

# THE SIGMA ZETAN

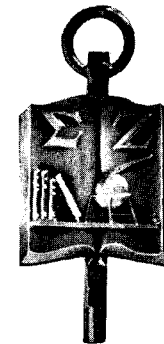


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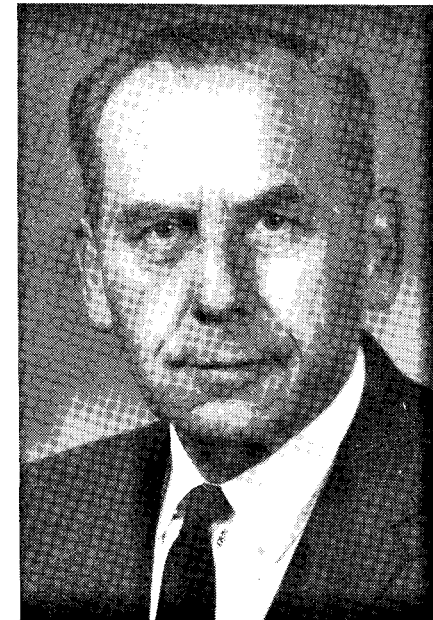
# THE SIGMA ZETAN

OFFICIAL ORGAN OF SIGMA ZETA



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### OUR NATIONAL PRESIDENT

Newell A. Schappelle, professor of Botany and chairman of the Biology Department at Mansfield State College, Mansfield, Pennsylvania is our National President for 1968-69. He received his Ph.D. degree in Plant Physiology from Cornell University in 1934. He has been teaching at Mansfield State College and a sponsor of the Lambda chapter of Sigma since 1946.

Prior to his teaching at Mansfield, Dr. Schappelle was Plant Physiologist doing research work at the South Carolina Experiment Station and also at the University of Puerto Rico Experiment Station. He also served as senior Plant Pathologist with the Pennsylvania Department of Agriculture for five years doing work on seed certification.

OUR NATIONAL OFFICERS 1968-1969



Left to Right—Dr. Drenan, Dr. Paschall, Dr. Cook, Mrs. Evans, Dr. Schappelle, and Prof. Fleming

- National President.....N. A. Schappelle
- National Vice President.....Homer Paschall
- National Recorder-Treasurer.....Kenneth E. Cook
- National Historian.....Fred A. Fleming
- National Editor .....James W. Drenan
- National Past President .....Beatrice Evans

Our national officers in behalf of all our members cordially welcome the new chapters into Sigma Zeta. We hope that you will call upon us whenever you need assistance, and that you will benefit from us as much as we will from having you in our fraternity. We know that our new chapters will play an important part in the continued growth of Sigma Zeta.

MINUTES OF THE THIRTY-EIGHTH ANNUAL CONVENTION OF SIGMA ZETA

APRIL 6, 7, 8, 1967

The thirty-eight annual convention of Sigma Zeta Honorary Science Society was called to order by National President Thomas R. Mertens at 9:10 a.m. in Room 104 of the Science Building on the campus of East Stroudsburg State College, East Stroudsburg, Pennsylvania. He turned the meeting over to Valerie McKay, president of Tau Chapter, who welcomed the delegates, and noted that 1967 was the twentieth anniversary of Tau Chapter. Mrs. McKay introduced Dr. Francis McGarry, Dean of Instruction, East Stroudsburg State College. Dean McGarry welcomed the group on behalf of the college, and noted that good teachers must furnish the spark to ignite the learning process.

Prof. Beatrice Evans, National Vice President, responded for Sigma Zeta, expressing appreciation for the hospitality shown by the East Stroudsburg State College members.

Prof. Kenneth E. Cook, National Recorder-Treasurer, presented the minutes (as amended) of the 37th annual convention of 1966, along with the financial statements. Sister Elizabeth Anne (Sigma) moved their acceptance, Miss Beverly Collier (Xi) seconded, and the motion was carried.

The official roll call of the chapter was read by Prof. Cook:

| Chapter | Student Delegates | Faculty Delegates |
|---------|-------------------|-------------------|
| Beta    | 0                 | 0                 |
| Gamma   | 0                 | 0                 |
| Delta   | 0                 | 0                 |
| Epsilon | 0                 | 0                 |
| Zeta    | 2                 | 0                 |
| Kappa   | 0                 | 0                 |
| Lambda  | 4                 | 1                 |
| Mu      | 2                 | 0                 |
| Nu      | 2                 | 2                 |
| Xi      | 3                 | 2                 |
| Pi      | 1                 | 1                 |
| Rho     | 3                 | 0                 |
| Sigma   | 3                 | 1                 |
| Tau     | 19                | 2                 |
| Upsilon | 6                 | 3                 |

|                   |   |   |
|-------------------|---|---|
| Phi .....         | 0 | 0 |
| Psi .....         | 0 | 0 |
| Omega .....       | 0 | 0 |
| Alpha Alpha ..... | 0 | 0 |
| Alpha Beta .....  | 4 | 2 |

Prof. Mertens gave his report as National President. He talked of the necessity of getting new chapters started and told of how this might be accomplished. Xi Chapter, for example, had invited two institutions to their spring initiation and banquet. He recommended that students and faculty personally contact near-by schools. It was moved that each chapter prepare a list of schools which might be contacted by letter. The Recorder-Treasurer was directed to send a letter of information to the schools listed.

