were invited to attend the annual meeting and exhibits of the Northwestern District of the Illinois Junior Academy of Science, which was being held in Morgan Gymnasium from 8:00 a. m. to 4:00 p. m. on Saturday.

REPORT OF THE RESOLUTIONS COMMITTEE TO THE SIGMA ZETA CONVENTION, MARCH 29, 1958

On behalf of the delegates here assembled, we recommend the following resolutions:

1. That we express our sincere appreciation to KAPPA Chapter for being such excellent hosts. Our physical welfare has been well cared for, and a spirit of friendliness has been manifest.
2. That Western Illinois University be thanked for the use of their facilities.
3. That we appreciate the work of our National Officers in preparing for this National Convention.
4. That we note with sorrow the passing of C. W. Bennett of KAPPA Chapter, past National President and a loyal member of Sigma Zeta.
5. That we thank the student members who have contributed such excellent papers to make our convention a success.

**REPORT OF THE FOUNDERS' CUP AWARD COMMITTEE
TO THE CONVENTION, March 29, 1958**

We are happy to present the Founders' Cup to TAU Chapter, State Teachers College, East Stroudsburg, Pennsylvania.

The purpose of presenting such an award is to encourage and recognize chapter scholarship and related activities. A few of the points which are considered when determining the winner of the award are: the quality of student papers presented before the convention, and the chapter's achievements on the home campus, as well as the number and quality of programs presented at chapter meetings.

The work which TAU Chapter has done is very impressive:

1. It meets twice a month, and about once a month shows a movie such as "Hemo, the Magnificent" to the student body.
2. It has posted on bulletin boards a list of members who can give academic help to students who need it.
3. The chapter now has a project to organize a chemistry club which it feels is needed on the campus.
4. It has been very cooperative with the national officers and maintains consistently good relations with them.
5. Twice in the last four years, the chapter has been represented at the national convention in spite of the distance involved; student papers have been presented at these conventions.

CHAPTER ROSTER, SIGMA ZETA—NOVEMBER 8, 1958

This list gives the names and addresses of ACTIVE chapters. The name of the faculty adviser or sponsor is listed. If the name of a student officer is known, it is also listed. The number in parentheses in front of the chapter name indicates the total number of active members reported by the chapter.

- (137) BETA Loren K. Freeman McKendree College, Lebanon, Illinois
- (575) GAMMA Warren A. Weaver Medical College of Virginia,
Mrs. Martha Albright Richmond 19, Va., Sec., 308A N. 12th St.
Richmond, Va.
- (192) DELTA Ollin J. Drennan State Teachers College, Kirksville, Missouri
- (376) EPSILON James H. McCloy Otterbein College, Westerville, Ohio
Janet Risch, Sec.
- (420) ZETA Gilbert W. Faust Wisconsin State College, Stevens Point, Wis-
Richard Demro, Sec. consin
- (601) KAPPA Dr. Kenneth H. Goode Western Illinois University, Macomb
Illinois
- (247) LAMBDA Newell A. Schappelle State Teachers College, Mansfield,
Pennsylvania
- (233) MU Willard Gaeddert State Teachers College, Mankato, Minnesota
- (333) NU Howard W. Gould Northern Illinois University, DeKalb, Illinois
- (555) XI Thomas R. Mertens Ball State Teachers College, Muncie, Indiana

- (94) PI Hal Russell Millikin University, Decatur, Illinois
- (74) RHO W. P. Morgan Indiana Central College, Indianapolis, Indiana
- (65) SIGMA Sister Mary Clare Our Lady of the Lake College, San Antonio 7,
Texas
- (118) TAU William G. Moore State Teachers College, East Stroudsburg,
Pennsylvania
- (67) UPSILON John A. Buehler Anderson College, Anderson, Indiana
- (61) PHI Leonard W. Charnock Eureka College, Eureka, Illinois
- (30) PSI Ray Holland Central Missouri State College, Warrensburg, Missouri

