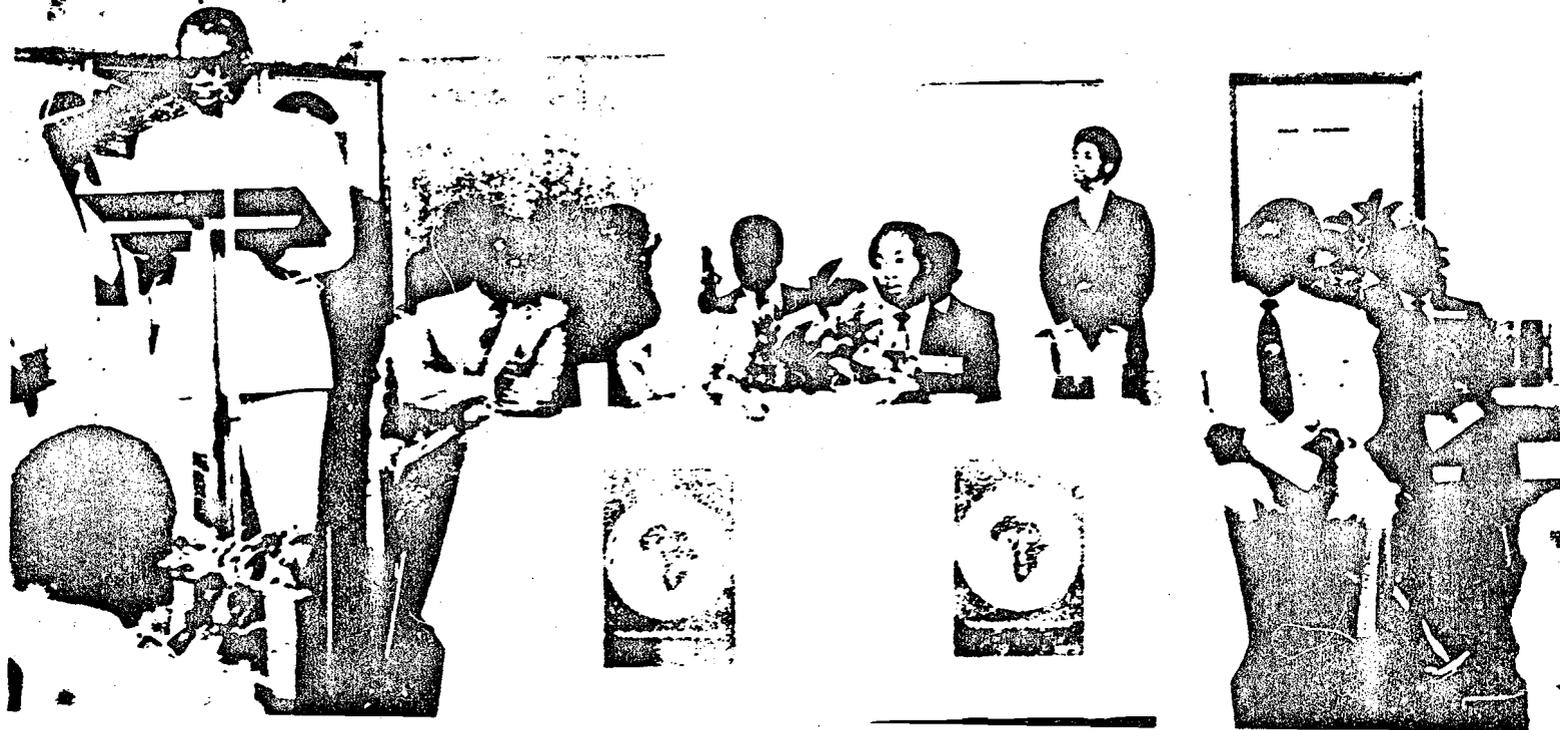


*Science Education
Programme for Africa*

Volume II

**A Report of the Botswana
Conference
May, 1980**

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The late Sir Seretse Khama
President of the Republic of Botswana
1966-1980

Officially opening the SEPA 20-year Review Conference

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A REPORT OF THE BOTSWANA CONFERENCE

PROGRAMME

20th May 1980	9:00 a.m.	Presidential Opening and Chairman's Address
	11:00 a.m.	Goodwill Messages
	2:30 p.m.	Evolution of SEPA
21st May 1980	9:00 a.m.	SEPA Programmes
	1:00 p.m.	Specialised Agencies Sessions
22nd May 1980	9:00 a.m.	Tour of Gaborone
	2:00 p.m.	Evaluators' Report
23rd May 1980	9:00 - 2:00 p.m.	Group Work
24th May 1980	9:00 a.m.	Group Work Continued
	10:30 a.m.	Group Reporting Session
	12:00 noon	Closing Ceremony

APPENDICES

1. Opening Address by His Excellency Sir Seretse Khama
2. Address by Chairman Ephantus Mugiri
3. Address by Norman Ayodele-Cole
4. Address by Executive Director Rufus Alabi

MAY 20, 1980

- **Presidential Opening Ceremony**
- **Welcome by University Rector**
- **Keynote Address**
- **Evolution of SEPA**

2

Presidential Opening Ceremony

The late Sir Seretse Khama, the President of Botswana, opened the 20-year Review Conference of the Science Education Programme for Africa (SEPA) on the morning of May 20, 1980, in the Union Building of the University College in Gaborone. Members of the audience were Ministers of State, officials of the Ministry of Education, Botswana, members of the Diplomatic Corps, representatives of the UN Specialized agencies in Botswana, and official delegates from Africa and overseas.

The Chairman of SEPA, Mr. E. Mugiri, introduced His Excellency. In his introduction, Mr. Mugiri paid tribute to the President as a great scholar and statesman. The President's keen support of science education has been evidenced by attendance at this conference as well as by his personal signature on the Instrument of Acceptance of SEPA by Botswana. Mr. Mugiri then called on His Excellency to declare the conference open.

In his opening address, President Khama said that developing countries like those in Africa require middle-level technology to help implement their development programmes. He added,

Given the stage of development of most African countries, the emphasis lies in the maintenance and servicing rather than the manufacture of tools and equipment we use in our development projects.

The President said that African countries import sophisticated machinery for primary industries, road construction, and mining, but they lack enough technicians and artisans to maintain these imported machines. The

situation, he pointed out, results in breakdowns and in the slowing down of development projects. "We desperately need people who will repair and maintain our telecommunication networks . . . roads and railways . . . plant and agricultural machinery." Sir Seretse Khama conceded that, in Africa, we live with a number of paradoxes such as the contrasts of climatic conditions and the uneven distribution of natural resources. "Admittedly, there is not much our African scientists can do when one part of a country is soaked with heavy rains whilst the other is a complete desert; when one part of a country is rich with gold and diamonds whilst the other is devoid of any natural resources." However, he maintained that African scientists could do well if they could control the floods and irrigate the dry areas, and if they could devise a better method of resource-distribution to improve the lot of the people who live in the poorest parts of the countries. President Khama also expressed concern about the continued lack of qualified science teachers and technical instructors in Africa, a situation which he attributed to the history of conditions of service of teachers all over the world. He expressed the hope that the Conference would evolve and review the methods by which more students might be motivated to taking up science as a teaching subject. The President welcomed the participants to Botswana and expressed the happiness of the people of Botswana in hosting the Conference. (See Appendix 1 for the full text of Sir Seretse Khama's address.)

After the opening address, Dr. Rufus Alabi, Executive Secretary of SEPA, expressed SEPA gratitude to President Seretse Khama for his interest

in the organisation. On behalf of SEPA, he wished the President good health, spiritual alertness, and political prudence to conduct the affairs of the presidency. He then presented the President with a plaque of an excerpt of Solomon Caulker's Speech at Rehovoth in 1960, and mementoes of the 1980 Botswana Conference.

Welcome by University Rector

The President and his entourage left the hall, after which Mr. George Makunga, the Representative Co-Member of SEPA for Botswana, and Chairman of the first plenary session of the Conference, introduced Professor N. E. Seditisha, Rector of the University College, Botswana.

The Rector's welcome included emphasis on the need for practical science, oriented to the needs and development of Africa. He congratulated SEPA for its activities in revitalizing science not only at the primary level but also in other areas such as science for out-of-school youths. He wished the conference well and extended to the participants the interest and friendship of the students and faculty of the University College.

Keynote Address

The Chairman of SEPA, Mr. Ephantus Mugiri of Kenya, delivered the conference keynote address. Speaking on the topic, *FROM REHOVOTH TO BOTSWANA: The Long Journey*, Mr. Mugiri described SEPA as "a stimulant and catalyst in science education development in Africa." Mr. Mugiri said SEPA, which began 20 years ago as the brain-child of the late Reverend Solomon Caulker of Fourah Bay University, Sierra Leone, has

helped to spread science education throughout Africa. He spoke of the role of SEPA in introducing the concept of "learning by doing" or the "discovery approach" in science. Mugiri described SEPA's aid to member states in the form of development of curricula and national manpower and the utilization of the local environment for science education and the development of science learning materials. He noted that the Science Education Training Course was founded by SEPA at Njala Univeristy College, University of Sierra Leone, for science teacher educators, curriculum workers, and in-service organizers from member countries of SEPA. The Teacher Training Materials Development Programme of SEPA also has produced a Handbook for teachers of science, a Source Book of innovative teaching ideas, and has developed many primary science units. As well, low-cost science equipment from locally available resources for use by science educators and students in pre- and in-service training has been developed. SEPA, in conjunction with UNESCO, has set up a task force to investigate the learning process of concept formation of the African child in science and mathematics. This programme is consonant with SEPA's philosophy and theories of child development and will furnish baseline information on the intellectual development of children in Africa. Mr. Mugiri expressed the gratitude of SEPA to UNESCO, USAID, the Education Development Center (EDC) of Newton, Massachusetts, the Carnegie Corporation of New York, The Ford Foundation, Mobil International, the United Nations Educational Programme, the German Foundation for International Education, the Economic Commission of Africa, and the Commonwealth Foundation for Training Cooperation for their assistance.

See Appendix 2 for the full text of Mr. Mugiri's address.

After a coffee break the first session of the Review Conference continued at 11 a.m. with Miss Felicity Leburu, a second Representative Council Member for Botswana, as the Chairperson. The session, which lasted one hour, was devoted to reading of goodwill messages from a variety of agencies.

● EDUCATION DEVELOPMENT CENTER (EDC). The Chairperson read a message from Charles N. Myers, Director of International Programmes of the American Education Development Center (EDC). In his message, Dr. Myers said he hoped the conference would be fruitful and spoke about the close links of cooperation between SEPA and EDC.

● ORGANISATION OF AFRICAN UNITY (OAU). Mrs. N. E. Setshwaelo then read a message from the Secretary General of the Organisation of African Unity (OAU), wishing SEPA success in its deliberations in Gaborone.

● UNITED STATES AID FOR INTERNATIONAL DEVELOPMENT (USAID). Mr. Louis Cohen, USAID Director in Botswana, made some brief remarks on the importance of the Review Conference. He congratulated Dr. Alabi and the SEPA Executive Committee for having succeeded in mounting the conference and in getting so many people to come to Gaborone. Other USAID personnel present were Jim Washington and John Grant.

