VOLUME I

PROCEEDINGS

Edited, Compiled and Organized

by

Barry B. Hunter, California State College

and

George A. Harmon, Clarion State College

Editorial Board

Foster E. Billheimer......................California State College
Albert Hoffman.........................Millersville State College
William R. Kodrich....................Clarion State College
Richard J. Medve......................Slippery Rock State College
Kenneth E. Michel......................Slippery Rock State College
Gould F. Schrock.......................Indiana University
Marc A. Sylvester....................California State College

Cover

Thomas P. Buckelew....................California State College
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedication.</td>
<td>iii</td>
</tr>
<tr>
<td>Preface to Volume I.</td>
<td>iv</td>
</tr>
<tr>
<td>History of APSCUB (1969-1976)</td>
<td>1</td>
</tr>
<tr>
<td>Past Presidents.</td>
<td>8</td>
</tr>
<tr>
<td>Student Awards.</td>
<td>9</td>
</tr>
<tr>
<td>Constitution.</td>
<td>10</td>
</tr>
<tr>
<td>Abstracts Title Page.</td>
<td>17</td>
</tr>
<tr>
<td>Abstracts Presented at Lock Haven State College (1972)</td>
<td>18</td>
</tr>
<tr>
<td>Abstracts Presented at Clarion State College (1973)</td>
<td>26</td>
</tr>
<tr>
<td>Abstracts Presented at Bloomsburg State College (1974)</td>
<td>34</td>
</tr>
<tr>
<td>Abstracts Presented at California State College (1975)</td>
<td>41</td>
</tr>
<tr>
<td>Abstracts Presented at East Stroudsburg State College (1976)</td>
<td>48</td>
</tr>
<tr>
<td>Abstracts Presented at Indiana University of Pennsylvania.</td>
<td>57</td>
</tr>
<tr>
<td>Author Index to Abstracts.</td>
<td>66</td>
</tr>
</tbody>
</table>
DEDICATION

The first volume of the Proceedings of the Association of Pennsylvania State College and University Biologists is dedicated to Dr. George A. Harmon (Clarion State College) to commemorate his academic and organizational services as Secretary-Treasurer of our scientific organization since its inception. He was in part responsible for the initial organization of APSCUB and has since acted as a stabilizing force in its numerous and varied activities. His beliefs that APSCUB would become a major vehicle in promoting the academic and pedagogical philosophies and activities of all state biologists has been largely responsible for its success and growth. His past contributions to APSCUB are greatly appreciated by all of its members, and we know he will be a prominent leader in its activities in future years.
PREFACE TO VOLUME I

This initial Proceedings of the Association of Pennsylvania State College and University Biologists (APSCUB) reflects the nature of the myriad of varied academic and professional activities which have transpired since the inception of the organization. The transactions recorded herein are minute in comparison to the totality of activities, meetings, and scientific endeavors, but hopefully it will establish the tenor of what the biologists of APSCUB represent in the academic world and to the educational system of Pennsylvania. APSCUB has prospered and grown in its first seven years of existence and has made possible educational and academic advancements heretofore not possible for the students of the Pennsylvania State Colleges and Indiana University.
On May 9, 1969 members of the biology faculty at Indiana University of Pennsylvania hosted a meeting of faculty representatives of the biology departments of the Pennsylvania State-Owned Colleges. The purpose of the meeting was to develop a vehicle for discussion of mutual problems and to exchange ideas among the biologists of the state-owned institutions with the possibility of the formation of an organization of the Pennsylvania State Colleges and University Biologists. Fifty-three faculty members representing eight of the state college and university campuses were in attendance at the Indiana meeting. The campuses which did not have faculty representation at the meeting indicated an interest in the concept of a state biologists' organization. In addition, a number of dignitaries representing the Indiana University Administration, and Dr. Irwin T. Edgar, representing the Department of Public Instruction were present.

Problems inherent to all biology departments were identified as: (1) ordering and receiving equipment and supplies; (2) out-of-state travel; (3) student transportation; (4) liability insurance for field trip travel and laboratory experiences; (5) graduate assistantships; and (6) lack of communication among biology faculties of the state institutions.