INACTIVE

- (161) ALPHA Southern Illinois University, Alton, Residence Center, Alton,
Illinois
- (16) CHI Missouri Valley College, Marshall, Missouri

CHARTERS REVOKED:

- (120) ETA
- (53) THETA
- (44) OMICRON

GRAND TOTAL OF ACTIVE MEMBERS: 4,572

**SIGMA ZETA HONORARY SCIENCE SOCIETY
FINANCIAL REPORT 1957-58**

RECEIPTS

Balance on hand,	April 6, 1957	\$ 847.27
Fees from chapters:		
Alpha	5.00	
Delta	10.00	
Epsilon	66.00	
Zeta	70.00	
Kappa	167.00	
Lambda	65.00	
Mu	56.00	
Xi	197.00	
Pi	21.00	
Sigma	8.00	
Tau	34.00	
Phi	30.00	
Psi	30.00	
		<u>\$ 759.00</u>

Jewelry, stationery, misc. sales:

Cash	3.05	
Gamma	2.00	
Delta	17.75	
Epsilon	14.70	
Zeta	1.35	
Kappa	12.45	
Xi	50.40	
Tau	30.87	
Phi	28.98	
		<u>161.55</u>
Total	\$1,767.82	
Total Expenses	684.87	

Balance on hand, March 20, 1958 \$1,082.95

EXPENDITURES

Convention expenses:	
Officers' travel	\$ 56.85
Travel rebate to chapters	100.00
	<u>\$156.85</u>
Office supplies and services:	
Postage and express	\$ 15.52
Duplicating service	3.05
G. W. Faust, salary	50.00
Printing, office forms	45.00
stationery	55.25
history booklet	118.25
Office supplies	2.60
Filing cabinet	16.75
	<u>306.42</u>
Jewelry:	
Eisenstadt Mfg. Co.	\$200.00
Refund to Gamma chapter	21.60
	<u>221.60</u>
Total	<u>\$684.87</u>

**SIGMA ZETA HONORARY SCIENCE SOCIETY
FINANCIAL REPORT 1956-57**

RECEIPTS

Balance on hand,	April 20, 1956	\$ 152.98
Fees from chapters		1,200.00
Sales		716.55
		<u>\$2,069.53</u>

EXPENDITURES

Convention expenses	\$ 245.75	
Office supplies and services	76.29	
Sigma Zetans	236.62	
Jewelry	663.60	
	<u>\$1,222.26</u>	
Total	\$1,222.26	
Balance on hand,	April 6, 1957	\$ 847.27

REGISTRANTS AT THE 1958 CONVENTION OF SIGMA ZETA

MARCH 27-29, 1958

BETA (5)

James Bann
John Lorentzen
Ronald Mauck
Robert Rehg
Howard Simpson

EPSILON (4)

Don Brehm
James McCloy
Janet Risch
Barbara Saum

ZETA (4)

William Bacher
Gerald Bruss
Gilbert Faust
Frank Hansen

KAPPA — Host chapter

NU (9)

James Beach
John Davison
Ron Hann
Donald Hegland
Ron Kopplin
Joe Montvic
Edward Stafford
Lois Stewart
Shirley Walker

XI (5)

Duane Deal
Richard Levy
Arthur Lumm
Donald Miller
Robert Shelley

PI (8)

Ted Bell
Joe Brown
Tom Colbert
James Drenan
Tom Richardson
Hal Russell
Bob Snell
Janet Walmsley

TAU (1)

Richard Person

UPSILON (3)

John Buehler
Jim Crosthwaite
Lowell Smith

NOTES FROM THE HISTORIAN

By Donald E. Miller

The Historian is trying to complete a file of Sigma Zetans but has been unable to secure the following:

1. Vols. I - VIII inclusive up to April, 1938.
2. I have only No. 1 of Vol. IX (1939). Perhaps there are others.
3. No. 2 of Vols. XXII, XXIV, and XXV. It may be that there never was a No. 2 for these last volumes.

If you have a copy of any one of the above issues, it would be appreciated.