Prof. James W. Drenan, National Editor, announced that the *Sigma Zetan* was in press, and should be mailed out by the end of April. He said that he would like to hear from each chapter as to how many copies were needed. He also made the perennial request for information from the chapters as to their activities. He suggested that alumni news might also be included. He asked for abstracts of student papers.

Prof. Mertens announced the appointment of the following convention committees:

Founders Cup Committee—Thomas R. Mertens (National President), Kenneth E. Cook (National Recorder-Treasurer), and Beverly Collier (Xi).

Auditing Committee—William Eden (Tau), Judy Varga (Sigma), and Marie Manchester (Lambda).

Nominating Committee—Duane E. Deal (Xi), Sister Elizabeth Anne (Sigma), Richard Honeycutt (Upsilon), and Jeanne Mittler (Nu).

Resolutions Committee—N. A. Schappelle (Lambda), David Clutts (Pi), Mary Anne Wight (Sigma), and Lee Neumeier (Zeta).

A general announcement was made asking for Founders Cup and Honor Award information.

Prof. Eden announced the afternoon field trip to Tobyhanna Army Depot.

Mrs. McKay announced lunch and banquet tickets, and student paper changes.

Mr. Donald Tiano (Rho) announced that Rho Chapter had designed a Sigma Zeta sweat shirt. He turned the design over to the Recorder-Treasurer for use by any other interested persons.

After a coffee break at 10:10, the meeting reconvened at 10:32. President Mertens turned the meeting over to William Eden. Prof. Eden proposed that perhaps some of the student papers be presented after the Friday banquet rather than having two parallel sessions on Saturday morning. It was decided that the National Council should consider this problem for next year, and go ahead as planned for this year.

The following papers were presented:

Don Tiano and John Houlihan (Rho)—Comparison of Two Techniques for Determining Linear Absorption Coefficients.

Judy Varga (Sigma)—Preparation and Study of the Octacyano Complexes of Group 6B.

Barbara Michaels (Tau)—Gas Chromatography.

Nora Lugo (Sigma)—Virus Replication.

After announcements by President Mertens concerning check cashing and the 1968 meeting invitation, the meeting adjourned at 11:45 a.m. The group went to Tobyhanna Army Depot for lunch and a field trip.

In the evening the convention banquet was held at the Holiday Inn of Stroudsburg, with Dr. Vernon E. Leslie speaking on "Problems in American Archeology."

After the speech, Prof. Evans presented the Sigma Zeta Honor Awards to:

Paul Berguson (Lambda)

Darlene Sayers (Upsilon) *in absentia*

Donald Tiano (Rho)

Mary Anne Wight (Sigma)

Dr. Grady Moore (Tau)

The second session of the convention was called to order by the National President at 9:06 a.m. Saturday morning. The following papers were presented in two simultaneous sessions:

Jeanne Mittler (Nu)—Loss of Chromosomes and Non-disjunction Induced by Caffein in *Drosophila*.

Martha Oliver (Upsilon)—Histochemical Techniques with the Pancreas.

Mary Anne Wight (Sigma)—A Technique for Chromosome Analysis.

David Clutts (Pi)—Effects of Milk on Blood Pressure.

Paul Berguson (Lambda)—A Discussion Pertaining to the Classic Research Regarding Cellular Growth Coordination in Plant Tissue.

Veronica M. Kruponski (Tau)—Vanillin, *cis*-Terpin Hydrate, and *cis*-Terpin as Ice Nucleators.

Janet Andraski (Tau)—The Mathematics of Beauty in Art and Nature.

Ethel Mae Higel (Xi)—The Thermogenic Qualities of Brown Adipose Tissue in Newborn Rabbits.

Constance R. LaFont (Upsilon)—Effects of Chemical Carcinogens on Microorganisms.

Larry Darlage (Rho)—An Inexpensive Paper-strip Electrophoresis Apparatus.

Following the student paper presentations, a business session was called to order by President Mertens.

Prof. Eden reported for the Auditing Committee that it appeared that Sigma Zeta had two honest Recorder-Treasurers. The committee found the books and accounts to be in order. Mary Anne Wight (Sigma) moved that the report be accepted; Judy Varga (Sigma) seconded, and the motion carried.