Subsequent discussions of the faculty representatives led to a motion (passed unanimously) to establish a Pennsylvania State Biologists Steering Committee as well as to develop objectives of the
proposed organization. The initial objectives were to: (1) develop a mechanism for exchange of personnel and equipment among the educational institutions; (2) develop innovative science teaching methodologies; (3) determine prevailing curriculum trends in the sciences; (4) determine the efficacy of establishing cooperative field stations; (5) consider the establishment of a forum to report student and faculty research; and (6) coordinate library materials and services.

An agreement was reached to create an organization from among the "biology department personnel" of the state-owned institutions. Dr. Edgar agreed to make the physical arrangements for a steering committee meeting in the Harrisburg area, and to offer any assistance he could. Further, each biology department was charged with selecting two persons to represent them at the meeting.

In the ensuing autumn Drs. Schrock and Stapelton, with Dr. Edgar's assistance, arranged for a Steering Committee meeting on October 21, 22, 1969, at the Holiday Inn West, Harrisburg. All of the state-owned institutions were represented at the meeting with the exception of Kutztown.

Initial faculty discussions focused on the type of organization which was needed and to identify common departmental problem areas to which such an organization could respond. The Steering Committee was divided into several working subcommittees: (1) Name and Purpose of the Organization, (2) Mechanics of Organization, (3) Listing of Problems and Procedures, (4) Future Activities. The subcommittees met during the evening and reported to the committee of the whole on the next day.
The Steering Committee received the reports of the subcommittees. The name, "Association of Pennsylvania State College and University Biologists," and a number of purposes of the organization were presented and accepted. It was agreed that interim officers elected were to be elected from the western region and serve as a constitutional committee. The interim officers elected were: President, Kenneth Michel; Vice President, Robert Little; Secretary-Treasurer, George Harmon. It was also stipulated that in the future the officers would be selected at large.

The date of April 10 - 11, 1970, were proposed for the first annual meeting of the Association. The interim officers and the host institution were charged with calling the initial meeting; each member department was to select representatives to an Association Board of Directors which was to become functional upon ratification of the Constitution at the first meeting.

Problems and Procedures were identified as belonging to one of two areas: Non-financial and Financial. In addition to the more routine topics falling in one or the other of these categories, it was discovered that there were other important problems, such as the lack of uniformity in teaching loads at the various institutions.

The Future Activities subcommittee recommended that the Association be divided into three geographical regions: Western, Southeastern, and Northeastern. It also recommended that committees be organized on the basis of special interests and disciplines. The subcommittee proposed that a speaker of stature be included in the program of the annual meeting and that field trips be arranged.
With these charges to the Constitutional Committee, the Committee of a Whole adjourned. During the winter months, the Constitutional Committee met a number of times at Slippery Rock to draft and re-draft a constitution and to arrange for a spring meeting. The campus committee at Shippensburg hosted a most successful first annual meeting.

Since the formation of the Association of Pennsylvania State College and University Biologists, its activities have waxed and waned in response to crises. At the first annual meeting at Shippensburg the work of the first president, Kenneth Michel, bore fruition in the ratification of the organization's constitution, the activities of the board of directors, and the functioning of the several regional organizations. Kenneth Michel was re-elected president for the ensuing year and Gould Schrock was elected president-elect. At this meeting the general format for subsequent meetings was established and few changes have evolved since that time. At Shippensburg the membership had an opportunity to initiate friendships and personal contacts that have endured over the near decade of the organization's existence.

The second annual meeting held at West Chester indicated that 1970-71 had been a quiet year for APSCUB. Regional meetings had been held and the organization was functioning. At this meeting Gould Schrock assumed the reins of leadership and Carmela Cinquina was elected president-elect.

The third annual meeting was held at Lock Haven in late spring, 1972, a time which made the Saturday meeting at the field station a memorable event. During this year the Association became a financial
reality. APSCUB was added to the Commonwealth list of organizations eligible to receive institutional dues and there was a black balance on the financial report. The direction of the Association was given to Carmela Cinquina and Joseph Vaughn was elected president-elect.

In the spring of 1973 the fourth annual meeting was held at Clarion. 1972-73 had been a busy year. The state-owned institutional faculties were now functioning under the condition of a collective bargaining agreement with the Commonwealth of Pennsylvania. The bargaining agreement had prescribed faculty work loads of 2/3 hour teaching load credit for each contact hour of laboratory instruction. During this academic year, the APSCUB executive committee met a number of times and prepared a document, "Position to be Taken in Negotiations on Behalf of the State College and University Biologists (Scientists)," which was adopted at the Clarion meeting. The position paper was instrumental in gaining 1:1 laboratory teaching credit in the next collective bargaining contract. The meeting also approved a resolution recommend- ing that the PDI continue to require secondary biology teachers to hold a valid certificate obtained by completing an approved program including a minimum of 24 semester hours of college biology.