Some thought has been given to the development of a pictorial history of Sigma Zeta. Perhaps some consideration should be given to this problem at the 1959 national meeting.

The Historian represented Sigma Zeta in connection with the inauguration of Robert H. Reardon as president of Anderson College and Theological Seminary on October 11, 1958. Delegates were present from 18 learned societies and other organizations as well as from 173 colleges, universities, and seminaries.

The inaugural address was given by Dr. Russell J. Humbert, President of De Pauw University. Greetings were brought in person to the president by nine outstanding persons including the Honorable Harold W. Handley, Governor of the State of Indiana.

The ceremonies were quite impressive. The weather was perfect for football players, but cold for those sitting in the shade on the north side of the Charles E. Wilson Library at 10:00 A. M. This included about sixteen persons on the platform, most of the Anderson College Choir, and many others. Those who think that biology field trips are rough should have been at this inauguration. Your Historian did not develop a cold and he hopes that others were as fortunate.

It was a pleasure to greet two past presidents of Sigma Zeta at the ceremonies, Dr. Zylpha Huribout and Dr. John Buehler both of whom are members of the faculty of Anderson College and are active in Upsilon chapter.

THE PRODUCTION OF A NEWTONIAN TELESCOPE MIRROR

By Richard L. Hoffman

Kappa Chapter

The process entails only three basic operations. (1) Grinding, (2) Figuring, with a substantial amount of (3) Testing, brings the mirror from the flat stage to the finished parabolic curve.

The mirror consists of a circular pyrex disc having a thickness of at least 1/5 the diameter.

The grinding operation is performed by placing the mirror blank upon a similar piece of glass that has been fastened to a work table. The table should be of such size so as to allow easy circumambulation while having the hands in contact with its center.

The grinding abrasive, usually carborundum, is sprinkled lightly over the lower member of the grinding pair (the tool). A small amount of water is added and the mirror is placed in position. A depressed curve is ground into the mirror by using a straight "center over center" stroke that is as long as possible. The "stroke" entails pushing and pulling the mirror repeatedly over the tool. The mirror must be turned while being ground, and the operator must walk around the table in a direction opposite to the direction that the mirror is turned. When the grinding sound ceases, the carborundum and water supply is renewed and the process is repeated.

Since the focal length is dependent upon the radius of curvature and the radius, in turn, is dependent upon the depth of curve, it is necessary to determine the position of the center of curvature. The determination is affected by the observation of the image of a lighted candle in the wet surface of the mirror which has been placed on edge. If the candle (object) is within the radius of curvature and moved laterally, the image moves in the same direction. If the object is without the radius of curvature, the image moves opposite to the direction of the object movement. The point at which there is no apparent image motion is the center of curvature. An optical law states that, "The focal length of a spherical mirror is equal to 1/2 the radius of curvature."

As the curve deepens the focal length decreases. The curved surface, upon acquisition of the approximate pre-determined focal length, is polished and brought completely spherical with the use of succeeding finer grades of carborundum and a 1/2 diameter stroke. The final polishing and figuring, (conversion of the sphere to the paraboloid) is affected with the use of a pitch lap and an optical rouge.

The lap is made by pouring melted pitch over the tool and pressing the mirror into the soft pitch so as to conform the pitch to the curve of the mirror. After channels have been cut into the pitch, a rouge and a water mixture is applied. The grinding stroke, decreased in length to 1/3 diameter, is again employed. The "conversion" is affected by deepening the central region of the mirror. The 1/3 diameter stroke produces the desired excavation.

The employment of the "Foucault Knife Edge" test determines the proximity of sphere to paraboloid. A pinhole source of light is placed at the center of curvature and the reflected cone of light adjusted so as to fall near the source. A verticle knife edge is cut into the reflected cone at right angles to its axis. The shadow observed on the mirror, when parabolic, is known as the "shadow-graph of the paraboloid." A zone of shadow (1/4 diameter wide) on the left is complemented by a zone of light of equal width on the right. The central zone displays a similar shadow-light arrangement (1/2 diameter wide) in reverse position of the outer zone.