● UNITED NATIONS EDUCATIONAL, SCIENTIFIC, AND CULTURAL ORGANISATION (UNESCO). Dr. G. Jokic, from the UNESCO regional office in Dakar, represented the Director General of UNESCO, Mr. Amadou M'Bow. She outlined

the ways in which UNESCO and SEPA have been working together since the Freetown meeting of 1970. In the field of Integrated Science, SEPA coordinated programmes in that field for UNESCO beginning in 1969. She also noted the role played by SEPA at the Maryland and Nijmegen meetings on Integrated Science organised by ICASE. The following fields were noted for further UNESCO/SEPA coordination:

- (a) Environmental Education
- (b) Integrated Science Education
- (c) Concept Formation in Children.

● GERMAN FOUNDATION FOR INTERNATIONAL DEVELOPMENT (DSE). Mr. Udo Bude from DSE said that the German Foundation for International Development has only recently been providing support for SEPA. DSE recognises that organizations as efficient as SEPA deserve every support possible, in view of the common objective of helping children in Africa learn more about science and learn how to solve life problems as these arise—in other words, how to encourage self-reliance.

● UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA (ECA). The Economic Commission for Africa (ECA) was represented by Mr. Norman Cole, who has long been associated with SEPA. He spoke of SEPA's work with science education which was begun some years before the UN or UNDP were working in Africa.

The Chairman then invited representatives of other specialized agencies and organizations present to deliver messages.

● **WORLD HEALTH ORGANISATION (WHO).** Dr. Quincke of WHO presented the good wishes of the Director-General and requested closer collaboration with SEPA in years ahead.

● **NETHERLANDS UNIVERSITIES FOUNDATION FOR INTERNATIONAL CO-OPERATION (NUFFIC).** Mr. Masterbroek of NUFFIC (Netherlands) outlined the relationship between the work of NUFFIC and SEPA. For example, NUFFIC is working in Botswana to help up-grade and administer a course for school-leavers who want to prepare for the University.

● **AFRICAN CURRICULUM ORGANIZATION (ACO).** Prof. P. A. I. Obanya from ACO described ACO, which was created in 1976 to concern itself with broad issues of curriculum. He said science education forms an important part of ACO's concern. SEPA has been involved with the organisation of each of ACO's workshops and has provided science input. ACO was represented at this conference by the speaker and by ACO's Chairman, Professor E. A. Yoloye of Ibadan.

● **UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP).** Dr. Victor Johnson from UNEP outlined the objectives of the organization as: "identifying and solving the environmental problems of our times" and said that SEPA has a role to play in relation to UNEP objectives; SEPA has contributed immensely to the UNEP programmes in meetings at Nairobi, Brazzaville, and Lusaka. He assured SEPA of continued assistance in all its programmes, and commended SEPA for its action programmes.

● **INTERNATIONAL COUNCIL FOR ASSOCIATIONS OF SCIENCE EDUCATORS (ICASE).** Mr. Dennis Chisman of ICASE, created seven years ago, has close

ties with SEPA. He said that the Executive Secretary of SEPA is a Vice President of ICASE, which helps to link the work of these two organisations. Science teachers associations plan regional or national activities in which ICASE often takes part, and would be willing to collaborate with SEPA. Mr. Chisman, also as a representative of the BRITISH COUNCIL, brought to the conference the regards of the British Council and highlighted its activities throughout Africa.

● AGENCIES NOT PRESENT BUT WISHES SENT:

- (a) Ford Foundation
- (b) Carnegie Corporation of New York
- (c) University of Illinois
- (d) African Social Sciences Programme (ASSP)
- (e) Bureau for Educational Research (BASE)
- (f) UNICEF

The good wishes of these agencies were sent earlier to the Executive Director of SEPA, Dr. Rufus Alabi, and he read them to the conference.

● FACULTY OF EDUCATION UNIVERSITY COLLEGE OF BOTSWANA. Prof. Parkins, Dean of Education, presented the good wishes of his faculty, whose Department of Science Education provided the professional support for the workshop.

● OLD SEPALINGS. Dr. Alabi presented a few of the people who contributed *widely* to SEPA in its formative years. These included:

- Prof. Norman Ayodele-Cole, the first Chairman
- Prof. E. Yoloye, the first African Evaluator of APSP/SEPA

Mary Jane Neuendorffer, Editor of APSP units
Mike Savage, onetime Director of Education SEPA
Miss Margaret Tawia, several-times Acting Chairman
Dr. Victor Johnson and Prof. Ben Laing, two old SEPAlings
present at the session.

They were given a standing ovation.

Evolution of SEPA

This Working Session opened at 2:30 p.m. and was chaired initially by Miss Felicity Leburu and later by Prof. Barnabas Otaala. The session was devoted to review of historical reminiscences of APSP/SEPA.

Professor Norman Ayodele-Cole, the first speaker, stressed the importance of the early SEPA/APS: conferences (Entebbe 1965, Dar-es-Salaam 1966, Akosombo 1967), which enabled educators from Africa to meet, for the first time on African soil, their counterparts from Europe and North America. At the same time, African educators from all parts of the continent entered into dialogue, strengthening academic contacts within Africa. APSP/SEPA programmes have been pertinent because they have taken into consideration African realities such as indigenous technology, knowledge of local plants and animals, etc. And, of course, SEPA/APSP helped, as stressed by previous speakers, in transforming science teaching from chalk-and-talk to the "discovery method" and "learning by doing."

See Appendix 3 for the full text of Professor Cole's address.

Mike Savage, from the Kenya Institute of Education, followed Dr. Cole and reviewed APSP/SEPA from the days of the Endicott House (Dedham, Massachusetts, USA, 1961) conference. This was an apparently unstructured conference where people discussed problems of science education, and grappled with solutions through their own experimentation--a spirit which the speaker says has become "quite contagious." Also, at that time, the African Mathematics Association was created and it was felt that an African organisation for science would be a necessary counterpart. Two

further considerations which helped African science education were the large workshop organised by Prof. B. Fafunwa of Nsukka and the existence of an active Science Centre in Nairobi which was, in fact, antecedent to the creation of APSP in 1965.

Finally, the speaker attempted to give to the participants the "feel" and "spirit" of those first APSP workshops which led to the writing of more than fifty units on natural science. Although APSP material was valuable, having been trial-tested carefully, it was felt that editorial help was necessary if the material was to be made more "visible" and "presentable."

Mike then introduced Mary Jane Neuendorffer from EDC who had been APSP and SEPA editor. She particularly stressed the importance for science educators and for children alike to learn and develop "as one goes along," in an informal and unstructured way. She believes that this method of work, which was the basis of APSP-EDC cooperation, is useful in any situation. All ideas are given a hearing, and development follows if the ideas are good. In APSP development work, all parties were important--pupils, teachers, science educators, writers, and editors--forming a learning as well as a teaching team. The speaker ended by passing to participants, a paper on *Tracing the Development of One APSP Unit: Sound*.

Miss Margaret Tawia traced the history of SEPA from its inception in February 1970 (Freetown) to the present day. (See her presentation, *SEPA in the 70's*, in the session of May 21.) One of the differences between APSP and SEPA is that SEPA has concerned itself with science

throughout the school curriculum, not only primary science. SEPA also institutionalised itself by setting up the Njala Science Education Centre and the Ibadan Centre for Educational Evaluation, both of which run courses on a regular basis. As of 1975, attempts have been made to involve French-speaking African countries into SEPA activities. Miss Tawia ended by describing the SEPA structure and making a plea to countries using SEPA material to adapt the material and develop it further.

Ephantus Mugiri, in his contribution entitled "*SEPA: The Challenge of Today and Tomorrow*" attempted to highlight the large contribution of SEPA to the formation of science educators on this continent, and to a new approach to education which we now call the SEPA APPROACH AND PHILOSOPHY. In order to consolidate itself, SEPA identified six main development themes for the present and the future. These are:

- (a) The child as a centre for action
- (b) The development of human resources
- (c) The development of science educational material
- (d) Educational evaluation
- (e) Environmental education and concept development
- (f) Out-of-school youth programmes.

He went on to suggest which type of institutions could be set up by SEPA, in the future. Examples given were:

- (i) An environmental Science Education Centre
- (ii) A Centre for the production of educational

material in Southern Africa.

(iii) A Centre for use of Indigenous Languages for Science Study, especially primary science.

The speaker stressed the importance of the use of the mother tongue in teaching science in the early years. He spoke of the involvement of French-speaking countries in SEPA and the efforts made by SEPA in Abidjan and Kigali to present itself to Francophone countries. Finally, the speaker discussed the possibility of development of multi-media packages about SEPA's projects, establishment of a consultancy service and a SEPA Directory of Resource persons, and of cooperation between SEPA and other organisations.

Discussion. Dr. V. I. Johnson supported Mr. Mugiri in his views that the SEPA programme for out-of-school activities should be revitalised. In fact, he said, Environmental Education is now being tracked on integrated rural development rather than formal school work. He also made a plea for the dissemination of SEPA materials and the production of guidelines to development.

Prof. P. A. I. Obanya requested better dissemination of educational materials and information from organisations such as SEPA, ACO, etc. He suggested a dissemination service (editorial department) and a SEPA newsletter. He expressed the view that there would be no problem of running workshops with French- and Portuguese-speaking Africans since this has been done before.

Dr. G. Jokic from UNESCO spoke of the problem of duplication of programmes and suggested collaboration prior to the operation of programmes in the field. She raised the problem of youth who have completed primary education but cannot get into secondary schools.

Mr. Kitondo Chali, Director of CDC, Lusaka made several points:

- (a) the role of science exhibitions and fairs in science education;
- (b) how to evaluate the utility and quality of science packages such as the one produced by SEPA;
- (c) the creation of "assembly- and clearing-house" for the collection and dissemination of materials and other resources.

Mr. M. Sonko from Gambia raised the problem of funding by SEPA and its activities. This problem will be discussed later in detail.

Professor Yoloye suggested that in the APSP/SEPA spirit, the conference from here on sit in informed arrangements and conduct the meetings in a face-to-face fashion rather than in a lecture room atmosphere. This suggestion was warmly received by everyone.

Dr. R. Alabi then presented past officials of the SEPA Secretariat: Edmund Cole, Marian Addy, and Lieutenant P. Nyaku.

The Chairman, Professor Otaala, closed the meeting at 5:30 p.m.

MAY 21, 1981

● **SEPA Programmes**

● **Specialized Agencies**

SEPA Programmes

Miss Margaret Tawia of the Ghana Education Services in Accra, a person long associated with the work of SEPA, presented its programmes and gave a brief history of its growth as well.

SEPA in the 'Seventies

Speaking on the subject *SEPA in the '70s* is really talking about the entire life of SEPA, for the organisation was born in 1970.

In February, 1970, at the first Representative Council Meeting held in Freetown, Sierra Leone, administration of the African Primary Science Program (APSP) formally passed into African hands. Nine member states were represented at this meeting, and a new name - Science Education Programme for Africa (SEPA) - replaced that of African Primary Science Program. In September of the same year, the second Representative Council Meeting was held in Kampala, Uganda, where the SEPA constitution was adopted. Since then the organisation has passed through all the stages that most newly-born must go. Indeed, SEPA is still young yet, and will continue to need constant care and attention to reach full maturity. But what she has gone through and been able to survive gives great hope for a full and productive future.

