

in the atmosphere, and thus modifying precipitation and disrupting storm patterns.

The delineation of the precipitation modification effect is a difficult task as it requires a thorough understanding of natural precipitation variability such as the orographic or lake effects. Since the magnitude of the investigated effect is usually within the range of naturally occurring statistical "noise," careful implementation of the available statistical tools and a concise understanding of the quality of the available data is imperative.

This paper presents some preliminary results of the

background work required to obtain quantitative and qualitative information about the climatology of the general area around the plant (Northwest Georgia), especially with regard to precipitation. Spatial correlation patterns are examined in the framework of topographical features and prevailing (surface and upper-air winds). It is felt that such knowledge is mandatory prior to attributing potential precipitation effects to the plant. Moreover, it is a necessary prerequisite of the field studies inasmuch as the planning and subsequent interpretation of the data are concerned.

JOURNAL OF THE TENNESSEE ACADEMY OF SCIENCE
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PROCEEDINGS OF THE TENNESSEE ACADEMY OF SCIENCE 1980

DIANE R. NELSON, *Secretary*
East Tennessee State University

EXECUTIVE COMMITTEE MEETING APRIL, 1980

The Executive Committee Meeting of the Tennessee Academy of Science was called to order by the President at 7:20 p.m. C.S.T. in the Walnut Room of the Henry H. Hill Student Center, George Peabody College, Nashville on April 18, 1980. Members present were Clay M. Chandler, President; A. Paul Wishart, President-Elect and Director of the Visiting Scientist Program; James D. Caponetti, Past-President; Diane R. Nelson, Secretary; Robert L. Wilson, Treasurer; Gus Tomlinson, Journal Editor; Richard J. Raridon, Director of the Collegiate Division; William N. Pafford, Director of the Junior Academy; S. K. Ballal and Edward Burke, Members-at-large; Roger Bynum and John Bennett, State Department of Education.

The President ruled that smoking would not be permitted during the meeting.

The Minutes of the November, 1979, Executive Committee Meeting and the Annual Business Meeting were published in the April, 1980, issue of the Journal. They were approved as printed without change by a motion passed unanimously.

The Editor, Gus Tomlinson, presented the following report:

"A report on 1979 activities, including a list of manuscripts received, published and rejected for the year, was given at the November meeting and published in the JTAS in April 1980. These data will not be repeated for this meeting. Instead, this report represents an updating of the November report plus projections for the next two issues.

The January 1980 issue included 11 scientific manuscripts plus TAS news announcements. The Junior Academy of Science Recognition Program for 1980 and the Aquatic Oigochaeta Workshop at TTU were highlighted as news events. The annual printing of the Ownership, Management and Circulation data for JTAS was also included in this issue.

The April issue features the new President of TAS, a Report of the Biological Field Stations of Tennessee, TAS Distinguished Teachers Awards for 1980, Highlights of the Major Addresses at the general session in November and a full page announcement of the Collegiate Division Regional meetings in March and April. The issue also includes the annual proceedings of TAS, Abstracts of presentations at the Annual Meeting, a list of the new members who joined TAS in November, plus 5 scientific manuscripts.

As usual, many scientists, technicians, and institutions have shared their time and/or resources to aid the TAS in publication of its Journal. The secretarial, clerical and technical costs which have been charged to the Academy via the editor's activities during the year averaged \$283.33 per month for a total annual cost of \$3400 to TAS. Since these activities have always been

carried out with part-time workers rather than Peabody employees, the merger with VU has had no appreciable effect on the TAS cost of the editorial work. Thus, these costs are expected to cost TAS \$3400 to \$3500 for the coming year. The Editor wishes to extend his annual word of thanks to those who contribute to the Journal, especially authors and reviewers of manuscripts whose contributions are absolutely essential.

The July issue is presently in page proof form. It will consist of 13 research manuscripts over a wide spectrum of subject areas, including math, physics, geology, botany, zoology and chemistry. One major news event to be highlighted in this issue is a request for nomination for TAS Fellows. The criteria to be used in the selection process will be included.