The finished parabolic mirror is now ready for a reflective coating and installation into the instrument.

CHROMOTOGRAPHY: A SIMPLE DEMONSTRATION

By Ben Hughes

Kappa Chapter

In a simple way, chromatography may be defined as a method of separation for constituents of a solution by means of their differing fixation and liberation on a solid or fixed surface with the aid of a fluid streaming in a definite direction. In other words, chromatography provides a means of separating even very small samples by simply pouring them through a column or over a filter paper.

The process was first discovered by Michael Tswett, a Russian botanist, in

1906. It would be nice to report that he received recognition for it in his life time, but as in so many other cases like this it has been developed as a valuable tool of science only since 1931. About this time, Kuhn and Lederer used it to discover that there are actually two forms of carotene, a momentous enough discovery to place its method in the lime light of science.

In its simpler form chromatography can be carried out in a column such as a burette packed with a suitable solid and eluted with a suitable solvent. As the compound is added at the top it is drawn into the top of the solid "phase". Then more solvent is added after it. As the solvent or eluent moves downward through the column, it carries with it at a faster pace the more soluble of the constituents and leaves behind the component with the greater affinity for the solid packing. Thus separate rings develop down the column and may be rinsed out at the bottom for analysis of the separated constituents.

(Demonstration)

A suitable choice of solvents and column packings will provide differing results and "Rf" values. The Rf value of a particular combination for a particular compound is defined as the ratio between the distance the front of the solvent moves and the distance that the ring of separated compound moves.

With varying combinations of solvent and solid, varying phases in which it can be carried out (recently a gas phase chromatography has been developed), and varying and simple apparatus necessary, chromatography has become one of science's most valuable and versatile tools. It has numerous advantages, the greatest of which is its ability to separate minute quantities for analysis, and has been used in every field of science. Truly it is one of the wonders of scientific technique.

THE EFFICIENCY OF FILTERS

By Ross L. Egger

Xi Chapter

This original experiment deals with the amount of volatile substances given off during smoking, which is filtered out and expressed in percentages.

By using the principle of equalized pressures, escaping water left a partial vacuum, which was replaced by smoke from an attached cigarette. The filter was detached from the cigarette and each was weighed separately. The weight was taken of the filter after four, eight, and twelve puffs. A "puff" was five seconds (pause) of letting the water escape and fifteen seconds of letting the heat on the cigarette distribute itself throughout. The initial weight of the filter was subtracted from the remaining three weights. This was divided by the difference in initial weight of the cigarette and the final weight of the butt and ashes to determine the percent of smoke by weight that is filtered out.

The results were as follows:

Viceroy and Winston seemed clearly behind Marlboro and Kent at four puffs, but Viceroy took the lead at eight puffs and at twelve clearly had absorbed a larger percentage than the others. Viceroy removed 8.06% as compared to 7.6% for Marlboro, 7.1% for Kent and 5.05% for Winston. This is not a statement as to which are "best" or "safest," but merely a study of the efficiency of the filters.

THE CRYSTALLIZATION OF FERRIC AMMONIUM ALUM

By Edward Safford

Nu Chapter

Ferric ammonium alum is a double salt of which there are three main types. The alums are hydrated double sulfates in which one cation is univalent and the other trivalent. Any alkali metal will serve the purpose, possibly excepting francium, and including the ammonium radical. Trivalent cation sulfates which will form these compounds are aluminum, chromium, ferric, manganic, nickelic, vanadium, and titanium.

The schonites have a divalent cation sulfate in place of the trivalent. The univalent cations are the same as for the alums. Divalent cations which form these are cupric, nickelous, ferrous, magnesium, zinc, cadmium, and possibly others.

Double halides are double chlorides of ammonium or potassium and another cation. They are much less hydrated than the alums or schonites. The most common are with divalent copper, cadmium, zinc, and magnesium, the series are also formed with uni- and trivalent cation chlorides.