In the eyes of some people, ten years may be a long enough time for an organisation to reach maturity. Yet it is really the nature of an organisation, and the assets with which it begins life, that determine its periods of childhood, adolescence, and adulthood. In nature, we know that

the lower an organism, the less complicated are its needs for survival and the shorter its period of growth to maturity. The butterfly, or the lizard or the mold, or our good friend the amoeba, compared to the human organism, appear to be mature and ready to be on their own even before they are born. So it is with organisations: the simpler their aims and objectives and the more limited their scope, the faster they would appear to reach fully independent existence.

SEPA is not a simple organisation; it has very lofty aims and aspirations; in equal measure, it has very great needs. It is against this background that SEPA's story in the '70s must be told.

Home for SEPA

The first problem that confronted the new organisation was securing a home. The keenness shown by Representatives attending the Uganda Meeting in September, 1970, in offering to host SEPA in their various countries was, perhaps, the greatest indication of their commitment to SEPA. Ghana finally was chosen as the seat of the Secretariat, and the first officer of SEPA arrived in Accra in January, 1971.

After prolonged consultation, SEPA's Headquarters Agreement was ratified and confirmed on 17th May, 1977, and the organisation now enjoys full diplomatic status.

Initially, the Secretariat had temporary accommodation made available to it by the then Ghana Ministry of Education (now Ghana Education Service) in its Inspectorate Block. Later, in August, 1973, the Secretariat moved

to its present premises which became vacant at the departure of the Ford Foundation from Accra. The premises were acquired on rental basis which automatically implies uncertainty about tenancy. As the scope of its activities grows, along with its quest for permanence, it is hoped that SEPA will be able to have its own building to accommodate the Secretariat.

Growth in Membership

The African states which had been involved in APSF and which were, therefore, in at the birth of SEPA were Botswana, Ethiopia, The Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Nigeria, Sierra Leone, Swaziland, Tanzania, Uganda, Zambia. One of the first steps taken to secure the continued commitment of these states to SEPA was to request an indication of willingness to join SEPA through the payment of a token contribution of \$600.00 (six hundred dollars). Provision also was made for associate membership to last two years, after which the country must decide whether or not to become a full member of SEPA. Membership always has been open to any country in Africa which accepts SEPA's Constitution and permits SEPA "to operate without let or hindrance." Dues, which are subject to review, are paid by members.

Difficulties encountered in many of the founding countries in budgeting the \$600.00 led to SEPA beginning with a very low membership. This, however, did not mean that the enthusiasm of the countries not yet members diminished. Gradually, most of these countries have come to satisfy the conditions for full membership and have continued active participation in

SEPA programmes and activities. One member state - Ethiopia - felt constrained, at one stage, to withdraw her membership because of internal national difficulties. It is, however, a matter of joy to report that in February this year she returned to the fold.

Tanzania, a most active member in the activities of SEPA's predecessor, APSP, never formally joined SEPA. In January this year, she asked to become an Associate Member, and it is with the greatest pleasure that we welcome her. Lesotho, a foundation member and throughout a participant in SEPA activities, has not joined SEPA as yet, but it is our sincere hope that she will in the not too distant future.

SEPA and Francophone Africa

Until recently, SEPA has consisted entirely of Anglophone countries, but this did not mean that SEPA was disinterested in Francophone Africa. In January of 1974, formal contact was made with Francophone countries, mainly those in the West, at a meeting held in Lome, Togo, followed by another meeting in July, 1975, in Dakar, Senegal. Soon after this meeting, some Ivory Coast science educators came to the Science Unit, Accra, Ghana, on a follow-up visit. There have, since then, been other contacts made through visits of SEPA Secretariat personnel, or associates, to many of these and other Francophone countries.

In all cases, the purpose has been the same: to present SEPA to these countries and to explain, at first hand, the role, aims, and objectives of SEPA. Two categories of people are met during these contact visits:

science educators (who may be described as consumers), and educational administrators, who are the policy-makers. The former are usually met with in workshops where SEPA materials and philosophy are introduced and discussed with participants. Policy-makers are enlightened on the directional roles that SEPA can play, and the assistance it can give in fashioning desirable science education trends in their countries.

A threshold appears to have been reached in these SEPA-Francophone advances and SEPA is very proud to register its first Francophone member in Cameroon.

SEPA and the Rest of Africa

Whilst there is strength in numbers, it is also true that too much haste results in less speed. The problem facing SEPA, as far as numerical growth is concerned, is where to strike a balance in the rate of growth so that it does not end up a gangling overgrown body, awkward to manage.

In order to reflect its name, and in the spirit of the Organisation of African Unity, SEPA is desirous of having all Africa, south of the Sahara, come under one umbrella in this unique educational enterprise. The barriers in the way to achieving this goal are, however, enormous. In addition to finance, there are barriers like language and tradition; there are problems of communication, credibility and acceptability, and there are problems of human resources. Notwithstanding, SEPA is stepping in the direction of our Arab neighbours and Spanish-speaking sisters. Contacts

have been made with several of the northern African countries and it is our hope that, very soon, another milestone will be reached when the first Arab country will have joined SEPA.

SEPA Membership to date

Country	Date of Full Membership
Botswana	13th November 1978
Ethiopia	1st March 1972
The Gambia	1st June 1977
Ghana	28th March 1972
Kenya	30th May 1972
Liberia	12th June 1972
Nigeria	21st March 1975
Sierra Leone	12th September 1972
Swaziland	4th April 1978
Tanzania	27th March 1980
Uganda	30th June 1974
Zambia	15th June 1973
Cameroon	November 1979
Mauritius	-

Organisation of SEPA

The components of SEPA's organisation are a governing Representative Council, an Executive Committee, and a Secretariat. Two representatives are appointed by each participating country to the Representative Council. The Executive Committee is elected from the Representative Council and has six members and a Chairman.

The SEPA Secretariat carries out the day-to-day operations of the Programme and consists of an Executive Director who is the chief executive and a Director of Programmes who is the generator and overall director of all activities and programmes. There is also an ancillary staff which takes care of financial, clerical, and security affairs.

In the early years of SEPA's existence, the University of Cape Coast acted as the fiscal agent. In 1976, SEPA became self-accounting.

The SEPA Representative Council and Executive Committee hold regular meetings; following are the venues and dates of meetings held.

Year	Executive Committee	Representative Council
1970 February	Freetown, Sierra Leone	Freetown, Sierra Leone
1970 September	-	Kampala, Uganda
1971 August	Nairobi, Kenya	-
1972 March	Accra, Ghana	-
1972 July	Lagos, Nigeria	Lagos, Nigeria
1973 April	Addis Ababa, Ethiopia	-
1974 April	Monrovia, Liberia	-
1974 August	Accra, Ghana	Accra, Ghana
1975 March	Nairobi, Kenya	-
1976 January	Accra, Ghana	-
1976 August	Nairobi, Kenya	Nairobi, Kenya
1977 April	Freetown, Sierra Leone	-
1978 April & August	Accra, Ghana	-
1978 December	-	Monrovia, Liberia
1979 June	Freetown, Sierra Leone	-

Programmes and Activities

The primary purpose of the existence of SEPA is the educational and other related programmes and activities that it generates and sustains.

SEPA absorbed the work of the African Primary Science Program, which,

as its name implied, was concerned with science at the primary school level. There was ample justification for the preoccupation with primary science since, before the advent of APSP, no real science worth the name was taught in the primary schools of the countries that later became involved with its activities. The most that was done was the teaching of hygiene and nature study, both of which were taught by the "chalk and talk" method, and emphasised rote learning.

On the other hand, all the countries could lay claim to the fact that science had been taught in their secondary schools for quite some time. Therefore, the need was to find out what could be done about introducing science to primary schools. This was a herculean task since the general reaction in many of these countries to the idea was one of incredulous disbelief. What sort of science was going to be taught primary school children - and how?

By 1970 when SEPA came into existence, the idea that science could be taught to, and learned by, primary school children had become fairly generally accepted. A number of teaching units had already been developed and were being used in their original or adapted form in primary schools.

Many citizens of the countries involved in APSP activities had taken part in the development and trial of these materials and the stage seemed set for the implementation of primary science programmes in several of the countries.

In the early seventies, therefore, other questions were asked: After

SEPA science in primary schools what next in secondary schools? What are the bases on which new curriculum materials - and even the old ones - should be grounded; i.e. what assumptions have been made about the psychological development of the learning child? How effective are the methodologies, techniques and materials being used? What competencies must teachers have to be able to teach SEPA science?

To answer the above questions and satisfy other related needs, SEPA identified the following as its aims and objectives.

- To serve as a clearing house for the exchange of information on science education in Africa through workshops, conferences, publications, etc.;
- to support and encourage the production of instructional materials as well as the manufacture of scientific equipment from locally available resources;
- to support and encourage national efforts and regional and international cooperation in science education;
- to cooperate with other educational programmes.

SEPA initiated a number of programmes and has carried out a number of activities, all directed at achieving its aims and objectives. The on-going programmes are:

- *Teacher Training Materials Development:* This project develops science teacher and teacher educator support materials. Included are a Science Teachers' Handbook, a Sourcebook of ideas for elemen-

tary science, monographs on science topics, psychology of learning and educational evaluation, instructional aids and locally available equipment, science integration, and other areas of interest.

- *Science Educators Training Course:* This was a project based at the University of Sierra Leone which had training and research in science teacher education as its major objectives. The project has now been fully incorporated into the University programme. Training leads to a non-graduate Certificate or to a Post-graduate Diploma in Science Education. Recently, the University agreed to award a Master's Degree also. Research areas include pre- and in-service education, concept development and teaching/learning strategies. The Njala project was preceded by a six-month pilot project which was run in Accra, Ghana, from April to October, 1972.
- *Educational Evaluation Project:* This was a research and development project carried out in cooperation with the University of Ibadan. This has also become a full University programme - the International Centre for Educational Evaluation. Initial training leads to a Post-graduate Diploma in Educational Evaluation and further training to the Master's Degree; a Doctorate Degree also is being awarded for the course. Research studies are carried out by the Staff and by Research Fellows. Evaluation of programmes in African countries forms part of project activities.
- *Concept Development:* This project deals with the development of science and mathematics concepts among African children, and the

development of constructive attitudes among African children about their immediate environment. The concept formation component gathers, assesses, and publishes research materials on African children; it also conducts research and training workshops on new and more appropriate approaches and instruments in the study of concept development within the African context. Another component is the development of comprehensive modules on local environmental issues suitable for study and evaluation in the primary school. Through the modules used, children become aware of their own attitudes and values regarding their environment.

- *Out-of-School Youth Project:* This is a research and development project aimed at reaching out-of-school young people (8-18) in their communities. The objective is to develop a programme and strategies for using day-to-day activities to cultivate problem-solving capabilities, change-making habits of thought, and effective communication skills among young people who cannot attend the formal school. Exploratory schemes have been run in selected communities in a number of African countries.
- *Development of Multi-Media Materials on Environmental Science Education Components:* The objectives of this project are to design and develop primary level instructional materials which focus on the environment by utilizing scientifically based principles and social action, and to encourage the incorporation of these materials in national curriculum development activities of both English- and French-speaking countries. The project's expected

results are the development of modules of instructional materials in both English and French including multi-media elements; the development of resource guides for teachers related to the use of the modules; and the evaluation of materials produced, with norms for their educational utilization and conditions for their regional transferability.