This is the first year that page charges have been billed to contributors to help to defray publication costs. The Editor is mailing invoices and reprint order forms to authors at the final proof stage and asking them to mail checks directly to the Treasurer. Slow payment results in re-billing. Non-payment results in no further publication in JTAS.

In conclusion, 1980 promises to be a good year. Fourteen new manuscripts have been received since November with one of them having been rejected to date. Printing cost increase proposals from Curley Printing Company were successfully lobbied down for this academic year. You may expect printing cost increases of substantial magnitude by the end of this year however."

The Editor's report was accepted.

The Director of the Visiting Scientist Program, Paul Wishart, presented the following report:

"A description and summary of the major activities of the Tennessee Visiting Scientist Program was submitted to the annual conference of the Tennessee Academy of Science at Nashville in November, 1979. The 1979-80 program highlights include a status report for the period extending from September 1, 1979 to April 1, 1980: number of visits completed = 26; number of students contacted = 1940; number of teachers and principals contacted = 90; number of classes contacted = 60; number of visits requested = 72."

In response to questions, Dr. Wishart stated that by the end of the year the number of visits completed will be about the same as previous year; most requests for visits are in the spring. Since Dr. Wishart is President-Elect, he will report on the appointment of an Acting Director of the VSP at the November meeting. Questions on the budget were held for later discussion.

The Director's report was accepted.

The Director of the Collegiate Division, Richard J. Raridon, presented the following report:

"The Collegiate Division of TAS met at Meharry Medical College on Saturday, November 17, 1979. Seven papers were

presented by students from four schools. There were about 40 students and faculty in attendance. Three regional meetings are being held this spring."

As delegate to the Association of Academies of Science and to Section X of AAAS, Richard J. Raridon presented the following report:

"I represented TAS at the AAAS Section X meeting and the National Association of Academies of Science meeting, both held in San Francisco during January 1980. The NAAS sponsored a symposium on the Legal Aspects in the Administration of Scholarly Non-Profit Organizations. The following talks were given: Scholarly Publishing and the Copyright Law, Maintaining Tax-Exempt Status, Postal Regulations and Publishing, and Audit Requirements for Non-Profit Organizations. These talks will be published in the NAAS Proceedings which each academy officer will receive. At the NAAS business meeting George C. Shoffstall of Penn State was chosen as President-Elect and I was re-elected to a three year term as NAAS delegate to the AAAS Council. The next meeting will be in Toronto during January 3-8, 1981."

The reports by Dr. Raridon were accepted.

The Director of the Junior Academy, William N. Pafford, presented the following report:

"During 1978-79 total expenditures of the Junior Academy were \$2462.07. 600 copies of the *Handbook and Transactions* were published. Copies were forwarded to each senior high school in Tennessee, to each student selected to present a paper at the annual meeting, to members of the TAS Executive Committee, and to selected members of the Tennessee State Department of Education.

Arrangements are now being finalized for the spring meeting of the Junior Academy which is scheduled for April 18 at Glenciff High School in Nashville. Members of the Executive Committee are invited to attend, as are all members of the Academy. Papers will be presented during the time of 9:30-11:30 AM and 1:00-3:00 PM. We are indebted to Gus Tomlinson and Bob Bryson Nashville Metro Science Coordinator, for helping to arrange our meeting.

A total of 48 papers from 11 different schools were received this year. This compares with 34 papers from 9 schools last year. Most papers are of excellent quality. We have invited 17 students to present their papers this year. As in the past, we will reimburse participants for a portion of their expenses. Since no participant lives more than 200 miles away from Nashville, however, overnight lodging will not be necessary.

A budget of \$3,000 is proposed for 1980-81. This is the same as for 1979-80. Last year we were able to pay a part of of the travel expenses for the student presenting the top paper at the annual meeting to attend the National Junior Academies of Science meeting in California. Mr. Wesley Allen, from Dickson High School, did attend the national meeting and presented his paper. We reimbursed Mr. Allen for registration (\$30) and for his plane fare (\$330). A letter of appreciation was received from Mr. Allen. I believe we were well represented at the meeting and I hope we are able to send a student to the national meeting this year."