Double salts usually form from two non-isomorphous salts in molecular proportions and with a different crystalline structure from either. The isomorphous salts show no relationship when in solution. In general double salts are easy to grow and are beautifully colored.

These salts will form only in temperature ranges where they are less soluble than their parent salts. Also, if the double salt represents a further hydration, the temperature cannot be so high as to prevent this exothermic reaction. It is a loss of hydration, the temperature must be high enough to promote this endothermic reaction.

I am presently trying to determine what conditions are best for the formation of ferric ammonium alum. Ferric salts are rather tricky and not much is printed about them in the literature. There are indications that pH may be a critical factor. I am presently engaged in a study of that aspect of the problem. Later, I hope to get an estimate of the formation range and see what effect varying concentration of reactants has on the crystallization.

AN APPLICATION OF SYMBOLIC LOGIC TO WIRING OF CIRCUITS

By J. C. Moutvic

Nu Chapter

There has recently evolved a new method by which we can analyze complex networks. It is a hybrid of Syllogistic Logic, and Mathematical symbolism. Ergo its name, Symbolic Logis.

In order to illustrate the methods of this system, I used it to solve the old problem of wiring a light to three independent switches.

The circuit was set up in symbol form using the symbols I_o and C to represent the switches and their respective positions. Following the laws set up by the Logic, the symbolic were then rearranged until the conditions desired were arrived at. Translation of the symbols back to the electrical components they

represent completes the sequence, and the circuit is set up accordingly.

This is a powerful method of resolution for it not only analyzes and develops new circuits, but demonstrates with mathematical rigor those which are impossible.

RADIOACTIVITY AND ITS EFFECT ON THE LIFE AND DESTINY OF MAN

By Lorraine Talerico

Tau Chapter

Since we are living in an Atomic Age and are even on the threshold of conquering space, I have attempted in the presentation of my paper to illustrate just what radioactivity, a profound factor in the atomic era, constitutes. Also, I have tried to bring to light both the harmful and beneficial aspects of radioactivity and how it will effect the destiny of Man.

Radioactivity is the spontaneous emission of particles and/or rays from an element resulting in the disintegration of the nuclei of the atoms of the element.

Antoine Henri Becquerel, a French scientist, discovered the phenomena of radioactivity in 1896. He noticed uranium had the power of emitting rays that were capable of passing through bodies opaque to ordinary light. Pierre and Madame Curie succeeded in isolating radium and polonium from the element thorium. Radium is the greatest radioactive substance known. Two other elements, actinium and ionium were discovered by Debierne and Giesel and Boltwood, respectively. Also, Hofmann discovered that lead separated from pitchblends was radioactive. However, none of these have been isolated.

Radioactivity may occur naturally or be produced synthetically by an atomic pile as a cyclotron. The artificial forms are known as isotopes and differ from the elements only in the atomic weight. The leading source of uranium ore is in the Belgian Congo, with Northwestern Canada being second.

Radioactivity of a substance is measured in terms of a half life period or the time it takes for half an element of the atoms to disintegrate. Also, the age of the element can be determined by measuring the amount of helium and lead present in it.

Radioactive elements emit four particles: alpha, beta, gamma rays and neutrons. The alpha rays are positively charged; beta rays are electrons; gamma rays and neutrons have no charge.

In addition to the emission of rays, the elements give off emanations of radioactive gases whose activity decreases in geometric progression with the time.

Radioactivity, if controlled can not be harmful; but if not controlled can be extremely dangerous. It causes cancer, cataracts, and sterility. It destroys bone marrow with subsequent fatal anemia. Keloid tumors are also prominent in cases of exposed radiation.

Each of the particles emitted has harmful physiological effects on humans. However, the gamma rays and neutrons are the most destructive.

Radioactivity can be detected by the fogging of photographic film; by the comets tail of ionized particles in a Wilson Cloud Chamber; by the discharging of an electroscope; or by the clicks of electrical discharge in a Geiger counter.