SEPA also does the following:

- conducts international workshops;
- identifies and furnishes science education specialists on a short-term basis to countries which request them for the organisation and conduction of national workshops;
- liaises with science education programmes throughout Member States and helps as a disseminating agent;
- promotes the co-ordination, adaptation, trial and use of science and general educational materials which are in use in the countries associated with SEPA;
- stimulates, and plays an innovative role.

Development of Resources

Through its programmes and activities SEPA has produced teaching/ learning materials and, more importantly, helped to develop human resources.

- *Materials for Primary Level:* Printed materials have been produced

for pupils and for teachers. Simple prototype equipment has also been produced. In some Member States, the printed materials are used in their original form, in others they have been adapted. Basic and relevant ideas for these materials were generated at international workshops. The materials were further developed at smaller regional workshops, then tried in classrooms in participating countries. The final products, therefore, represent long periods of work.

- *Materials for Teacher Education:* Apart from the materials specially produced for use by the primary science teacher, there are materials developed for teacher education. A teacher's handbook and a sourcebook are available, as well as seven films which are useful additional aids for teacher education. Other materials are in the process of development.
- *Human Resources:* One of SEPA's greatest achievements is the corps of professional competent personnel it has helped to train. While the numbers are very far from satisfying the requirements of the various Member States, there can be no doubt that these people are having a marked impact on curriculum development trends in their countries. That several Member States are embarking on the development and production of their own science curriculum materials is an indication of the level of awareness that involvement in SEPA activities has brought about.

Financing SEPA

Securing enough money to carry out all that it would like to do has been SEPA's problem throughout its life. Having attained administrative independence, it was only natural to expect that full financial independence should follow. SEPA has two sources of funds: international donor agencies, and member countries.

Several international agencies have assisted SEPA with funding. Foremost among these are the United States Agency for International Development (USAID) and the Carnegie Corporation of New York. For some time, USAID provided funds for international workshops, Representative Council and Executive Committee meetings, and the salary of the Executive Secretary. USAID also made funds available for the Science Educators Training Course at Njala - Director's salary and student awards - until the course became absorbed into the University programme about a year ago.

The Carnegie Corporation supported the Educational Evaluation Course at the University of Ibadan and made substantial contributions to it.

UNESCO, CFTC, DSE, EDC, UNEP, ECA, Ford Foundation, CEDO are a few of the other organisations that have supported or collaborated with SEPA.

Contributions by Member States are paid according to rates determined by the Representative Council. Although Member States are willing to pay their contributions, their financial situations often make it impossible for the monies to be paid on time. Since the full support of the Secretariat is to come from these contributions, irregularity in the payments often

produces difficult moments at the Secretariat.

SEPA is actively looking for avenues to generate funds to support its activities; one possible source of revenue is the publication and sale of the materials it develops.

SEPA in International Circles

SEPA is growing in stature in international circles since it has undertaken contractual activities on behalf of international organisations of repute such as UNESCO and UNICEF.

In 1973, SEPA approached the OAU for Observer Status. It is still pushing its case in the hope that the OAU will soon see fit to grant the request. SEPA is also seeking Inter-governmental Organisation Status with UNESCO.

African organisations that have been cooperating with SEPA are the African Curriculum Organisation (ACO), AWAREC, ASSP and OCAM.

Specialized Agencies Session

This afternoon session was devoted to discussions by the International Specialized Agencies. The various organisations present spoke about the programmes and projections of their work, with special reference to possible areas of collaboration between their organisations and SEPA.

● ORGANISATION OF AFRICAN UNITY (OAU). Delivering a speech on behalf of the OAH, Mrs. N. Setshwaelo of the OAH Secretariat conveyed to the Conference a personal message from the OAU Secretary-General on his regret for not being able to attend the conference personally owing to other commitments. Mrs. Setshwaelo said SEPA's 20-year review coincided with the OAU's adoption of a new development strategy for the next two decades. She said that one of the major priorities of this development strategy is science education. She expressed the OAU's concern and anxiety over the unsatisfactory conditions in the field of science and technology in the economic development of Africa. "Evidence of this is its (concern for science and technology) inclusion in the OAU Charter," she added. Science and technology had also been the subject of several conferences and symposia organised by the OAU alone or in conjunction with the ECA and UNESCO. She also said that the inaugural Economic Summit in Lagos in April 1980 declared science and technology an area of top priority. Mrs. Setshwaelo regretted activities in Africa in these areas had been developed to serve the needs of the colonial metropolitan areas and said that under SEPA's guidance a new system could be evolved that would serve the interests of Africans. On behalf of the OAU, Mrs. Setshwaelo wished SEPA

more success in the future, adding that the good relationship and cooperation existing between the OAU and SEPA would always be maintained in the interest of the common goal of African development.

● UNITED NATIONS EDUCATIONAL, SCIENTIFIC, AND CULTURAL ORGANISATION. Presenting a paper on behalf of UNESCO, Dr. (Mrs.) Gordana Jokic said that UNESCO's current programme in science and technology education has the overall objective of development of a better understanding of the nature of science and technology, and their role in a changing society. UNESCO's aim is to improve and extend the teaching of these subjects in school and out-of-school education, and to promote information in these fields. Dr. Jokic said it is UNESCO's role to foster the advancement of science and education in its application to development. In this regard, UNESCO plans to help strengthen national scientific and technological capabilities and will, in its future programmes, intensify its cooperation with member states for the purpose of helping to improve the quality and relevance of their science and technology educational programmes. UNESCO, she also said, would cooperate with member states in the planning, organisation, and training of personnel at the level of national science and technology policy bodies. Dr. Jokic said that the UNESCO Regional Office for Education in Africa would continue to play a "catalytic role between the African countries in the field of exchange of scientific information, educational activities, and research."

● UNITED STATES AID FOR INTERNATIONAL DEVELOPMENT (USAID). Mr. Jim Washington traced the long history of association between USAID and SEPA.

He remarked that of all the agencies present, USAID had the longest connection with SEPA. He mentioned several areas of cooperation: workshops, fellowships, and institutional development such as the Njala Science Educators Training Course. He affirmed USAID's confidence in the *modus operandi* of SEPA and the way it has executed programmes over the years. USAID sees SEPA as a model organisation. The main areas of cooperation with USAID included secretarial support, the Teacher Training Material Development, and the Out-of-School Youth Programme. He asked that SEPA develop new and stimulating programmes that will be attractive not only to USAID but to other agencies. Since SEPA was well known to USAID, the latter will be willing to continue to cooperate with SEPA in areas which fall within the priority area of USAID in the next plan period. He mentioned that the current USAID grant which would have expired in 1979 is being extended until 1981.

● UNITED NATIONS ENVIRONMENTAL PROGRAMME (UNEP). Dr. Victor Johnson remarked that SEPA had always collaborated with UNEP and hoped for further cooperation with them in the next plan period. He specifically mentioned the role SEPA can play in the Environmental Education projects at national and International levels since SEPA activities have long been based on Environment. He pledged the total support of UNEP to SEPA for

- (a) programming
- (b) consultancy
- (c) implementation of SEPA programmes

- (d) national and international workshops
- (e) development of instructional materials for teaching environmental science education at continental level.

• UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA (ECA). Professor N. Ayodele-Cole presented the administrative organisation of the ECA. Educational programming activities are covered by a section of the Manpower Development in the Division of Public Administration, Manpower and Management, under Mr. Edokpayi.

He described the kinds of programmes and assistance which ECA undertakes. First, are a variety of programmes dealing with the socio-economic development of member states of the United Nations in the African region. ECA's role over the past 21 years has been to coordinate programming activities of the specialised agencies of the United Nations within the continent in the various areas of their speciality (WHO, FAO, UNICEF, UNESCO, etc.). Now, ECA's role has been enlarged to execute and implement programmes and lead the direction of economic development of Africa for the current UN Third Development Decade 1980-1990. In this area, ECA coordinates with OAU as indicated by the First Joint Economic Summit Conference in Lagos in April of 1980. Further coordination exists with UNDP, the World Bank, ADB, IFAO, and others for financial resources to implement projects in Africa.

The resources for executing ECA programmes come mainly from funding agencies, especially the World Bank Group and UNDP for joint projects with

the specialised agencies. A small percentage of the funding comes from contributions of Member States towards an African Trust Fund for development. Another percentage comes from developed industrialised countries who provide fellowships for development in various sectoral fields within the Commission's activities. It is in this latter area that ECA can help SEPA (as it has been doing over the past two years) by providing fellowships for the science educators' programme at Njala University College.

● GERMAN FOUNDATION FOR INTERNATIONAL DEVELOPMENT (DSE). Mr. Udo Bide of DSE highlighted the activities of his organisation. This included those areas of cooperation with SEPA as well as with organisations in Africa. DSE has awarded fellowships for the SETC training in Njala and has supported follow-up workshops of DSE-sponsored students as well. Among areas of future collaboration are the dissemination activities of SEPA.

Within the area of *formal and non-formal basic education*, the centre tries to contribute to the development of basic education programmes, the elaboration of needs-oriented curricula, development of evaluation techniques, the elaboration of teacher training programmes, and the improvement of basic education through the use of educational technology. Furthermore, the centre promotes the cooperation of researchers in education

in developing countries and in the Federal Republic of Germany in view of joint research in priority areas of education.

In the field of formal basic education, preoccupation with problems of curriculum development and evaluation has also led to cooperation with the IIEP and other organisations, for example in the preparation of the handbook for curriculum evaluation, published by IIEP, and in an African Regional Seminar for Advanced Training in Systematic Curriculum Development and Evaluation, held in Ghana in 1975.

Resulting from this African Regional Seminar and assisted by DSE, the African Curriculum Organisation (ACO) constituted itself as an association of nationally recognised centres for curriculum development and research in Africa. The objective of ACO is to stimulate curriculum development in Africa by establishing a network of communication among the centres, organising joint training programmes and seminars of curriculum specialists, exchanging curriculum materials, and encouraging joint curriculum research.

At present mainly centres in English-speaking countries are members, but it is expected that more institutions in French- and Portuguese-speaking countries will join. The secretariat of ACO is presently at the International Centre for Educational Evaluation (ICEE) of the University of Ibadan, Nigeria.

DSE is prepared to cooperate with ACO in conducting information study tours, seminars, and short-term training courses on areas such as

techniques of curriculum development, low-cost teaching aids, book production, and educational administration and in providing scholarships for non-degree courses.

The Federal Ministry for Economic Cooperation (BMZ), through its Agency for Technical Assistance (GTZ) provides assistance for an ACO project based at the Kenya Institute of Education in Nairobi supplying training for curriculum staff. The programme for 1981 in this area foresees an International Conference in cooperation with ACO at which the past cooperation will be evaluated and guidelines for the planning of the future programme laid down.

There will also be another intensive training course on special problems for curriculum development for members of curriculum centres belonging to the African Curriculum Organisation. A similar course will address itself to curriculum workers in French-speaking Africa. There will be other training and dissemination activities, either on a national or sub-regional level. The long-term training through scholarships is mainly provided at the International Centre for Educational Evaluation of the University of Ibadan and at the SEPA Science Educators Training Course, and the University of Sierra Leone at Njala University College.