The Director's report was accepted.

The representatives from the State Department of Education, John Bennett and Roger Bynum, reported that the Distinguished Teachers awards from the nine districts of the state had been selected and notified. They suggested that a different mechanism is needed and recommended that a committee of the Academy initiate invitations from supervisors and provide a list of potential candidates. President Chandler appointed Dr. Wishart and Dr. Pafford to develop guidelines for the selection process and to report at the next Executive Committee meeting.

The representatives' report was accepted.

No reports were received from the Standing Committees. President Chandler announced that he was appointing Dr. Prem Kahlon, Chairman of the Research Committee.

The report of the Treasurer, Robert L. Wilson, was published in the April, 1980, issue of the Journal.

The Treasurer presented a budget for 1980-81 for consideration by the Executive Committee.

The following budget was adopted:

1. President's Office	\$ 15.00
2. Secretary's Office	600.00
3. Editor's Office	3500.00
4. Treasurer's Office	1500.00
5. Printing-Mailing Journal	9000.00
6. AAS Conference	200.00
7. Annual Meeting Expense	2000.00
8. Auditor	30.00
9. Programs of the Academy	
Collegiate Division	\$1500.00
Visiting Scientists	3000.00
Junior Academy	3200.00
	7700.00
	\$24545.00

Projected Income

Tennessee Department of Education	\$15000.00
Membership Dues	7000.00
Page Costs From Journal	1000.00
Registration at Annual Meeting	700.00
Interest on Savings Account	1300.00
	\$25000.00

The Treasurer, acting on instructions from the Executive Committee, put the TAS savings account of \$10,000 in certificates of deposit at 13%. Another savings account contains \$1500 at 8%, but is accessible at any time.

OLD BUSINESS

Libby Workman declined the position of Executive Director for the Academy. Additional sources of funds for the Director and the Academy are being investigated.

NEW BUSINESS

1. The 1980 annual meeting will be held at ORNL, November 21-22. Dr. Wishart, Program Chairman, suggested the theme, "Atmospheric Science: Issues and Solutions."

2. The 1981 annual meeting will be held at Austin Peay State University, November 20-21. Dr. William Ellis will be Local Arrangements Chairman.

3. Future meetings will be held at UT Martin in 1982 and Volunteer State in 1983.

The meeting was adjourned at 10:27 p.m. C.S.T.

EXECUTIVE COMMITTEE MEETING

NOVEMBER, 1980

The Executive Committee Meeting of the Tennessee Academy of Science was called to order by the President at 7:00 p.m. E.S.T. in the Energy Room of the Holiday Inn, Oak Ridge, on November 20, 1980. Members present were Clay M. Chandler, President; A. Paul Wishart, President-Elect; James D. Caponetti, Past-President; Diane R. Nelson, Secretary; Libby Workman, representing the Treasurer; Gus Tomlinson, Journal Editor; Richard J. Raridon, Director of the Collegiate Division; William N. Pafford, Director of the Junior Academy; Edward W. Burke, S. K. Ballal, and Gordon Morris, Members-at-large; John Bennett, State Department of Education.

The President ruled that smoking would not be permitted during the meeting.

The Secretary, Diane R. Nelson, had mailed printed copies of the Minutes of the April, 1980, Executive Committee Meeting. A motion to accept the minutes as printed was passed unanimously.

The Treasurer, Robert L. Wilson, was not present; however his report was submitted by Libby Workman. The audited report appears elsewhere in these proceedings along with the report of the Auditor. Both reports were accepted by a motion passed unanimously.

Methods of obtaining additional funds to offset increased publication costs were discussed. A motion was made by Dr. Wishart that the President appoint a committee to develop a brochure and contact materials for textbook and equipment and supply companies for soliciting advertising for the Journal. The motion passed and Dr. Chandler appointed Richard Raridon, Libby Workman, and Diane Nelson to the committee. Gordon Morris and James Caponetti will assist the committee. Another person from UTCHS will also be requested to assist the committee.