Miss Mary Anne Wight (Sigma) presented the report of the Resolutions Committee, which was seconded by Beverly Collier (Xi) and accepted. The report was as follows:

"Be it resolved that Sigma Zeta expresses wholehearted appreciation to the Tau Chapter and East Stroudsburg State College for the amiable accommodations and the privilege of meeting here. Especially are we appreciative of the individual efforts of its sponsors, Prof. William Eden and Col. Clifford Poutre, and of the chapter president, Mrs. Valerie McKay and her coworkers, and all the friendly members of the chapter for arranging the excellent program and schedule of events. We also wish to commend Dr. Grady Moore for his work with Tau Chapter. We want to express our sincere appreciation for the excellent work done by the retiring Recorder-Treasurer Duane E. Deal, who presented the minutes of the 1966 convention and to pledge our cooperation to the new Recorder-Treasurer, Kenneth E. Cook. Furthermore, we wish to commend the president, Dr. Thomas R. Mertens and all of the other officers for their efforts in behalf of Sigma Zeta during the past year."

Miss Beverly Collier (Xi), representing the winner of the Founders Cup in 1966, presented the cup to Tau Chapter for 1967 in recognition of their

many contributions to Sigma Zeta. Mrs. Valerie McKay accepted for Tau Chapter.

Jeanne Mittler (Nu) presented the report of the Nominating Committee. The following slate of officers was presented:

National President—Beatrice Evans (Alpha Beta)

National Vice President—N. A. Schappelle (Lambda)

National Recorder-Treasurer—Kenneth E. Cook (Upsilon)

National Editor—James W. Drenan (Pi)

National Historian—Fred A. Fleming (Beta)

National Past President—Thomas R. Mertens (Xi)

Duane Deal (Xi) moved to accept the report, to close nominations and to instruct the secretary to cast a unanimous ballot for the slate. William Eden (Tau) seconded the motion, which carried.

Prof. Mertens passed the gavel to President Evans. The other national officers were introduced: it was noted that Prof. Schappelle had been sponsor of Lambda Chapter for 20 years. Duane E. Deal presented the postal scales to Kenneth E. Cook as an emblem of the office of Recorder-Treasurer.

President Evans announced that no decision for the location of the 1968 meeting had yet been made. Sigma Chapter had extended an invitation.

The thirty-eighth annual convention of Sigma Zeta was declared adjourned at 11:35 a.m.

Kenneth E. Cook

National Recorder-Treasurer

REGISTRANTS

ZETA CHAPTER

Lee Nuemeier  
Mary Nolan

LAMBDA CHAPTER

Paul D. Berguson  
Robert Burnett  
Marie Manchester  
\*N. A. Schappelle  
Joseph J. Shultz

MU CHAPTER

Karen Benson  
Joanne Stolp

NU CHAPTER

\*Donald Fuller  
Jeanne Mettler  
Laura Pagel  
\*James Williamson

XI CHAPTER

Marshall E. Bowman  
Beverly Collier  
\*Duane E. Deal  
Ethel Mae Hiegel  
\*Thomas R. Mertens

PI CHAPTER

David Clutts  
\*James W. Drenan

RHO CHAPTER

Larry Darlage  
Larry Swift  
Donald Tiano

SIGMA CHAPTER

\*Sister Elizabeth Anne  
Nora Lugo  
Judy Varga  
Mary Anne Wight

TAU CHAPTER

Janet Andraski  
Judy Boyanek

Cecelia Capozzolo  
Maryann Daniels  
\*William Eden  
Donna Evick  
Elaine Felli  
Gail Ferrey  
Susanne Johnston  
Linda Kostrna  
Veronica Krupinski  
Karllyn J. Leslie  
Valerie McKay  
Barbara Michaels  
Nancy Miller  
Nancy Mortensen  
\*Col. Clifford Poutre  
Allan Riechenback  
Sandra Shay  
Stanley Snyder  
Alberta Zalimas

UPSILON CHAPTER

\*Paul J. Anderson  
\*Kenneth E. Cook  
Clella Gilbert  
Richard Honeycutt  
Constance LaFont  
\*Marie Joiner Mayo  
Martha Oliver  
James L. Shoot  
Roger Wells

ALPHA BETA CHAPTER

\*Beatrice Evans  
Louis Cheatham  
Robert Elzy  
\*Paul Osborne  
George Patmor  
Dennis A. Shaw

\* Faculty Members

GUESTS

Dr. and Mrs. Vernon Leslie  
Mr. John McKay  
Dr. and Mrs. Grady Moore  
Mr. and Mrs. Samuel Wallace  
Mrs. William Eden  
Mrs. Clifford Poutre

SIGMA ZETA HONORARY SCIENCE SOCIETY  
Financial Report—September 1, 1966 - August 31, 1967