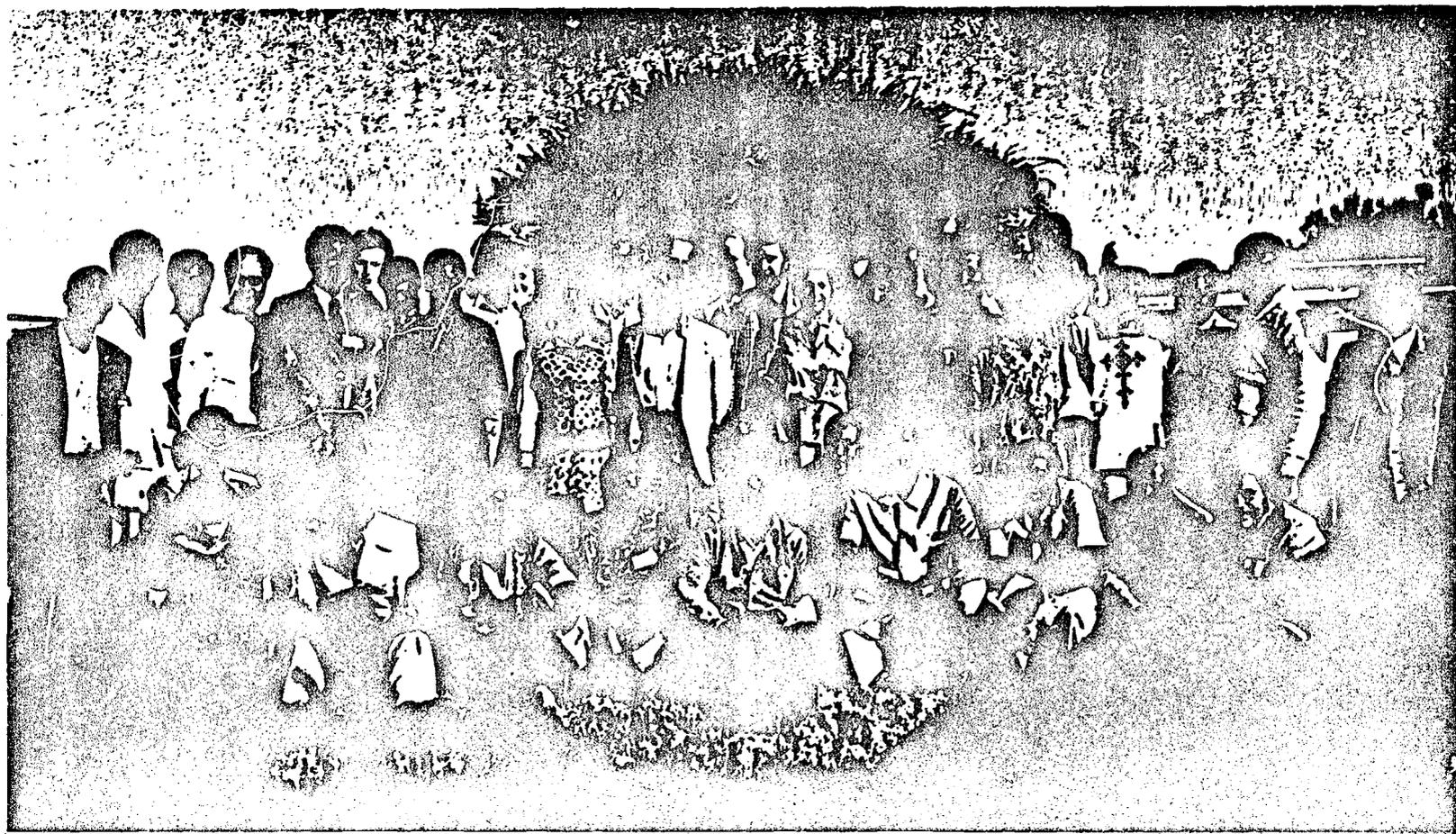
DSE has offered to sponsor in 1980 a follow-up workshop for its Njala and Ibadan graduates. There was a plan in the DSE 1981 programme to run a sub-regional workshop on testing of SEPA and APSP teaching materials in Lesotho. At the current conference DSE through ACO sponsored Directors of Curriculum Development Centres to the Conference prior to a study tour of Botswana.

MAY 22, 1981

Evaluation Report

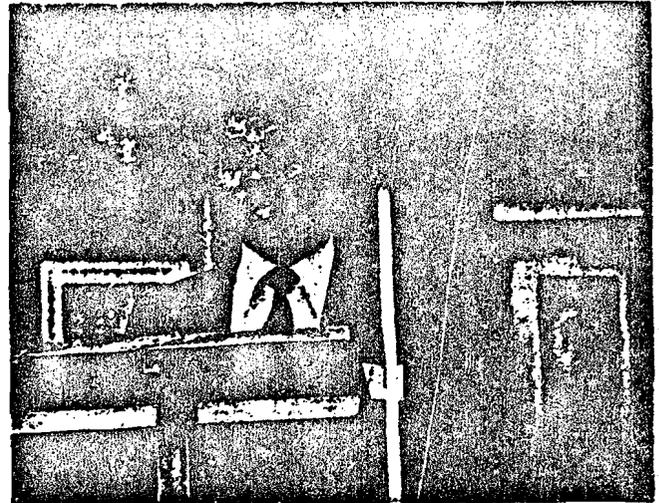
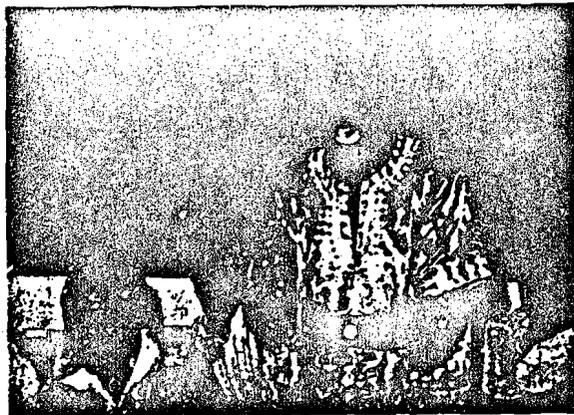
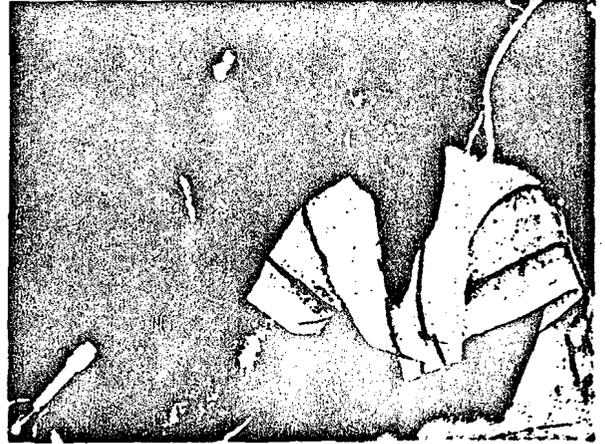
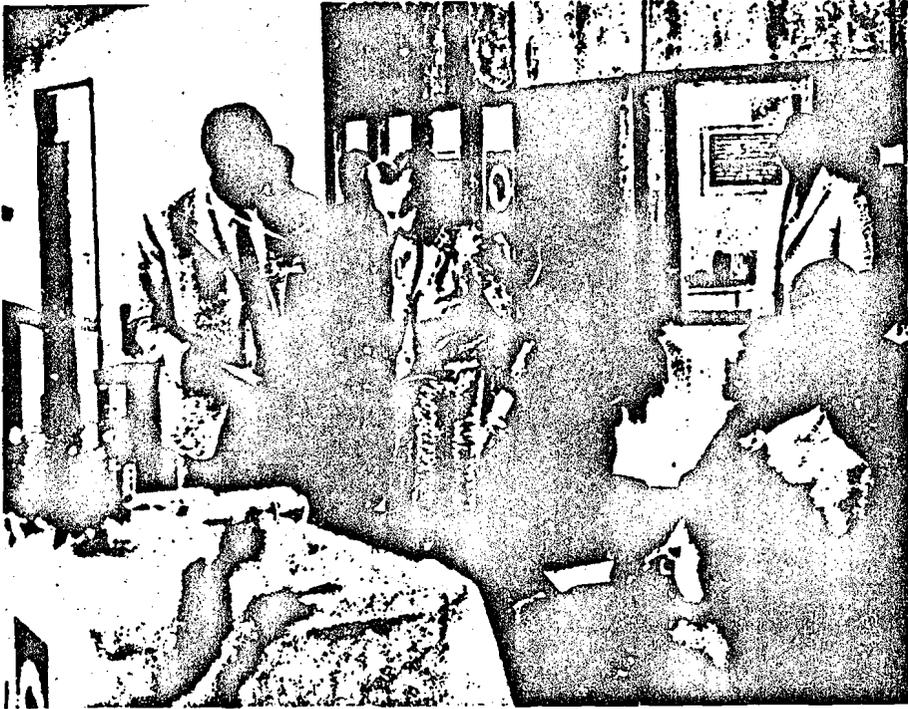
This was devoted to a review of the material and ideas in *Volume I* of the *Review Report of SEPA* by Tunde Yoloje and Sam Bajah. Reference should be made to *Volume I* for this section.

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SEPA - GABORONE - BOTSWANA - 1980

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44

Photographs on Overleaf Clockwise

*Rufus Alabi, Executive Director of SEPA
presenting SEPA mementoes to
Sir Seretse and Lady Khama*

*Mike Savage, Kenya
speaking on SEPA's programmes*

*Ephantus Mugiri, Chairman of SEPA
addressing the conference*

*Victor Johnson, Sierra Leone
making a point about SEPA's future*

MAY 23, 1980

&

MAY 24, 1980

THE FUTURE

- o Funding of SEPA
- o Dissemination of SEPA Ideas and Materials
- o Structure of SEPA
- o Programmes for the 'Eighties

BEST AVAILABLE DOCUMENT

THE FUTURE

There were four groups of two days duration formed an essential part of the to be responsible. They took an active part and contributed meaningfully. Recommendations. The meetings took place on Thursday 22nd May 1980 in the afternoon, all day on Friday 23rd May, and in the morning of Saturday 24th May. The groups worked independently and reported to a plenary session on 24th May.

Group I: Funding of SEPA

Chairman: M.O. Sonko

Rapporteur: H.D. Magagula

Members: E.T. Cole, E.K. Eichner, S. Katende, V. Johnson,
B.C. Nwosu, J. Washington

A. Overview

Basic areas to be funded were established. These included:

- (i) funding for long-term support of the organisation (including that of the Secretariat),
- (ii) funding of programmes.

B. Observations

1. It is desirable for SEPA to be both *self-reliant*, i.e. determine its objectives and seek help in carrying these out, as opposed to goals which may be dictated by the funds to which they are tied, and *self-sufficient*, i.e. work towards being able to fund its own projects and not risk having these collapse due to non-availability of a second party to provide financing.

2. Donor agencies like to see: a clear definition of projects; an assurance of need, long-term viability, and growth; some type of input by the recipient in order to keep the project going. Such contribution could be in terms of time given to the project (man-hours given for no gain), or could be in the form of documentation already available on the project. This would cut down on the financial burden of a feasibility study.