The Editor, Gus Tomlinson, presented the following report: "Since the annual meeting in November of 1979, four issues of JTAS have been published and mailed to subscribers on the quarterly schedule of January, April, July and October. In addition to the regular, annual inclusions such as proceedings, abstracts, highlights of the general session addresses, Tennessee field station reports, news events, etc., volume fifty-five (1980) included 39 regular manuscripts. The breakdown by subject area for 1980 inclusions in JTAS is as follows:

Zoology	13
Botany	4
Chemistry	2
Geology	4
Medical Sciences	5
Environmental Sciences	2
General Science	5
Science Education	1
Mathematics	1
Historical	1
Physics	1
	39 Total

PLUS

General Session Address Summaries	3
Field Station reports	3
Sets of abstracts	2
News Events	8
Proceedings	1
Index	1
New Member list	1
Yearly contents summary	1

A portion of the January issue 1981 is in page proof form with the remainder at the printer being set for galley. With the publication of the January 1981 issue, the backlog of manuscripts which have been accepted for publication will be the lowest that it has been in several years (about 10) depending on exactly how many can be fit into the issue because of special figures and/or space requirements). The primary reasons for the low backlog of manuscripts are (1) the low number of new papers received during this year (Only 21 as compared to 49 in 1979 and 58 in 1978) and (2) the publication of 6 more manuscripts this year as compared to last year. A number of manuscripts are in the author revision stage, and therefore not accepted at this time, but only 3 of these are of 1980 vintage. That is, all but 3 were returned to authors for revision prior to 1980 and have not been resubmitted (typically an indication that a manuscript may not be resubmitted). Seven additional manuscripts are still in review by sectional editors (among the 21 received this year and not yet accepted for publication). Since the April 1981 issue will be devoted primarily to annual meeting activities, and will not include many regular manuscripts, perhaps the backlog will increase again as new manuscripts are received in the winter and spring.

Publication costs for the Journal have been minimized by holding all issues to the regular minimum 36 page format, reducing the published number of copies downward to slightly above subscriber mail out lists (i.e. decreased reserve copies to fill later orders that may come in) and avoiding administrators at the printing company who seem to want to increase prices each time they can "Corner" a customer in the hall. Operating costs of the Editor's office have averaged \$289 this year as compared to \$276 during last year (about 4% increase). Estimated costs for 1981 are about \$295/month to operate the Editorial process and about 02425 per quarterly issue at the printer. These costs will be offset somewhat by regular subscription income plus the newly instituted page costs and single issue sales. For example, bills for \$480 for page charges and photocuts were sent out to contributors to the October issue. Extrapolated to a year, this will mean about two thousand dollars of new income to help defray expenditures for publication of the Journal.

A few requests for reprints have been received this year. The arrangement with the library at MTSU last year, thanks to the assistance of Dr. Chandler, has worked well to date to fill these requests.

Although the number of new manuscripts received during 1980 is down, those that are being received seem to be well written, shorter than usual, and of high caliber. For example, more medical science manuscripts are being published this year than ever before. Hopefully, the improvement in quality of research being reported for publication in JTAS will continue."

The Editor's report was accepted.

The Director of the Visting Scientists Program, Paul Wishart, submitted the following report:

"The current roster of scientists for 1979-80 consists of 105 individuals from all geographic areas in Tennessee. Compilation of the roster began during the spring and summer of 1979. Letters were written to the scientists listed in the previous year's roster to inquire of their desire to continue to serve as a VSP member. Participants were requested to make appropriate additions or changes in the topics for their presentations. Application forms for new nominees were sent to each of the scientists in an effort to secure additional specialists from different academic fields from the various parts of the state. Approximately twenty new scientists were added to the official team as a result of the inquiry. After the required data for the new roster had been received, forms were sent out to all of the new prospects to obtain: 1) information as to the topics to be presented in the secondary schools and 2) relevant professional and personal data required to conduct the program. Follow-up letters were mailed during the fall to those who failed to respond to the first mail-out in order to complete the roster.