The dreaded use of radioactivity in atomic weapons and bombs is not to be condoned. The effects of bombings are dreadful. If an atomic war should develop almost all life on earth would cease.

However, man has learned to utilize radioactivity for peaceful purposes, too. Radiation is proving very effective in the field of medicine, particularly in the curing of certain cancers. Industry has also perceived the great potentialities of radioactive power and soon atomic reactors will be supplying energy in plants, ships and planes.

In conclusion, one should become conscious of the overwhelming power that is produced by radioactivity. Already man has launched artificial satellites in orbit around the earth and is on the threshold of conquering space. Radioactivity and atomic power is his implement. It is an implement that will either prolong or annihilate his life and destiny. Whichever course is taken because of radioactive power is known to no one except the infallible unsurmounted power of God, Himself.

THE PYTHAGOREAN THEOREM: ITS HISTORY AND PROOFS

By Hope A. Koch

Tau Chapter

Of all the theorems and propositions in use in geometry today, the most famous and utilitarian is in all probability the one known as the Pythagorean Theorem. It winds its way throughout mathematical history and turns up in other fields outside of geometry.

Through the years, several hundred proofs, some algebraic and some geometric, have been devised to prove that $a^2 + b^2 = c^2$.

The Egyptians and Babylonians were thought to have used the Pythagorean relationship, but now there is doubt as to whether it was actually known or used out of purely empirical reasons.

Although the early Chinese knew the idea of the theorem, no proofs were found until hundreds of years later. The Hindus were also aware of it rather early, but never concerned themselves with proofs. The following is the diagram sent by Bhaskara, a late Hindu mathematician, to those in the West, and the proof that could accompany it.

$$c^2 = 4 \left(\frac{1}{2} ab \right) + (b-a)^2$$

$$c^2 = 2 ab + b^2 - 2 ab + a^2$$

$$c^2 = b^2 + a^2$$

One of the most famous proofs was devised by Euclid of Alexandria in the Third Century B. C. Two other noted proofs were devised by men famous in other fields, James Garfield and Leonardo Da Vinci.

New proofs are still being discovered for this relationship which, although given such detrimental nicknames as Pythagoras's Pants and Peacocks Tail, remains a very useful and honored theorem.

COLLOIDAL CHEMISTRY—OUR EVERYDAY COMMODITY

By Richard Person

Tau Chapter

Bancroft's definition of colloid chemistry is very vague to the average person, but to people of chemistry it is one of the most important phases of chemistry.

The movement, preparation, and other properties of colloids are very simple, these properties provide many conveniences that seem necessary in our modern society. Industry has also capitalized on the principles of the Cottrel precipitator by saving the tiny particles that formerly went up in smoke. Homogenization, virus isolation, and vaccine production are some of the technical uses of colloidal chemistry.

The housewife uses colloids and their principles daily; however, she very seldom realizes that those clean eggs she bought have been so cleaned by a gel known as water glass. Her Certo used in preparing jams and jellies is a protective colloid and produces a greater volume of jam than her grandmother produced.

Some of our more modern conveniences are latex materials. Latex rubber gloves are prepared by dipping "hand forms" into a colloidal rubber solution until the desired thickness of latex is produced on the form. These are dried and removed to provide delicate protection for surgeons, housewives, and laundry workers.

All living matter, whether animal or plant, is made up of colloidal materials and is sustained by colloidal processes. Of similar importance is colloidal chemistry in everyday living, in almost all of our foods, such as proteins and starches, in our clothing whether natural or synthetic in origin, and in our shelter materials, such as wood, bricks, and concrete. The glory of sunsets and colors of birds' feathers are some of the many evidences of colloids in our natural phenomenon.

POISONOUS SNAKES OF THE UNITED STATES

By Joan Lozo

Tau Chapter

In this day and age, the poisonous snake is regarded with little or no concern. With modern medical knowledge, the chance of a fatal accident occurring is practically eliminated. However, the best way to avoid being bitten is to be able to recognize these snakes and to understand a little about their habits. Different poisonous snakes are found in various sections of the United States. Each specimen may be identified by the locality in which it may be found, by its habits, or by the color and the structure. It is important for everyone to know the dangerous snakes of the area in which he lives and to become aware of them.