In view of the above, there is a need for a drafting committee to review project documents drawn up for funding and for preliminary discussions with donor agencies. A Representative Council is needed also to order priorities for programme planning, sector development, and selection for project implementation of a two-year programme of activities for SEPA. In addition, SEPA could identify programmes of Science Education for development in member countries. The funding of these programmes could be done through country proposals to UN agencies and various aid agencies. SEPA could provide advice on the professional aspects of the programme.

C. Other Methods of Raising Funds

1. Member States' Subvention

Payment of obligation to SEPA by member states should be timely, and SEPA should have the authority to make efforts to retrieve arrears. It is considered essential for country representation to keep the Secretariat informed of any changes relating to staff deployment (contact persons), the financial year, and procedure for effecting the release of funds from their countries. On the other hand, the Secretariat should take it upon itself to remind the countries as their contributions fall due.

2. Increased Membership Drive

It was noted with satisfaction that several new countries had joined or indicated an interest in joining SEPA. In particular, a welcome note was sounded by the membership of some Francophone countries. As more language barriers are broken, there will be a need to make translation facilities available.

3. Consultancy Contracts

SEPA was urged to accept and sub-contract consultancy jobs. Such tasks would, if undertaken for non-SEPA countries, be subject to a 14% administrative levy. To this end, SEPA should publish a brochure indicating the areas in which expertise is available.

4. Sale of SEPA Materials

The group endorses the move already made in appointing a Publications

Sub-committee, chaired by Professor Daniel Chaytor. It is desirable to ensure a pecuniary benefit for distribution of materials in order to help SEPA realise its self-sustaining goal. The sub-committee is to establish a "marketing policy."

Representatives of member states are to identify possible distribution centres and to act as contacts and signatories for SEPA. Contract documents to be presented and signed between SEPA and a distributor are to be sent to member countries in advance of the October Representative Council Meeting in order to enable them to study and seek advice on the matter.

5. Increased Member Country Subventions

This is considered inevitable in view of a restructuring of the Secretariat and the constant inflation. A review of dues is considered necessary every four years.

6. Endowment

SEPA should endeavour to approach professional and other bodies and solicit their investment. The mechanics of approaching such bodies would be the same as that used in soliciting for grants.

7. Increased Support for Delegates by Member States

Whenever possible, countries should contribute towards the travel of their delegates to SEPA meetings. This would enable the Secretariat to divert to other projects some of the money which would otherwise be used in travelling.

8. O.A.U. Observer Status

SEPA's drive for observer status with the Organisation for African Unity is to be continued with a view to requesting funds for carrying out some of those projects with which the O.A.U. has identified itself.

Group II: Dissemination of SEPA Ideas and Materials

Chairman: N.H. Ayodele-Cole

Rapporteur: R.A. Mtumi

Members: S.T. Bajah, S.G. Barnes, U. Bude, K.A. Chali, T. Dubale, Y.H.M. Jallow, R.G. Lauterbach, J.E. Lubben, J.O. Menya, M.J. Neuendorffer, R. Seggalye

A. Overview

The group was asked to examine how SEPA ideas and outputs can be effectively disseminated to increase the visibility of SEPA. The group agreed on the following underlying factors as components of an effective disseminating network: materials developed by SEPA, training methods, information, personnel matters, and terminology. These factors were discussed under four sub-headings which form the format for this report.

1. What SEPA ideas and materials are to be disseminated.
2. Which target groups should be considered by SEPA in its dissemination exercise.
3. How SEPA ideas and outputs can be disseminated.

4. How SEPA can co-ordinate or operationalize sub-headings 1, 2 and 3.

B. Observations

1. Ideas and Materials for Dissemination

Concern was expressed that SEPA has remained largely a remote organisation so that its ideas, objectives, philosophy, and activities are not known as widely as the organisation would wish even though these have been stated in earlier versions of the SEPA brochure. Since SEPA deals with governments and professional groups, it is felt that the organisation should maintain strong communication links with both educational administrators and professional bodies. In this way, SEPA should be able to improve its public relations system and retain an image. The group suggests a two-pronged measure to achieve this objective: disseminate ideas, objectives and SEPA philosophy, and distribute APSP/SEPA materials.

2. Ideas, Objectives, Philosophy

It is suggested that a SEPA brochure be updated every two to three years, and the revised version should have SEPA ideas, objectives, and philosophy clearly and simply explained. The group emphasised that SEPA should draw a clear distinction between the broad term "methodology" and the SEPA approach. The latter, a sub-set of the former has distinctive parts and approach.

- (1) The kind of materials used in teaching,

- (ii) The way materials are conveyed to pupils,
- (iii) The impact of materials on children.

The group is aware of SEPA's available programmes and activities and recommends that these be given wide publicity in the brochure and other relevant SEPA publications.

- (i) Out of School Youth (OSY)
- (ii) Science Educators Training Course (SETC)
- (iii) International Centre for Educational Evaluation (ICEE)
- (iv) Environmental Educational Programme
- (v) Low cost equipment
- (vi) Teachers' Training Material Development (TMD)

The group submits that organisational structure and administration should be featured in SEPA publications and that contributions of various member countries and the benefits they derive from SEPA's budget should be fully reported for funding purposes.

The SEPA constitution should be published.

The activities of the various funding agencies should also be reported from time to time.

C. Distribution

1. The Materials

The following SEPA materials have been specifically identified for

distribution. (Refer to the flow-chart on p. 59.) The group is of the opinion that several APSP/SEPA units are still relevant, and should not be left to gather dust. These include:

- (i) APSP units and Teachers' Guide
- (ii) SETC units and Teachers' Handbook
- (iii) Publications by the Secretariat such as Handbook for Science Teachers
- (iv) Our Environment, Volumes 1 and 2
- (v) In-service Training for Teachers
- (vi) Handbook for Teachers Evaluation of APSP units
- (vii) Making a Start for Teachers
- (viii) Concept Formation
- (ix) Teachers Guide to the APSP Materials.

2. Target Groups for Material Distribution

The group discussed possible targets likely to benefit from SEPA materials and recommends that the following organisations and institutions be placed on SEPA's priority mailing list for materials.

- (i) Relevant Ministries
- (ii) Institutes of education
- (iii) Curriculum and teachers' centres
- (iv) Inspectors of schools
- (v) Teacher trainees and tutors
- (vi) In-service teachers and pupils
- (vii) Teachers' associations

- (viii) Subject associations
- (ix) Funding agencies
- (x) SEPA-lings (those who have participated in APSP/SEPA activities such as workshops, training courses)
- (xi) Adult and youth education institutes

3. Strategies and Logistics for Distribution

For effective dissemination, the group suggests that:

- (i) Reports be written by SEPA participants on their return from SEPA meetings; Representative Council members should ensure that key education Ministry officials are adequately briefed on SEPA conferences.
- (ii) National Coordinators (national focal points) be identified for such functions as material dissemination.
- (iii) Newsletters, brochures, mass media, etc., carry information about SEPA. (See flow-chart, column 3.)
- (iv) SEPA Educational Journal publish research investigations and findings.
- (v) Subject panels also make deliberate efforts to publicise SEPA ideas and activities.
- (vi) Workshops and other in-service courses or training programmes be intensified and that national teams mount pilot projects on dissemination. (Distribution of materials in any particular country depends on what goes on in that country especially when that country has other

materials circulating.)

(vii) One day be set aside mainly for science fairs, symposium and lectures. These SEPA Days should be organised at national levels (probably in honour of Rev. Dr. Solomon Caulker).

D. SEPA Commission

It was thought that a commission in the sense of the UNESCO Commission within the Ministry of Education is not necessary at this stage. The SEPA Representative Council Members (two) should become more active focal points within their countries to ensure that SEPA interests are adequately covered, especially with regards to the prompt payment of Member States contributions to the Secretariat in Accra.

FLOW-CHART SHOWING

- (1) Ideas, Objectives, Philosophy
- (2) Target Groups
- (3) Dissemination Organs

(1) WHAT

(2) WHOM

(3) HOW*

A. Ideas, Objectives and Philosophy of SEPA

- (i) Methodology and Approach
- (ii) Programming Activities
- (iii) Administrative Structure
- (iv) Role of Cooperating Agencies

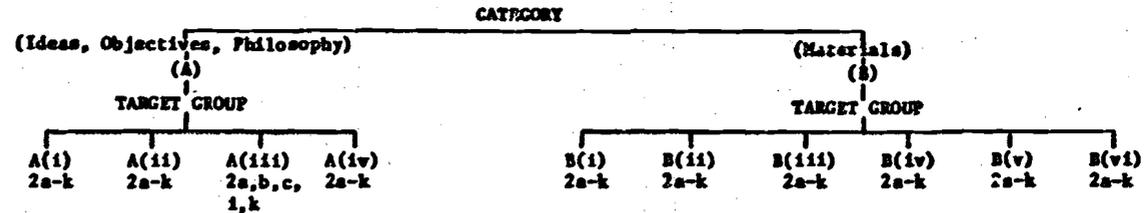
- (a) Relevant Ministries
- (b) Institutes of Education
- (c) Curriculum/Teachers' Centres
- (d) Inspectors of schools
- (e) Pre-service students and teachers
- (f) In-service teachers and pupils
- (g) Teachers' Associations
- (h) Subject Associations
- (i) Funding Agencies
- (j) SEPALINGS
- (k) Adults and Youths

- 1. Representative Council Report
- 2. National Focal Points (National Coordinators)
- 3. Publications - Newsletters, brochures
- 4. SEPA Education Journal
- 5. Use of Science Panels
- 6. Workshops and In-service Training
- 7. SEPA Day
- 8. Commercial Publishing
- 9. National Education Journal/ Reports
- 10. Mass Media - Radio, TV, Newspapers
- 11. Editorial Board

B. SEPA Materials

- (i) APSP Units (50) and Teachers Guide
- (ii) SETC Units (Njala)
- (iii) Teachers' Handbook
- (iv) Publications by the Secretariat
- (v) Concept Formation
- (vi) Audio-Visual Materials

*Documents should be sent to relevant organisations for the attention of the contact person.



Group III: Structure of SEPA

Chairman: E. Laing

Rapporteur: P.R. Nyaku

Members: M. Addy, D.J. Kachulu, E.M. Mugiri, R. Ohuche

A. Overview

The group examined the administrative and organisational structure of SEPA, identified problems working against the smooth running of the organisation and its Secretariat, and suggested solutions that would increase the efficiency and visibility of SEPA while keeping down costs.

Before tackling the assignment, members studied documents prepared by the SEPA Secretariat and submitted to the Representative Council on the subject some notes on guidelines for group discussion prepared by Professor E.A. Yoloye, and notes on administrative and organisational structure prepared by the Executive Director, Dr. Rufus Alabi. During the first part of the work, the group had an opportunity to discuss with Dr. Alabi various points he had raised in his paper.

B. Recommendations

1. Organizational Structure of SEPA Secretariat

The group recommended a new organizational structure for the SEPA secretariat. The personnel involved are listed below, followed by a diagram depicting the structure.