The 1979-80 roster was typed in two sections in order to make it possible for late responses to be included for the current academic year. More than 600 copies were prepared for distribution to teachers, supervisors, and scientists throughout the state. Geographic areas extending from Upper East Tennessee to the Memphis area are involved in the program with both rural and metropolitan secondary schools utilizing the services of our scientists.

In recent years a significant number of schools have indicated a desire to have repeated visits from scientists representing one or more special academic areas, as for example: Biology or Geology. Arrangements are made for selected schools to schedule as many as four follow-up visits if these requests for services are compatible with the curricular program of the school. Scientists in the past two years have been encouraged to work with teachers in science inservice programs and to provide help to students engaged in research projects.

Increasing costs for transportation continue to have a limiting influence on the size of the VSP educational effort. In addition, the unexpected closing of schools during inclement weather presents serious problems of rescheduling or cancellation of visits.

Scientists have been most professional in their willingness to accept the very modest honoraria (maximum of \$30.00) provided by the VSP in order to serve Tennessee's high school students and teachers. The TAS Executive Committee in 1978 increased the mileage allowance from \$0.15 to \$0.17 per mile for the use of private cars. This rate is currently used for the 1980 program.

Evaluative comments from both the schools and the scientists indicate that the program provides a much needed service and is deserving of continuation in future years. Evaluative reports are used after each visit and the feed-back from the scientists, science teachers, principals, and students are most beneficial in improving the operation of all portions of the program.

Following are the special fields in science and science related areas that were included in the program for the current year:"

- | | |
|--|--------------------------|
| 1. Astronomy | 7. Mathematics |
| 2. Biology and Ecology | 8. Medicine and Pharmacy |
| 3. Chemistry | 9. Nutrition |
| 4. Engineering | 10. Physics |
| 5. General Science | 11. Psychology |
| 6. Geology, Geography, and Earth Science | 12. Textiles |

SUMMARY

VISITING SCIENTISTS PROGRAM

STATISTICAL SUMMARY

CONTACTS MADE	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Number of visits	60	66	60	42	61	61	80	71	77
Number of Students Contacted	9343	10234	8911	3502	8515	5776	7522	4691	4217
Number of Teachers Contacted	268	249	214	148	181	321	296	153	322
Number of Classes Contacted	178	217	209	81	151	161	161	132	140
Mileage					3535	3625	3971	3447	3334
Number of Scientists on Roster	99	83	96	90	128	104	104	105	112

The Director's report was accepted. A motion to approve Bernard Benson as the new Director of the Visiting Scientists Program as of November 1980 was passed unanimously. Dr. Chandler will send him an official letter of appointment. Dr. Wishart was applauded by the Executive Committee in appreciation of his contributions to the Academy as VSP Director.

The Director of the Collegiate Division, Richard J. Raridon, presented the following report:

"Three meetings of the TAS Collegiate Division were held during the Spring of 1980. The Western Region met at Southwestern in Memphis. Forty students and faculty attended and 18 papers were presented. The Middle Region met at Austin Peay State University. Thirty-four people attended and 11 papers were presented. The Eastern Region met at Roane State Community College. Thirty-seven people attended and 13 papers were presented. Special thanks go to Drs. Julian T. Darlington, James X. Corgan, and Irving T. Glover for handling the local arrangements. Total expenses for the three meetings were \$513."

The Collegiate Division will meet Saturday morning, November 22, 1980. The Director's report was accepted.

The Director of the Junior Academy, William N. Pafford, presented the following report:

"High school students submitted a total of 48 research papers to the Junior Academy of Science during 1979-80. A panel of readers selected the top 17 papers for presentation at the spring meeting, which was held at Glencliff High School, Nashville, on April 18, 1980.