EARTHQUAKES: THEIR CAUSES AND EFFECTS

By John S. Ruth

Tau Chapter

Earthquakes have been a source of great destruction and loss of life for centuries. Many explanations concerning the causes of these great tremors have been brought forth through the years. No longer do we believe them to be caused by a giant spider, by subterranean winds, or some other ridiculous source based upon imagination only. Scientific observation and thought has gradually replaced superstitions and false assumptions until today a great many truths are known about this terrifying phenomenon.

Earthquakes are characterized and distinguished from other vibrations by various facts. They usually come and pass from existence in a very short period

of time and they are characterized by groups of waves rather than by single ones. Aftershocks may persist for as long a period as several years; i.e., the aftershocks of the Mino-Owari, Japan, tremblor in 1891 totaled 3,365 during a twenty-six month period.

The great majority of earthquakes are believed to be caused by a rapid dislocation of a part of the earth's interior structure brought about by the accumulation of strains and stresses. Many other creditable theories have been advanced, however. The most prominent of these are the Earth Block Theory, the Fault Theory, the Mosaic Block Theory, the Elastic Rebound Theory, and the Theory of Continental Drift. Two recent theories which have commanded attention deal with shrinkage of the earth's crust and radioactivity. Each of these theories has been dealt with in my paper. The most effective method of studying earthquakes is by the study of their waves. Tremblor waves are of two main types: Preliminary, consisting of longitudinal and compressional waves; and surface also of two types, Rayleigh and Love, or transverse waves. Recently a short-period transverse vibration wave, the Lg Wave, has been discovered.

Seismologists and scientists the world over are anxiously awaiting the results of the many studies undertaken throughout the world during the IGY. Never has such an active and concerted effort taken place in this field.

FAD DIETING: ANALYSES AND EXPOSURES AS CONTRASTED WITH PROPER DIETING

By Susan Ann Bright

Tau Chapter

Introduction

America is known as a land of plenty with enough available food to supply our entire population with an ideal diet. Proper nutrition is not a problem because there is a lack of food but rather because the food that is consumed does not have the proper nutritive components. As a result of this haphazard feasting, obesity is a common enemy of the typical American. These afflicted "chubbies" are providing bait for the food faddist who seeks to persuade his victims that reducing can be made a swift and easily accomplished task by following his recommendations. Such claims have emotional appeal and are too often accepted without intelligent questioning.

Despite the rapid progress made in improving the nutrition of our nation, dietary quacks are gaining increased control over the gullible public. About half a billion dollars is spent for fad diets and "health foods" every year, and that figure will continuously increase unless people will learn to accept sound nutritional information to combat these fallacies.

At the present time reliable educational sources are not zealous enough and federal laws are not inclusive enough to combat food faddism. The Food and Drug Administration can only act if interstate commercial products include false or misleading claims, and has no authority to subdue falsifications presented in books, magazines, public lectures, radio, or television. When erroneous or confusing statements cannot be classified as commodity advertisements, the Federal Trade Commission is also useless in a counterattack against this quack racket. Between these two inadequate laws there is a wide gap enabling the most obvious dietetic faddist to satisfactorily operate, uninhibited by any barrier except the information of reliable educational programs. Obesity definitely has created a major health, economic, and social problem.

May the information that I present on this current problem reveal some of the consequences and pitfalls of fad dieting as contrasted with an intelligent, well-formulated dietary program.

THE SYNTHESIS AND USES OF

7-Chloro -4(4-Diethylamino-1-Methylbutylamino)-Quinoline

Or

CHLOROQUINOLINE

By Thomas F. Richardson

Pi Chapter

The modern research chemist has come to the aid of mankind in many ways especially in the last twenty years. One of these ways is in the synthesizing of substitutes for natural materials man has always taken for granted, but suddenly finds himself without. An example of this is in the synthesis of a compound called chloroquine which replaced quinine in the early 1940's when the Americans and their allies found this valuable anti-malarial outside their grasp.