Following the business meeting the office of president was turned over to Joseph Vaughn and Gordon Kirkland was elected president-elect.

The ensuing years were quiet for APSCUB. The fifth annual meeting was held at Bloomsburg in connection with the Pennsylvania Academy of Science. Blair Carbaugh was elected president-elect. The sixth annual meeting was held at California in 1975 and Barry Hunter was elected president-elect.
1975-76 found APSCUB active again. The faculties were concerned that the state-owned institutions were not being supported financially at realistic levels. President Carbaugh appointed an Ad Hoc Committee to consider the matter. The committee reported departmental responses to its resolution requesting operating budgets of realistic levels to support viable education. The resolution was adopted at the seventh annual meeting at East Stroudsburg in the spring of 1976. Barry Hunter assumed office and William Morrison was elected president-elect. The publication of an organizational history and collection of abstracts of scientific papers was presented by Barry Hunter and was approved. President Hunter also requested that an Annual Student Award be presented to a student at each college and Indiana University who best exemplifies excellence in their biological studies and activities. Action on this request was deferred, but subsequently was approved at the Executive Committee meeting at Lock Haven in the fall of 1976. Another important academic consideration was re-initiated at the fall meeting when Blair Carbaugh was appointed to chair an Ad Hoc Committee on Professional Development to establish whether APSCUB should seek monies from the APSCUF Educational Trust Services Fund to establish academic institutes for APSCUB faculty.

The Eighth Annual Meeting was hosted by Indiana University of Pennsylvania and was attended by numerous faculty and students. William Morrison became president and Robert Reed became president-elect. The major theme of this meeting was "Environmental Health." Dr. Trenton Davis, East Carolina University, Dr. Maurice Shapiro, University of Pittsburgh, Dr. Judith Graham, Environmental Protection Agency, and Mr. Harry Steigman, Pennsylvania Department of
Environmental Resources provided diversified topics on contemporary environmental health problems and some possible solutions for future implementation. The first Annual APSCUB Student Awards were presented to students who were selected by the faculty of the state institutions, excluding West Chester State College and Shippensburg State College which did not select a student. Dr. George A. Harmon was commemorated for his years of exemplary service to APSCUB, and the APSCUB Proceedings (to be published spring 1978) was dedicated to him. The next annual meeting of APSCUB will be held in the spring of 1978 at Kutztown State College.
PAST PRESIDENTS

1969-1970  Kenneth E. Michel...........Slippery Rock State College
1970-1971  Kenneth E. Michel...........Slippery Rock State College
1971-1972  Gould F. Schrock............Indiana University
1972-1973  Carmela Cinquina..............West Chester State College
1973-1974  Joseph Vaughn.................Bloomsburg State College
1974-1975  Gordon L. Kirkland...........Shippensburg State College
1975-1976  Blair T. Carbaugh.............Lock Haven State College
1976-1977  Barry B. Hunter..............California State College
1977-1978  William S. Morrison...........Slippery Rock State College
STUDENT AWARDS
(1976-1977)

The state biologists (APSCUB) initiated a biology student award for the academic year 1976-77. This award was presented to the outstanding student (graduate or undergraduate) from each biology department at each state-owned college and Indiana University. The criteria for selection of the students were determined by the individual biology departments at each educational institution.

The student awardees at each institution were commemorated at the Annual APSCUB Meeting at Indiana University of Pennsylvania in April of 1977. Each student received a certificate of excellence from APSCUB to denote their exceptional achievement in the biological sciences.

1) Cathy Steel - Bloomsburg State College
2) Darlene Blanchard - California State College
3) Gloria Nichols - Cheyney State College
4) Nancy Jacisin - Clarion State College
5) Tom Eveland - East Stroudsburg State College
6) Cynthia Hoch - Edinboro State College
7) Harry W. Mankonen - Indiana University
8) Suzanne Walsh - Kutztown State College
9) Charles F. Andrews - Lock Haven State College
10) Stephen Winton - Mansfield State College
11) H. James Reisinger - Millersville State College
12) No student award - Shippensburg State College
13) William C. Shufstall - Slippery Rock State College
14) No student award - West Chester State College
CONSTITUTION FOR THE ASSOCIATION OF PENNSYLVANIA STATE COLLEGE AND UNIVERSITY BIOLOGISTS
(Ratified April 17, 1970)

Article I - Name and Objectives

Section 1: Name

The name of the organization shall be:
The Association of Pennsylvania State College and University Biologists.