RECEIPTS

Membership Fees: (Active + Associate + Faculty)

|                           |          |
|---------------------------|----------|
| Beta (8 + 0) .....        | \$ 50.00 |
| Gamma (54 + 0) .....      | 270.00   |
| Delta (16 + 7) .....      | 87.00    |
| Epsilon (8 + 0) .....     | 40.00    |
| Zeta (25 + 17 + 3) .....  | 142.00   |
| Kappa (25 + 0) .....      | 125.00   |
| Lambda (10 + 14) .....    | 64.00    |
| Mu (8 + 4) .....          | 44.00    |
| Nu (0 + 0) .....          | 00.00    |
| Xi (52 + 0) .....         | 260.00   |
| Pi (5 + 12) .....         | 37.00    |
| Rho (13 + 4) .....        | 69.00    |
| Sigma (12 + 5) .....      | 65.00    |
| Tau (14 + 10) .....       | 85.00    |
| Upsilon (14 + 6 + 1) .... | 76.00    |
| Phi (10 + 13) .....       | 63.00    |
| Chi (12 + 0) .....        | 60.00    |
| Psi (24 + 0).....         | 178.00   |
| Omega (6 + 3) .....       | 33.00    |
| Alpha Alpha (0 + 0)....   | 00.00    |
| Alpha Beta (4 + 3) .....  | 23.00    |

\$ 1771.00

Jewelry Sales:

|               |          |
|---------------|----------|
| Beta .....    | \$ 30.16 |
| Gamma .....   | 240.76   |
| Delta .....   | 10.30    |
| Zeta .....    | 43.26    |
| Mu .....      | 9.25     |
| Xi .....      | 59.12    |
| Rho .....     | 10.20    |
| Tau .....     | 31.50    |
| Upsilon ..... | 27.54    |
| Phi .....     | 14.82    |
| Omega .....   | 61.80    |

\$ 538.71

Stationery .....\$ 2.00

TOTAL RECEIPTS .....\$ 2311.71

## FINANCIAL REPORT—Sept. 1, 1966—August 31, 1967 (Cont'd)

## DISBURSEMENTS

|  |              |
|--|--------------|
| Printing the <i>Sigma Zetan</i> .....        | \$ 601.48    |
| Office Supplies .....                        | 101.21       |
| 1967 Convention travel .....                 | 768.00       |
| 1967 Officer convention travel .....         | 352.00       |
| Convention expenses .....                    | 121.61       |
| Secretarial expense—editor .....             | 100.00       |
| Secretarial expense—recorder—treasurer ..... | 200.00       |
| Jewelry .....                                | 537.55       |
| Refunds on overpayments .....                | <u>42.00</u> |
| TOTAL DISBURSEMENTS .....                    | \$ 2823.85   |

## FINANCIAL SUMMARY

|  |                |
|--|----------------|
| Balance on hand, September 1, 1966 ..... | \$ 2595.74     |
| Receipts as above .....                  | <u>2311.71</u> |
| Total cash .....                         | \$ 4907.45     |
| Disbursements .....                      | <u>2823.85</u> |
| Balance .....                            | \$ 2083.60     |

|   |                |
|---|----------------|
| Balance in checking account, August 31, 1967 .. | \$ 583.60      |
| Balance in savings account, August 31, 1967 ... | <u>1500.00</u> |
| Balance on hand, August 31, 1967 .....          | \$ 2083.60     |

## SIGMA ZETA DEVELOPMENT FUND

|  |              |
|--|--------------|
| Balance on hand, September 1, 1966 ..... | \$ 953.99    |
| Interest .....                           | <u>50.01</u> |
| Balance on hand, August 31, 1967 .....   | \$ 1004.00   |

SIGMA ZETA HONORARY SCIENCE SOCIETY  
Interim Financial Report - September 1, 1967 - April 10, 1968

## RECEIPTS

## Membership fees (Active + Associate + Faculty)

|                           |            |
|---------------------------|------------|
| Beta (3 + 0) .....        | 15.00      |
| Gamma (50 + 0) .....      | 250.00     |
| Delta (0 + 0) .....       | 60.00      |
| Epsilon (12 + 0) .....    | 60.00      |
| Zeta (52 + 15) .....      | 275.00     |
| Kappa (43 + 0) .....      | 215.00     |
| Lambda (18 + 7) .....     | 97.00      |
| Mu (18 + 1) .....         | 91.00      |
| Nu (0 + 0) .....          | 00.00      |
| Xi (56 + 0 + 7) .....     | 280.00     |
| Pi (6 + 10) .....         | 40.00      |
| Rho (0 + 0) .....         | 00.00      |
| Sigma (5 + 9) .....       | 34.00      |
| Tau (6 + 4) .....         | 34.00      |
| Upsilon (10 + 10 + 1) ... | 60.00      |
| Phi (0 + 0) .....         | 00.00      |
| Chi (6 + 0) .....         | 00.00      |
| Psi (13 + 0) .....        | 65.00      |
| Omega (1 + 2) .....       | 7.00       |
| Alpha Alpha (0 + 0) ....  | 00.00      |
| Alpha Beta (3 + 3) .....  | 18.00      |
|                           | <hr/>      |
|                           | \$ 1541.00 |