Structure

Executive Director

Assistant Director Programmes (new designation)

1) Administrative Officer Accounts

**2) Administrative Officer Administration & Information
Office Manager (Translator)**

Two Shorthand Secretaries — for Executive Director and

Assistant Director (P)

Typist (2)

Accounts Clerk/Typist

Clerical Officer/Library Assistant

Driver/Messenger

Cleaner

Gardener

Night Watchman

Field Offices

Executive Director

1. Coordinator (Francophone & Luxophone)
2. Coordinator (East & Central Africa)
3. Coordinator (North Africa)
4. Coordinator (Southern Africa)
5. Administrative Officer (Admin. & Information)
(West Africa)

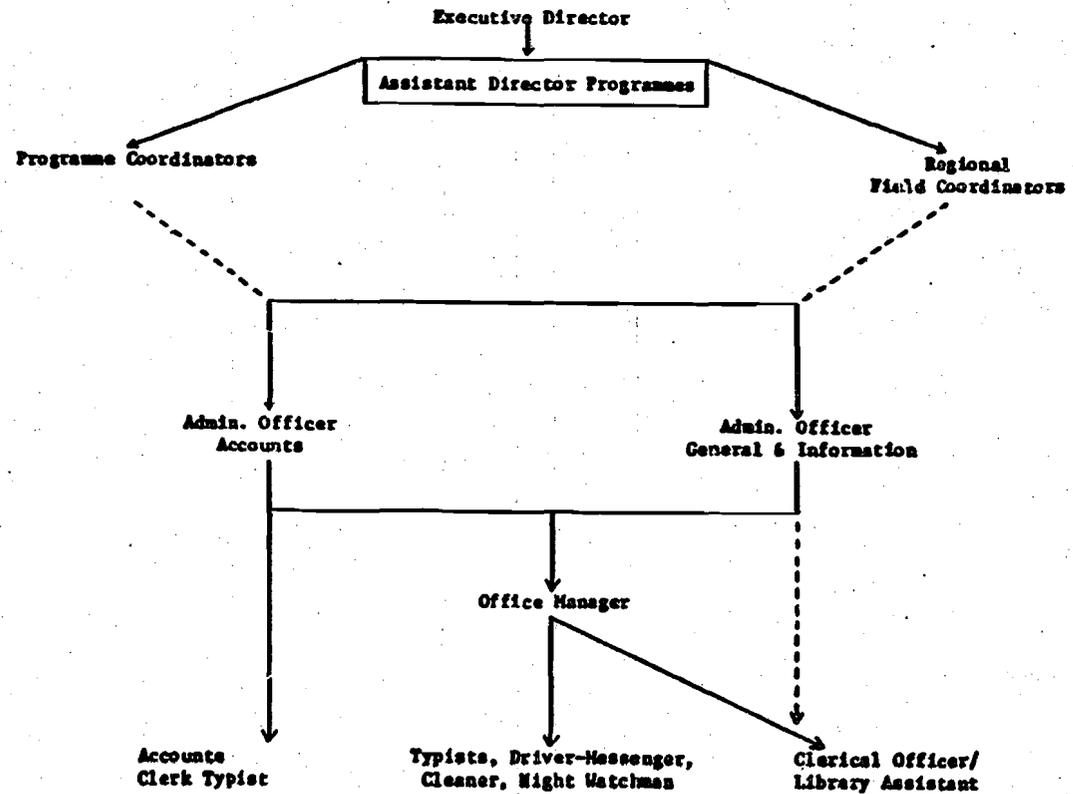
Programmes

Executive Director

Assistant Director (Programmes)

Coordinator Coordinator Coordinator Environmental Low Cost Other
Equipment Programmes

Proposed Secretariat Structure
in 1980s



Group members further recommended that:

- (1) The overall responsibility for the formulation and initiation of programmes should belong to the Executive Director and not

to the Director of Programmes.

- (ii) The Director of Programmes should be the deputy of the Executive Director and assist him in handling institutional programmes as well as developing new programmes.
- (iii) There is no valid justification for the Planning and Research Committee or the Finance and General Purpose Committee that were proposed by the Secretariat. It is the view of members of the group that the functions intended for these committees can be served adequately by the Secretariat presently and in the foreseeable future. Moreover, the cost of organising meetings for the committees would increase the cost of running the Secretariat considerably, something SEPA is doing everything to avoid.
- (iv) Programme Officers may be recruited for specific programmes as part of funded programmes.
- (v) One secretary for the Executive Director, one secretary for the other Director and an appropriate complement of stenographers and typists are to be recruited to handle the volume of work at the Secretariat.
- (vi) Although the post of Director of Administration has been recommended in view of the administrative load in the Secretariat, it is further recommended that it should be filled with an Administrative Officer until such time as the financial resources permit the recruitment of a specially trained person for the post.

2. Reprographic Centre

The group recommends that immediate steps be taken to set up a reprographic centre and suggests the formation of a technical committee to assist the Executive Director to develop the proposal for submission to a funding agent like the Africa Development Bank which had indicated to the Executive Director that it would favourably consider such a proposal.

3. Regionalisation and Geographical Spread

The group was of the opinion that it would be too expensive for SEPA to set up Regional Centres. It noted that if members representing their various countries would do their work well, there would be no need for regional centres to ensure that the presence of SEPA is sufficiently felt in each member country. National (SEPA) institutions in some countries can help in promoting the visibility of SEPA in those countries in which they are situated.

4. Public Relations

The group observed that representatives of countries are supposed to project and publicize the ideas of SEPA in their various countries, and expressed the need to emphasize this point to them. It is envisaged that the publication of a SEPA Newsletter will serve to remind the country representatives of their responsibilities to SEPA.

5. National Commission of SEPA

The group did not find sufficient justification to recommend the

establishment of such a commission for SEPA in various countries. It would recommend that in-country workshops organised by SEPA to generate interest in various countries be followed up from time-to-time with similar workshops. In this connection it was suggested that long-term programmes for in-country workshops be written and presented to appropriate funding agents for assistance.

6. Incentive for Coordinators

The group agreed with the observation that the interest of Coordinators in SEPA's projects cannot be maintained indefinitely unless they are given some kind of reward for their work. The group would therefore recommend that where a programme is being developed, the need for a full-time coordinator should be spelt out and provision made in the proposals for financing his remuneration. Similarly, the honorarium for a part-time coordinator or consultant should be built into proposals intended for prospective funding agents.

7. Full-time Directors of Projects

The group recommends the employment of full-time Directors of Projects to be based at the SEPA Secretariat as a long-term project, subject to the availability of adequate funds.

8. Review of Structure

The group acknowledges the fact that the Representative Council has the prerogative to review the organisational structure of SEPA from time-to-time to enable the Council to determine which committees it should

create as dictated by changing circumstances (particularly availability of funds).

Group IV: Programmes for the 'Eighties

Chairman: M. Atchia

Rapporteur: M. Tawia

Members: R.D. Coleman, G. Jokic, F.M. Leburu, L.B. Lukhele,
M. Muehke, J.E. Obembe, G.R. Quincke, F. Richard,
M.B.R. Savage, M.V. Setshwaelo, J.A. Suffolk, W. Westphal,
E.A. Yoloye

A. Overview

Eight main areas were identified by the group. These are listed below and developed in subsequent pages.

1. Assistance to countries to run their workshop/science programmes
 - (a) Strategy for this action
 - (b) Understanding by SEPA of national set-ups
2. Setting up of new specialised centres such as those of Njala and Ibadan
3. Production of pace-setting curriculum material
4. SEPA Clearinghouse for science material and exhibition of science equipment

5. Register and provision of resource persons
6. SEPA PRIZE
7. SEPA and Mathematics Education in Africa
8. SEPA and pure and applied science (i.e. the non-educational field)

B. Areas

1. SEPA Assistance to Countries

(In-country workshops, programmes)

Rationale

Over the years, teacher/learning materials developed by SEPA have encouraged child-centered activities, using the environment as a resource and emphasizing the philosophy of learning by doing.

SEPA also has assisted in training personnel to use these materials in the various countries and to help in dissemination of both SEPA philosophy and materials. Many countries are now embarking on curriculum development or revision as a direct outcome of their involvement in SEPA activities. Some countries still lack adequate expertise to carry out these projects alone, and thus input from SEPA will probably be welcomed in the area of in-country training for local personnel.

Emphasis should be placed on a country's stated needs. SEPA should not give directions as to what should be done. Although SEPA visibility may be low in cases where a country has taken the organisational lead,

nonetheless SEPA's assistance can be effective.

In many cases, SEPA assistance should result in

- (a) Increasing the critical mass of expertise in providing additional personnel to assist the national group when there are not enough people to do a particular job.
- (b) Providing personnel who can share experiences, information on successes and failures in similar ventures tried elsewhere.

Constraints

- (a) **National Sensitivity:** The country's stated needs must be taken into consideration and no attempt should be made by SEPA to preempt these. SEPA's role should be one of coming to help, rather than presenting pre-packaged offerings.
- (b) What resources can SEPA provide?
What should be SEPA's role?
 - (i) Securing funding
 - (ii) Identifying appropriate resource people
 - (iii) Providing appropriate tools (kit/package)

Strategies

- (a) **Net-working:**
SEPA should help to bring together people whose expertise, experiences, etc., may be shared for mutual improvement.

Materials/information exchange (perhaps in the form of a clearing-house) would be one of SEPA's roles.

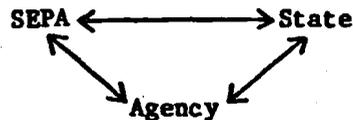
(b) Initiation of Ideas:

Through SEPA's international contribution, countries may be able to bring into focus ideas which will lead to the improvement of science education.

(c) Brokerage Role:

SEPA should be able to use its wide experience to help countries identify sources of funds that can be tapped for national programming. Funding agencies may be contacted (as has been done for CFTC), and countries can be informed of how they can secure needed assistance.

Countries, on the other hand, may identify what can be obtained elsewhere and ask SEPA to act as the intermediary to secure funds. This could be done on three fronts so that all avenues are explored for resources that will facilitate in-country activities.



2. Specialized Centres

There are at the moment two existing institutions:

Njala: Science Educators' Training Course for persons from Teacher Training Colleges and inspectors of primary schools.

Two programmes are being run at the moment:

- (a) Masters degree
- (b) Diploma

Ibadan: International Centre for Educational Evaluation and Research. At Ibadan, the course now offers Masters and Doctoral programmes.

These have been taken over by the institutions involved (in Ibadan and Njala). Their courses should be advertised through all country curriculum centres and SEPA should encourage its members to send persons to these centres.

Criteria for Location of Programme

- (a) Francophone areas should receive priority.
- (b) Availability of appropriate contact person (ideally, should be a national of the country).
- (c) Existence of a programme into which it might fit.
- (d) Readiness on part of institution to assume full responsibility for programme after SEPA initiates it.
- (e) Accessibility of institution should be considered.

Recommendations

SEPA should :

- (a) Establish a second SETC (Science Educators' Training Course) in a Francophone country.
- (b) Expand the Njala course to include Environmental Sciences and

- include this dimension in the second Francophone SETC course.
- (c) Approach specialized agencies - UNICEF, UNFPA, WHO, UNESCO, UNEP - for funding both the expansion and the new courses.
 - (d) Make specific addition to Ibadan courses e.g. health sciences (WHO might be approached). This would involve an input into the Health Tutors Training Course at the Institute of Education (Ibadan).
 - (e) Consider establishing a SETC course in a Portuguese-speaking country.