Section 2: Objectives

The objectives of the association shall be:

A. to work for the solution of problems common to the faculties involved in biological education, research and ancillary activities in state owned colleges and universities.

B. to provide a vehicle by which the faculties of the state owned colleges and universities will be able to communicate ideas, share skills and streamline administrative procedures.

C. to promote comradery among the membership.

D. to create a facility for the exchange of materials and equipment.

E. to encourage scholarship among the membership.

F. to open lines of communication with legislators and other public officials:

1. in matters of biological importance.

2. in matters of conviction and concern among biologists in the course of performance of their duties.

G. to encourage the exchange of students and faculties among the State Colleges and University.

H. and to cooperate with other societies to achieve the above objectives.
Article II - Membership

Section 1: Regular Membership

Membership shall include faculty members of the Commonwealth of Pennsylvania State Colleges and University who are involved in biological education and/or biological research.

Section 2: Ex-officio Membership

Ex-officio membership shall be given to members of the Science Division of the Pennsylvania Department of Education.

Section 3: Special Membership

Other persons active in areas of biology and who support the aims and objectives of the organization may become members upon approval of the Committee on Membership.

Article III - Officers

Section 1

The officers of the organization shall be a President, a President-elect, a Vice-president, and a Secretary-Treasurer. All regular members are eligible to hold any of the offices. All officers shall serve for a term of one year and the Vice-president and Secretary-treasurer shall be eligible for reelection. They shall be elected at the Annual Meeting from a slate of candidates prepared by the Nominating Committee and from nominations made from the floor.

Section 2

A Board of Directors shall consist of one representative (or his alternate) from each of the state owned colleges and university (14 in number) and the members of the Executive Committee. Each member shall serve a term of one year and is eligible for reelection.

Section 3

The officers shall take office following their election at the annual meeting. The Directors and their alternates shall be selected by their respective institutions in the spring prior to the annual meeting and shall take office at the annual meeting.
Section 4

The Directors of each region shall select a chairman from among the members of the Regional Board of Directors, who shall serve as a member of the Executive Committee.

Article IV - Duties of Officers

Section 1: Officers

A. The President shall preside at the annual meeting and at the meetings of the Executive Committee and Board of Directors. He shall appoint all permanent and ad hoc Committees as provided in the constitution. He shall assume all other duties normally associated with the office.

B. The President-elect shall serve an internship to learn the functions of the Office of the President by attending the annual meeting and the meeting of the Board of Directors and the Executive Committee. He shall enter upon the duties of the President at the close of the annual meeting next succeeding that at which he is elected and shall serve as President until his successor enters upon his duties.

C. The Vice-president shall assume the office and duties of the President in the absence of the President or his inability to serve. He shall work cooperatively with the President in administering the affairs of the Association, shall be responsible for the program at the annual meeting, and assume such other duties delegated to him.

D. 1. The Secretary-treasurer shall keep, or cause to be kept, accurate minutes of the annual meeting and distribute copies to the membership. He shall keep, or cause to be kept, accurate minutes of all meetings of the Board of Directors and Executive Committee and shall send copies of the minutes to the Directors. He shall answer correspondence specifically related to the duties of his office and assist the President in carrying on the general correspondence of the Association.

2. The Secretary-treasurer shall have the authority to sign the Association's checks and shall be responsible for keeping an itemized accounting of the Association's receipts and disbursements. He shall submit a financial report for the fiscal year at the annual meeting and at the meetings of the Board of Directors.

3. The Secretary-treasurer shall maintain a mailing list of the membership.
Section 2: Board of Directors

The function of the Board of Directors shall be:

A. to make rules and regulations to further the objectives and purposes of the organization.

B. to consider problems brought to their attention by Individual Members, Institutions, or Regional Groups.

C. to provide for an annual audit of the accounts of the Secretary-treasurer.

D. to provide for State and Regional Meetings of the membership.

Article V - Meetings

Section 1: Annual Meeting

There shall be an annual meeting of the membership held in the spring. The details of the annual meeting are to be determined by the Executive Committee and any ad hoc committee appointed to this assignment.