## Jewelry Sales:

|              |           |
|--------------|-----------|
| Beta .....   | 5.25      |
| Gamma .....  | 218.87    |
| Lambda ..... | 28.61     |
| Xi .....     | 77.78     |
| Phi .....    | 6.30      |
|              | <hr/>     |
|              | \$ 336.81 |

|                  |             |
|------------------|-------------|
| Stationery ..... | <u>3.00</u> |
|------------------|-------------|

TOTAL RECEIPTS .....\$ 1880.81



**INTERIM FINANCIAL REPORT—Sept. 1, 1967—April 10, 1968**  
 (Cont'd)

## DISBURSEMENTS

|   |                  |
|---|------------------|
| Postage, duplicating, office supplies ..... | \$ 59.90         |
| Jewelry .....                               | 94.53            |
|   | <u>\$ 154.43</u> |

## SUMMARY

|   |                   |
|---|-------------------|
| Balance on hand, September 1, 1967 .....        | \$ 2083.60        |
| Receipts as above .....                         | 1880.81           |
| Total cash .....                                | <u>\$ 3964.41</u> |
| Disbursements as above .....                    | 154.43            |
| Balance on hand, April 10, 1968 .....           | \$ 3809.98        |
| Balance in checking account, April 10, 1968.... | \$ 2309.98        |
| Balance in savings account, April 10, 1968 .... | 1500.00           |
| Balance on hand, April 10, 1968 .....           | <u>\$ 3809.98</u> |

## SIGMA ZETA DEVELOPMENT FUND

|  |                   |
|--|-------------------|
| Balance on hand, September 1, 1967 ..... | \$ 1004.00        |
| Interest September 29, 1967 .....        | 28.17             |
| Interest December 29, 1967 .....         | 28.49             |
| Interest March 29, 1968 .....            | 28.81             |
| Total, April 10, 1968 .....              | <u>\$ 1089.47</u> |

### FOUNDERS' CUP AWARD

A highlight of the 39th National Convention was the presentation of the Founders' Cup to Upsilon Chapter. At each convention a committee is appointed to determine the chapter most worthy of the award. Usually they base their decision largely on the report of chapter activities during the preceding year and on the quality of student papers presented by the chapter at the National Convention. A chapter is not permitted to receive the award two years in a row.

At the 1968 convention Tau Chapter, the previous awardees, turned the cup over to the new winners — Upsilon Chapter. Upsilon has always been one of our most active chapters. During the 1967-68 year they carried out a fine local program on campus; they did an excellent job in serving as hosts for the 1968 National Convention; and Upsilon students presented several fine papers at this convention. Winning of the award helped Upsilon Chapter celebrate the twentieth anniversary of its founding. Upsilon also was awarded the Founders' Cup in 1951.

### ABSTRACTS OF STUDENT PAPERS

#### ORCHID TISSUE STUDY

by Doug Doolittle, Xi

The purpose of this study is to develop a technique for aseptic culture and total utilization of meristematic tissue from members of the orchid family. A literature survey showed it was not until 1960 that George M. Morel successfully cultured cymbidiums in an attempt to produce virus-free plants. My work involves plants from the *Cattleya* alliance.

Under aseptic conditions, a few cells from the meristem region are removed and placed in a suitable medium. The cultures can either be shaken or left static; within three to four weeks, differentiation takes place. In the following three to four weeks a root and a shoot develop.

Future work will involve the use of plant extracts in the medium. A standardization of environmental conditions will be attempted.

Although plant tissue culture will never replace the seed, it is a valuable tool for the commercial grower in that he can produce uniform and possibly virus-free plants by this technique.

#### SELECTIVITY OF ABSORPTION OF Sr RELATIVE TO Ca BY VERMICULTURE

by Judy Varga, Sigma

The long half life radioisotope  $^{90}\text{Sr}$  contained in waste pits at ORNL is believed to be coprecipitated with  $\text{CaCO}_3$ . These carbonates are subject to dissolution by rainwater percolating through the waste pits. Movement of the  $^{90}\text{Sr}$  through the surrounding soil could be retarded by geochemical reactions such as ion-exchange between this radionuclide and clays in the region.

To study such possible effects,  $^{85}\text{Sr}$  and  $^{45}\text{Ca}$  were coprecipitated as carbonates atop the vermiculite column. Two series of such columns were leached with 1M, 0.1M, 0.05M, and 0.01M HCl, respectively. Series two differed from Series one in that the  $^{85}\text{Sr}$  was added only after the precipitation of  $\text{CaCO}_3$ .

As expected, the 50% breakthrough volume, V, (volume of leaching agent required to recover 50% of either isotope) is inversely proportional to acid strength. The relative rate of movement through the column of  $^{85}\text{Sr}$  to  $^{45}\text{Ca}$  is

expressed by  $K \frac{\text{Sr}}{\text{Ca}} = \frac{V_{\text{Sr}}}{V_{\text{Ca}}}$  such that  $K \frac{\text{Sr}}{\text{Ca}} > 1.00$  indicates slower movement of  $^{85}\text{Sr}$ . For Series I, the average value of the above ratio was  $1.18 \pm 0.47$ ; for Series II,  $1.13 \pm 0.42$ . Hence, strontium behavior is essentially the same whether strontium is present during or only after precipitation of  $\text{CaCO}_3$ .