This paper was devoted to a little background and history of the drug chloroquine and its synthesis.

When the Japanese first over-ran the Dutch East Indies, the allies lost the source of 95 per cent of the world's quinine. With the last of this natural anti-malarial, the American Armies in the South Pacific faced, in the threat of malaria, a far greater enemy than the guns and tanks of Japan. At this time, research chemists the nation over searched unceasingly for some other drug that would replace the anti-malarial qualities of the non-available quinine. Chloroquinoline or Aralen was found to be effective.

The remainder of the paper was devoted to the synthesis of the drug starting from ethyl oxaloacetate and m-chloroaniline through a seven-step process ending with the desired 7-chloro 4-(4-diethylamino-1-methylbutylamino)-quinoline.

MARSILEA

By Richard L. Levy

Xi Chapter

In the field of Botany, teachers seem many times to skip over a topic because they fear the students will not comprehend what is being discussed. One of these phases seems to be the development of the heterosporous tendency (the tendency to produce two different kinds of spores) which is a major step in the evolutionary chain leading to the development of seeds. Also related to this topic is the development of a complete understanding of a sperm and of how it looks and acts in the process of reproduction.

In the phylum Pteridophyta, order Hydropteridales, there is a genus, Marsilea, which can be used to great benefit in studying the heterosporous tendency and sperms. These plants are water ferns that grow in shallow water and bear laterally on the petiole small prominent reproductive structures known as sporocarps.

At the beginning of sporocarp germination, the characteristic of Marsilea which seems to have the most importance is the dramatic and short period of time that it takes for the gametophyte to mature, fertilize, and form a new plant. The time element involved in this process is as follows: it takes one hour after the sporocarp has been cracked for a mucilage ring to which the spores are attached to appear; twelve to twenty hours elapse before the microspore reaches maturity; in fourteen to twenty-two hours the megaspore develops into a megagametophyte; and after fertilization, the sporophyte will develop a leaf in two to four days.

With rapid development in this plant's life cycle and the consistent change of the organism, the high school student would not lose interest while studying

the plant. Also, in a few short days, a complete life cycle can be followed and observed; whereas in some plants, it might require a year or more to follow the life cycle completely.

In connection with the heterosporous tendency, it can be shown by observing *Marsilea* how the female gametophyte stays within the spore to develop and produce a new sporophyte. From this point, it should be easy to move into the production of seeds by a plant when actually all that takes place is a retention of the megaspore in the megasporangium while megagametophyte and sporophyte production occurs.

NEWS ITEMS FROM SIGMA CHAPTER

College doors closed behind five Sigma Zetans on May 26 at Our Lady of the Lake. Bachelor of Arts degrees were received by Margaret Longo who will enter Louisiana State Medical School, Baton Rouge, La., in September, Theresa Lim who has been granted an assistantship at Fordham University in the field of chemistry, Bernadette A. Borchers and Fay Doyle who have accepted positions as research assistants at the Anderson Cancer Hospital, Houston, Texas, in the departments of virology and genetics respectively. A Bachelor of Science degree in Medical Technology was received by Lucille Nentwich who has accepted a position at the Nix Hospital Clinical Laboratory, San Antonio, where she received her clinical training during the past year.

Paulette Langlinais, now president of Sigma Chapter, began her training at the Nix Hospital Clinical Laboratory on June 1, with a view to receiving her Bachelor of Science degree in Medical Technology June 1, 1949.

The following members will fill the remaining offices for the coming scholastic year: Gladys Cronfel, Vice President, Gloria Correa, Secretary, and Kathy Mulligan, Treasurer.

EDITOR'S NOTE

The above papers are in the form as submitted by the authors. They have not been edited. The editor believes it should be of interest to note the quality of the work originating from the various chapters.