Section 2: Board of Directors

The Board of Directors shall meet at least one time per academic year. Additional meetings may be called as deemed necessary by the President of the Association or by one-fourth of the Director membership.

Section 3: Regional Meetings

Regional Meetings of the membership shall be held in the fall. These meetings shall be under the supervision of the Boards of Directors of their respective regions. The membership shall be divided into regions as follows:


B. South Eastern: Cheyney, Millersville, Shippensburg, and West Chester.

C. Western: California, Clarion, Edinboro, Indiana, and Slippery Rock.
Section 4: Executive Committee

The Executive Committee shall meet as necessary to carry on the business of the organization.

Article VI - Committees

Section 1

The President of the Association shall have the power to create special committees. All committees shall have the authority to create sub-committees and to call upon consultants as they deem necessary in carrying out their assigned functions. The term of service shall be for one year although reassignment to a Committee is highly desirable. The members of the Committees shall elect their own Chairman unless otherwise stipulated.

Section 2: Permanent Committees

A. The Executive Committee

1. The committee shall consist of the President, President-elect, Vice-president, Secretary-treasurer, and the three Chairman of the Regional Boards of Directors.

2. The President and Secretary-treasurer shall perform these same offices on this Committee.

3. The functions of the Executive Committee shall be:

   a. to coordinate the activities of the organization.

   b. to fix the agenda for the annual meeting and meetings of the Board of Directors.

   c. to transact the business of the organization between meetings of the Board of Directors.

B. The Nominating Committee

1. The committee shall consist of three members from at least two different institutions.

2. The functions of the Nominating Committee shall be:

   a. to prepare a slate of candidates such that there will be at least two nominees for each office selected from the membership at large. The ballot may not contain more than one nominee from a given institution and must represent at least two of the three regions.
b. to submit to the membership the list of nominees 30 days prior to the annual meeting.

c. to receive nominations from the floor at the annual meeting. The nominee must have consented to have his name placed on the ballot.

d. to prepare ballots and conduct a secret ballot election at the annual meeting.

C. The Membership Committee

1. The committee shall consist of three members.

2. The functions of the Membership Committee shall be:
   a. to familiarize new faculty with the objectives and work of the organization.
   b. to act upon applications for memberships by persons not specified in the constitution.
   c. to determine membership categories.

D. The Publications Committee

1. The committee shall consist of three members.

2. The functions of the Publications Committee shall be:
   a. to maintain an up-to-date directory of Pennsylvania State College and University Biologists.
   b. to publish a newsletter containing information on curriculum development at the various institutions, research in progress, graduate programs, personnel and material exchanges, solutions to financial problems involving travel, purchasing and assistantships, and other information of interest to the membership.

E. The Financial Advisory Committee

1. The committee shall consist of the Secretary-treasurer (chairman) and three members.

2. The function of the Financial Advisory Committee shall be to make recommendations to the Executive Committee and the Board of Directors concerning the long-range financial policies of the organization.
Article VII - Quorum

For meetings of the Board of Directors, a majority of the Directors shall constitute a quorum. For general meetings, a quorum will consist of a majority of those members present and voting.

Article VIII - Amendments

This Constitution may be amended by a 2/3 vote of the Board of Directors provided that each Board member shall have been sent written notice of the proposed amendment not less than 30 days prior to the meeting at which such amendment is voted.

Pattification

This Constitution comes into effect by a majority vote of the assembled eligible members, provided:

A. that all members of the biology faculties of the State Colleges and University have been notified by the Secretary as to the time and place of this meeting 30 days before it is to take place.

B. that copies of the proposed Constitution, have been circulated to all eligible persons for their consideration two weeks before the meeting is to take place.
SCIENTIFIC AND EDUCATIONAL

ABSTRACTS

of

FACULTY AND STUDENTS

of

APSCUB

(1972-1975)

I. Lock Haven State College (1972)
   (Abstracts 1-8)

II. Clarion State College (1973)
    (Abstracts 9-19)

III. Bloomsburg State College (1974)
     (Abstracts 20-28)

IV. California State College (1975)
    (Abstracts 29-36)

V. East Stroudsburg State College (1976)
   (Abstracts 37-48)

VI. Indiana University of Pennsylvania (1977)
    (Abstracts 49-59)