**AN APPROACH TO THE ANASTOMOSIS OF SMALL ARTERIES***by James L. Shoot, Upsilon*

A patency rate of 100 per cent was demonstrated in dogs at the end of 14 days in 36 anastomoses of brachial arteries averaging 1.5 millimeters in external diameter by Chase and Schwartz (1). A method of performing end-to-end anastomosis has been developed which employs a minimum of special instruments and a minimum of assistance. This method has been demonstrated in rats in the anastomoses of arteries averaging 1 millimeter in external diameter with a patency rate of 50 per cent. While the procedure described may be performed by a surgeon alone, the use of an assistant, who controls the tension of the stay sutures, is of considerable value. Success using this technique is attributed to the following four factors: (1) magnification which provides necessary visualization and mobility, (2) doubly-armed sutures which permit the accurate placement of stay sutures through the lumen, (3) a limited number of refined instruments, and (4) a technique resulting in minimal trauma to the blood vessel.

**A SURVEY OF INFLUENZA ANTIBODIES IN A COLLEGE POPULATION***by Francine Mikalik and Barbara Shannon, Sigma*

This investigation was undertaken to determine the antibody titer of a college population against influenza virus because of the prediction of a 1967-68 winter influenza epidemic. The measure of antibody titer in the population by the hemagglutination methods constitutes the basis of this report.

A bivalent virus vaccine comprised of strains A<sub>2</sub>—Japan/170/62, A<sub>2</sub>—Taiwan/1/64, and B—Massachusetts/3/66 was used in carrying out the Hemagglutination Inhibition tests by the macrotiter and microtiter methods. Blood samples were taken and sera prepared from a population of 91 students and 12 faculty. The population was divided into groups according to their reported history of influenza. Group I included those who reported having had the infection and immunization. Group II included those who reported no infection but had been immunized. Group III reported having had the infection but no immunization and Group IV reported neither infection nor immunization.

The results indicated that the highest titer was obtained in most cases by the microtiter method. In comparing group results it was found that Group I demonstrated the highest titer, Groups II and III were intermediate and Group IV evidenced the lower titer.

**A STUDY OF HEMOLYTIC STREPTOCOCCI AND STAPHYLOCOCCI IN THE COLLEGE POPULATION***by Maxine Acosta, Sigma*

Alpha hemolytic streptococci and alpha pneumococci are among the normal flora of the throat while non-pathogenic staphylococci are commonly found in the nose or on the skin. Carriers of pathogenic hemolytic staphylococci and b—streptococci in the college population were the primary concern of this study. Approximately 50 people were examined through nose, throat and skin swabs cultured respectively on blood agar. Significant colonies were subcultured and microscopic and biochemical studies were performed. Approximately 50% of the people examined were possible staphylococcal carriers, 5% possible staphylococcal carriers, 5% possible b—streptococcal carriers, and 23% possible pneumococcal carriers.

**IMPRINTING***by Margery A. Yeakel*

In my paper I have represented imprinting as an extremely rapid form of learning that takes place in the early life of many organisms and that is possible only during a very brief period in their lives. This limited period of "best imprintability" called the critical period varies from animal to animal. The purpose of my experimentation was to discover the limits of the critical period in baby chicks, specifically Vantress Broilers.

Preliminary procedure consisted of the construction of an imprinting apparatus, a 90 inch runway enclosed in plexiglass walls. A styrofoam rabbit decoy was rotated around the runway and thus served as the imprinting object.

In an effort to determine the age at which an imprinting experience of ten minutes is maximally effective, the chicks were divided into eight groups which were imprinted at various times after hatching: 1 to 4, 5 to 8, 9 to 12, 13 to 16, 17 to 20, 21 to 24, 25 to 28, and 29 to 32 hours. At the desired time each chick was placed individually in the runway of the imprinting apparatus about six inches from the rotating decoy and was permitted to follow the model for a period of ten minutes after which each chick was returned to its individual compartments.

To test the strength of imprinting in each age group, each chick was again placed individually in the imprinting device. After allowing several minutes for the chick to adjust to the surroundings the model was rotated around the runway for a total of five revolutions. The data which I collected

indicated the conclusions: little or no imprinting occurred in chicks which were imprinted before the age of 12 hours after hatching; the highest degree of imprinting was observed in chicks imprinted between 13 to 16 hours after hatching, falling off sharply after 17 hours.

### THE CATENARY

by Thomas Molanda

A flexible, inelastic chain or chord of uniform density, suspended at its two ends, will form an arc of a catenary under the influence of gravity. If the Y axis goes through the minimum point, the differential equation of the catenary is

$$\frac{d^2}{dx^2} = \frac{1}{a} \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$$

which is solvable as a second order differential equation (with the dependent variable absent). The parameter  $\frac{1}{a}$ , depends upon the ratio of the length of the cable to the distance between the supports. The equation of the catenary is therefore  $y = a \cosh \frac{x}{a}$ , where the X axis is "a" units below the minimum point.