A panel of judges was selected to evaluate the presentations. Members of the panel were Dr. Clifford Hofwolt, Vanderbilt University; Ms. Jean Nicholson, Nashville Metro Public Schools; and Dr. Gus Tomlinson, Nashville Metro Public Schools. The five papers receiving the highest rating are being published in their entirety in the 1980 Junior Academy *Handbook and Transactions*. Abstracts of the other 12 papers presented will be published. All judges commented favorably on the high quality of the presentations.

The student who presented the top-rated paper was Mr. James Thomas McClure, from Waverly Central High School, Waverly, Tennessee. Mr. McClure's paper was entitled "The Development of Oblique Co-ordinate Geometry." An invitation was extended to Mr. McClure to present his paper at the annual meeting of the American Junior Academies of Science, which is being held in Toronto, Ontario, Canada, January 3-8. Due to a prior commitment, however, Mr. McClure will be unable to attend. An invitation was, therefore, extended to the student whose presentation was ranked second at the April meeting, Mr. Thomas J. Nadeau, from Dickson County High School, Dickson, Tennessee. Mr. Nadeau has accepted our offer and will represent us at the meeting in Toronto. The title of his paper is "Design and Construction of a High-Efficiency Amplifier System."

The 1980 *Handbook and Transactions* is in press. Copies of the *Handbook* will be mailed to every high school in Tennessee, to members of the Executive Committee of TAS, and to all students who presented papers at the spring meeting.

The 1981 spring meeting of the Junior Academy has been tentatively set for April 17* at Glencliff High School, Nashville, Tennessee.

Thanks are extended to readers, judges, and especially to Mr. Bob Bryson and Mr. Tony Beasley of Nashville Metro Schools. Mr. Bryson and Mr. Beasley assisted us with local arrangements. Their consideration and kind hospitality insured a successful meeting and an enjoyable experience for all participants."

The Director's report was accepted. *Revised date will be April 24.

As delegate to the Association of Academies of Science and to Section X of AAAS, Richard J. Raridon stated that he will attend the AAAS meeting in January and will report at the spring meeting. A motion to accept the report was passed, and Dr. Raridon was re-appointed as the TAS delegate to Section X of AAAS.

The representative from the State Department of Education reported that the TAS appropriation is included in the state's budget.

President Chandler presented committee reports from the respective chairpersons as follows:

1. Auditing Committee. The Chairman, Myron S. McCay, sent the following report:

"Members of the Auditing Committee have inspected the records of the Treasurer for 1980 and have found them to be correct, complete and clearly recorded.

Again it seems appropriate to commend the Treasurer for the clarity of the record of all receipts and expenditures, and for the thorough audit of these transactions by a local public accountant."

2. Fellows Committee. The Chairman, James W. White, sent the following nominations for Fellows: Bernard Benson, R. K. Fletcher, Alvin H. Nielsen, William S. Parks, David W. Yarbrough. Joe Leonard Robertson was added to the list of nominees.

A motion was passed to approve the nominees as Fellows of the Academy and to present them to the membership at the annual Business Meeting.

3. Membership Committee. The Chairman, Burton W. Bordine, set the following report:

"As Membership Chairman of the Tennessee Academy of Science for the past year, I have attempted to increase membership through the use of the enclosed letter. I do not know the results of this procedure; but hopefully, they were positive."

The Committee's report was accepted.

4. Necrology Committee. The Chairman, Edward W. Chester, sent the following report:

"The Necrology Committee regrets to report the death of the following members: Helen Lavina Ward, a long-time member of the Academy and editor of the *Journal* from 1954 to 1964; Frank Boyer, Chemistry Department, UTC; Mary Ward Tarter, retired secondary teacher; Isabel Tipton, Prof. of Physics (retired), UTK; and Warren McAllister Deacon, Vanderbilt University."

The Committee's report was accepted.

5. Nominating Committee. The Chairman, James D. Caponetti, submitted the following nominees for officers of the Academy:

"Dr. A. Paul Wishart, UT Knoxville, President; Mr. S. K. Ballal, Tennessee Technological University, President-Elect; Dr. Diane R. Nelson, East Tennessee State University, Secretary; Dr. Robert L. Wilson, UT-Chattanooga, Treasurer."