Substituting first two terms of the power series of  $\cosh \left(\frac{x}{a}\right)$  into the equation of the catenary produces the equation of the approximating parabola  $y = a + \frac{x^2}{2a}$ . In physical applications of the catenary when the cable is held taut, the load is distributed almost totally horizontally and the cable closely resembles the graph of the approximating parabola. Therefore, in many applications, the approximating parabola can replace the catenary to facilitate solutions to problems while the relative error is held at a minimum.

Continuing the analysis of the catenary yielded several interesting relationships:

1. The arc length is determined by the formula  $s = a \sinh \frac{x}{a}$ , where "s" is the arc length and "x" is the horizontal distance from the origin.
2. The area under the catenary from "x" = 0 to "x" = "x<sub>1</sub>" is equal to the product of the arc length from "x" = 0 to "x" = "x<sub>1</sub>" and the constant "a".
3. The radius of the curvature at any point, P, of the catenary is equal to

the product of the square of the ordinate at P and the constant  $\frac{1}{a}$ , and is also equal to the length of the normal segment from P to its intersection on the X axis.

4. The tension at any point P of the cable is directly proportional to the vertical distance from the X axis to the point P.

### DIFFERENTIAL THERMAL ANALYSIS OF SOME INORGANIC HYDRATES

by Randy Harter, Xi

Differential thermal analysis (DTA) is a method of studying the thermal induced changes a substance undergoes upon heating. These changes may be physical (melting, boiling or change in crystal structure) or chemical (decomposition, dehydration, or redox); some are endothermic, some exothermic. Le Chatelier first used this method in 1887 for the classification of clays. In 1899 Roberts-Austin suggested the use of two thermocouples to measure the temperature difference between the sample and a reference material as a function of time. DTA has been widely used in chemistry since 1930.

To get a thermogram, one needs two sample holders, two thermocouples, a furnace, a temperature control programmer, and a recorder. Best results are obtained if the furnace is evacuated. Factors for obtaining good thermograms are evaluated. The main drawback to the method is lack of reproducibility between different instruments, even in the same laboratory.

Some results obtained are shown below;

- |       |  |       |
|-------|--|-------|
| A. 1. | $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \rightarrow \text{CuSO}_4 \cdot 3\text{H}_2\text{O} + 2\text{H}_2\text{O} (1)$                  | 95°C  |
|       | 2. $2\text{H}_2\text{O} (1) \rightarrow 2\text{H}_2\text{O} (g)$   | 125°C |
|       | 3. $\text{CuSO}_4 \cdot 3\text{H}_2\text{O} \rightarrow \text{CuSO}_4 \cdot \text{H}_2\text{O} + 2\text{H}_2\text{O}$                    | 145°C |
|       | 4. $\text{CuSO}_4 \cdot \text{H}_2\text{O} \rightarrow \text{CuSO}_4 + \text{H}_2\text{O} (g)$   | 285°C |
|       | 5. $\text{CuSO}_4 \rightarrow \text{CuO} + \text{SO}_3 \text{ ca.}$  | 900°C |
| B. 1. | $\text{CaSO}_4 \cdot 2\text{H}_2\text{O} \rightarrow \text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O}$ | 75°C  |
|       | 2. $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} \rightarrow \text{CaSO}_4 (\text{soluble}) + \frac{1}{2}\text{H}_2\text{O}$        | 125°C |
|       | 3. $\text{CaSO}_4 (\text{soluble}) \rightarrow \text{CaSO}_4 (\text{insoluble})$   | 150°C |
| C. 1. | $\text{MgSO}_4 \cdot 7\text{H}_2\text{O} \rightarrow \text{MgSO}_4 \cdot 6\text{H}_2\text{O} + \text{H}_2\text{O} (1)$                   | 75°C  |
|       | 2. $\text{MgSO}_4 \cdot 6\text{H}_2\text{O} \rightarrow \text{MgSO}_4 \cdot 4\text{H}_2\text{O} + 2\text{H}_2\text{O} (1)$               | 95°C  |
|       | 3. $3\text{H}_2\text{O} (1) \rightarrow 3\text{H}_2\text{O} (g)$   | 170°C |
|       | 4. $\text{MgSO}_4 \cdot 4\text{H}_2\text{O} \rightarrow \text{MgSO}_4 \cdot 3\text{H}_2\text{O} + \text{H}_2\text{O} (g)$                | 125°C |
|       | 5. $\text{MgSO}_4 \cdot 3\text{H}_2\text{O} \rightarrow \text{MgSO}_4 \cdot 2\text{H}_2\text{O} + \text{H}_2\text{O} (g)$                | 145°C |
|       | 6. $\text{MgSO}_4 \cdot 2\text{H}_2\text{O} \rightarrow \text{MgSO}_4 \cdot \text{H}_2\text{O} + \text{H}_2\text{O} (g)$                 | 190°C |
|       | 7. $\text{MgSO}_4 \cdot \text{H}_2\text{O} \rightarrow \text{MgSO}_4 + \text{H}_2\text{O} (g)$   | 330°C |

The method may be applied to a wide variety of reactions in inorganic, organic, and polymer chemistry.

## BRIEF BIOGRAPHIES OF SIGMA ZETA HONOR AWARD RECIPIENTS

### Bruce Wallin      Lambda

Bruce has been active in setting up both Lambda's college tutoring program and its program of lectures for high school students. He has been a member of the chapter Executive Council and has engaged in many extracurricular activities. He has the outstanding grade average of 3.87. He has done research in organic chemistry and has been awarded an assistantship in biochemistry at Cornell University.

### Carl Wince      Phi

Carl was selected by Phi chapter both for his scholastic achievements and for his contributions to the local chapter. As President of the Science and Mathematics Association, he played a major part in organization of the annual Science Fair, the Jackson Science Lecture, and in arranging science demonstrations for high school visitors.

### Judy Ann Varga      Sigma

Judy has served as Historian and President of the chapter. She has also been active in the Texas Academy of Science Collegiate Academy, the Texas Student Education Association, and in Alpha Chi honorary. She has been on the Dean's List for four years, being either first or second in her class each year. She has received several research grants and an ORNL traineeship. She has presented two papers on her chemical research at Sigma Zeta National Conventions. Judy has been awarded on NSF grant for further training at the University of Colorado.

## 1968-9 CHAPTER REPORTS

BETA (1926)—McKendree College, Lebanon, Illinois 62254  
Professor Fred Fleming, *Advisor*

GAMMA (1927)—Medical College of Virginia, Richmond, Virginia 23119

DELTA (1927)—Northeast Missouri State College, Kirksville, Missouri 63501  
Phyllis Bishop, *Pres.*  
Lance Wessling, *V.P.*  
Dale Mason, *Sec.*  
John Behle, *Treas.*  
Professor Eugene Smith, *Advisor*

EPSILON (1929)—Otterbein College, Westville, Ohio 43481  
Frederick D. Glasser, *Pres.*  
Roger E. Wharton, *V.P.*  
Marilyn Miller, *Sec.*  
Frederick A. Myers, *Treas.*  
Dr. Roy H. Turley, *Advisor*  
Mr. Roger Wiley, *Hist.*

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Robert E. Fiehweg, *Pres.*  
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 Karen Benson, *Pres.*  
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 Linda Slykhuis, *Treas.*  
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- XI (1938)—Ball State University, Muncie, Indiana 47306  
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 Dr. Homer Paschall, *Advisor*
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- RHO (1943)—Indiana Central College, Indianapolis, Indiana 46227  
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 John Steed, *Treas.*  
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- SIGMA (1944)—Our Lady of the Lake College, San Antonio, Texas 78207  
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 Juanita Martinez, *V. P.*  
 Sister Elizabeth Anne, *Advisor*
- TAU (1947)—East Stroudsburg State College, East Stroudsburg, Pa. 18360  
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 Mrs. Dolores Neal, *V. P.*  
 Veronica Krupinski, *Sec.*  
 Sandra Shay, *Treas.*  
 Prof. Clifford Poutre- Prof. William Eden, *Advisors*

- UPSILON (1948)—Anderson College, Anderson, Indiana 46012  
 Thomas Trick, *Pres.*  
 Daryl Yoder, *V.P.*  
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- PHI (1948)—Eureka College, Eureka, Illinois 61530  
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 Earl Smith, *V.P.*  
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 Alan Roemersberger, *Treas.*  
 Prof. George Vlahos, *Advisor*
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 Ronald Brown, *V.P.*  
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- PSI (1956)—Central Missouri State College, Warrensburg, Missouri 64093  
 Prof. Gary Clark, *Advisor*
- OMEGA (1961)—State Teachers College, Frostburg, Maryland 21533  
 Veronica A. Derda, *Pres.*  
 Karen H. Houck, *V.P.*  
 Linda Bond (corresponding), *Sec.*  
 Judy Hughes (recording), *Sec.*  
 Vince Mazz, *Treas.*  
 Mr. Robert Tate, *Advisor*
- ALPHA ALPHA (1961)—State University College of Education, Oswego,  
 New York 13126
- ALPHA BETA (1963)—Campbellsville College, Campbellsville, Kentucky  
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 Linda Eastridge, *Sec.*  
 Linda Eastridge, *Treas.*  
 Miss Beatrice Evans, *Advisor*  
 Nancy Mullins, *Rept.*

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Phyllis Meshel, *Pres.*

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Donna Miller, *Sec.*

Linda Schlegel, *Treas.*

Prof. Roy Miller—Prof. Arnold Fritz, *Advisors*

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ALPHA EPSILON (1969)—Olivet College, Olivet, Michigan 49076