Concept Development Programme

- (a) Is it necessary to institutionalize it?
- (b) What steps should be taken?

Ideas were generated in 1975 in a Nairobi meeting of East and Central Africans (largely). SEPA took concept development as an important area related to learning in science. A group was set up which did a state of the art review (about to be published). Attempts to institutionalize this have failed thus far.

The group recommended that the programme should be institutionalized. University College of Botswana has expressed interest. The following rationale was made:

- Professor Barnabas Otaala would join the staff of the Department of Educational Foundations in August 1980.
- High interest was expressed by the Science Education Department.

- A good working relationship between the two above-mentioned departments would lead to a concrete infrastructure.
- Location of a programme in Southern Africa is highly desirable.

Editorial Training

The group recommended that this be given high priority. Information needs to be gathered on availability of such a programme now in an African institution. If this search is unsuccessful, the possibility of training outside Africa should be investigated. Scholarship support for SEPA members should be sought.

Production of Low-Cost Science Equipment

There are two possibilities:

- SEPA will introduce a programme to use an institution to train personnel in the design and production of low-cost materials at SEPA. This can be investigated at Kenya Science Teachers College (Nairobi).
- For long-term objectives, SEPA should look for institutions in Francophone and Portuguese-speaking African countries to perform the same function.

SEPA should consult with ILO, UNESCO and explore other funding possibilities, including private institutions.

3. Production of Pace-Setting Curriculum Materials

Part of the success of APSP/SEPA can be attributed to the production by the programme of the units, films, and monographs of the late 1960s and early 1970s.

Directly, and indirectly, these materials have been used by many countries to re-orient the direction taken by national primary science curriculum programmes.

Ten years later, however, the capabilities of national centres have developed considerably. In addition, national sensitivities preclude the adoption of non-nationally produced curriculum materials, however excellent.

Nevertheless, in certain key areas, the production of Pan-African materials is useful and justifiable.

In a few areas, such as media production, the limited financial and manpower resources available are a severe constraint on the production of materials. SEPA as an international organisation can take advantage of this as a novel fund raising project.

In other areas, countries themselves have identified their needs, such as that for more "appropriate technology" education, but as yet have insufficient or inadequately coordinated manpower to enable them to produce their own materials.

SEPA has the experience and the manpower Africa-wide to produce such materials, but lacks the funding.

Suggested Projects for the Production of Pan-African Curriculum Materials

(a) Appropriate Technology and Development Studies:

There is a steadily increasing body of knowledge in this field. Its impact on the formal educational system is still to be felt. SEPA prototype materials could do much to sensitize curriculum centres to ways in which such content and skills could be introduced to science programmes in schools.

Model teaching units developed should emerge from real problems in the child's environment (e.g. related to "appropriate technology").

These models should span the spectrum of curriculum materials; i.e. the package should include:

- teachers guides (both upper and lower primary)
- pupils books
- tutors resource books
- students resource books
- relevant audio-visual materials such as films, film strips
- simple techniques of assessment

Science teaching frequently and deservedly is justified on the grounds of practical use. However (partially due to the nature of questions on exams), science teaching often remains pure science with pure applications. Bridging the gap between science and the practical application it is meant to serve is too often left to the pupil. Therefore, the task of the units is to make

the actual, practical problems to be solved apparent all through each teaching unit.

Such a project would require the following components for its successful execution:

- a full-time project director
- funds for commencing a series of regional meetings (maximum of three)
- inputs from experts outside Africa since this is where much of the knowledge lies
- editorial and graphic design input
- secretarial assistance
- commitment from participating countries that facilities for trial of materials in schools and colleges will be made available.

(b) Teaching Resources for Use in Science Teacher Education Programmes at the University Level:

National universities increasingly offer programmes for primary teacher educators. By and large these programmes are based on the universities' experience in running programmes for secondary science teachers and show little of the SEPA approach and philosophy. It is for this very reason that the Njala training programme was established. The Njala experience should be made available to more national institutions running similar programmes. The A.C.O. materials developed for their resident-training programme are a sample of what could be prepared.

However, these were produced for a broadly based course in curriculum studies. Materials more specifically focussed on science are needed.

Such a project would require inputs as identified for the previous project on appropriate technology.

(c) Source Book for Assessment Techniques:

One serious constraint on the utilization of innovative curriculum materials by both curriculum centres and classroom teachers is the perceived contradiction between the curriculum and the examinations. Advances have been made however in examination techniques more appropriate to the new curricula, both within and outside Africa.

It is therefore proposed that SEPA seek funds to commission the production of a source book of exemplary assessment techniques.

Such a project would require the following inputs:

- travel to collect information
- editorial and secretarial assistance
- consultancy funds for the person
- consultancy funds for possible collaboration

(d) Media for Primary Science Teacher Education:

APSP/SEPA films have been used by many countries. Human and financial resources are not available at many national centres for the production of these more sophisticated but useful curriculum materials. It is recommended that SEPA seek funds to mount

a project to produce additional A.V. materials. This project should be aimed not only at developing the products but also at developing appropriate staff from curriculum centres by involving them fully in the project.

Such a project would require:

- a project director
- funds for a meeting to identify what films, film strips, slides, tapes, etc., should be made
- funds for a Pan-African film crew to work in various locations
- funds for rental of equipment if not available from national centres
- funds for films and processing, etc.
- funds for agreed upon number of prints
- funds for accompanying written materials

4. SEPA Clearinghouse

This area embraced the idea of a central place for display of materials and prototype science equipment, but details of its physical facilities and how it would operate were not discussed.

5. Register of Resource Persons

SEPA should enlarge its list of available resource persons from within the continent to cover the present and proposed programmes.

People should be available who are able to conduct professional work in French or Portuguese.

Coordinators of programmes and those chosen to act as resource persons in workshops should be proven SEPALINGS.

Funds are necessary to pay people who take short leaves of absence (or even sabbaticals where these exist) to do assignments for SEPA on a full-time basis.

6. SEPA Prize

The purpose of this suggestion is to give a stimulus to action by member states especially through CDC or other centres dealing with science education. A biennial prize could be awarded either to organisations or to researchers working in organisations in accordance with SEPA objectives.

To qualify for the prize, originality and utility in the production of prototypes or of handbooks will be a determining factor.

The prize could be awarded for a variety of objectives to be announced in advance every two years, e.g. for

- prototype products in any one of the sciences
- clearing materials
- a new strategy for teaching science

The value of the prize could be \$1,000-\$1,500. All exhibits will be submitted to a jury made up of scientists chosen by the Council of SEPA.

A first selection would be made in the country of origin by the Ministry of Education.

The establishment of this prize would actively encourage the study of

science at various levels and make SEPA known in the various countries. It would encourage other countries to join SEPA and develop a healthy competition among countries and individuals.

The winner would see his/her work being rewarded and would acquire international fame. If the prize is awarded for a book it could be edited by SEPA and given the widest possible circulation.

7. SEPA and Mathematics Education in Africa

Mathematics was a part of the Endicott House Conference, but, sadly, the mathematics programme did not take hold.

Mathematics is a sister to science, difficulties in mathematics affect performance in science.

Setting up a separate organisation to concern itself with mathematics could be extravagant when an organisation, SEPA, already exists.

It is proposed that:

- (a) mathematics should be a part of SEPA's activities;
- (b) SEPA initiate an international investigation into the difficulties pupils encounter in their mathematical studies at different levels, the aim being to help teachers understand their pupils' perceptions and problems and thereby teach better;
- (c) SEPA investigate the effect of "modern" mathematics on performance in physics;
- (d) SEPA initiate investigation of the difficulties caused by learning mathematical concepts in a second language,

and prepare a glossary of terms causing problems.

This programme was modified at the plenary session to read **Mathematics/ Science interface at primary and secondary levels.**

8. SEPA and Pure and Applied Science (i.e. the Non-Educational Field)

SEPA should:

- (a) Undertake a survey of agencies and institutions involved in appropriate technology and traditional medicine research. Develop a "state of the art" report.
- (b) Decide how to include this material in school science programmes.
- (c) Appoint a task force to get this started.

- o Closing Session
- o Acknowledgements
- o Participant List
- o International Organisations Represented
at Botswana

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Closing Session

The Closing Session took place at 12:00 noon on Saturday May 24, 1980, and was presided over by the Permanent Secretary, Ministry of Education, Mr. K.M. Masogo.

In his closing remarks he expressed great delight on behalf of the people of Botswana for the choice of Gaborone as venue for the review conference. This, he said, had made Botswana the convergent point for international scientists.

He thanked SEPA for following up the Conference with a workshop at Francistown and prayed for continued visible existence of SEPA worldwide.

Earlier during the ceremony, Mr. F. Richards of Mauritius Institute of Education expressed delight, on behalf of the DSE-sponsored Curriculum Directors, and remarked that their exposure to the working experience of SEPA was worth the while.

Mr. M. Sonko, Executive Member from Gambia, on behalf of SEPA thanked all participants, local and international, and expressed the hope that the international agencies present would feel able to work with SEPA in the '80s.

On behalf of the specialized agencies, Mr. Jim Washington of USAID thanked the organizers for giving the various agencies the opportunity of having first-hand knowledge of the problems and plans of SEPA and hoped that the outcome of the Conference will attract more agencies to work with SEPA as USAID had done throughout the history of the organisation.

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Certificates of attendance were presented to all participants. The session ended at 1:05 p.m.

Acknowledgements

This report would not be complete without credit to Education Development Center (EDC), Newton, Massachusetts, which, operating under a grant from USAID, laid the foundation for SEPA through the able way it managed and directed the African Primary Science Program. Long after SEPA came into being, EDC continued to assist and to offer encouragement to the young organisation till it found its feet. It is with gratitude that SEPA looks back on the APSP era and on all the persons who were associated with it.

SEPA thanks also go to USAID and Carnegie Corporation of New York who made it possible for a dream to come true.

Finally, SEPA gives thanks to its first Executive Secretary, and the earliest pioneers, who sacrificed much for the organisation to be born.

List of Participants: Botswana 1980

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+ For ACO Tour only.

International Organisations Represented at Botswana

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UNESCO	Mrs. G. Jokic
USAID	Mr. Jim Washington
ECA	Prof. N. Ayodele-Cole
UNEP	Dr. V.I. Johnson
DSE	. . . . .	Mr. Udo Bude
GTZ	. . . . .	Madam E.K. Eichner
NUFFIC	. . . . .	Mr. J. Masterbroek
EDC	. . . . .	Mrs. Mary Jane Neuendorffer
ICASE	. . . . .	Mr. Dennis Chisman
ACO	. . . . .	Prof. Pai Obanya
WHO	. . . . .	Dr. G. Quincke

Appendix 1

ADDRESS BY HIS EXCELLENCY THE PRESIDENT SIR SERETSE KHAMA,
OPENING THE SCIENCE EDUCATION PROGRAMME FOR AFRICA (SEPA)
REVIEW CONFERENCE, MAY 20, 1980, GABORONE

Mr. Chairman, Honourable Ministers, Your Excellencies, Members of the Diplomatic Corps, Distinguished Representatives of International Organisations, Ladies and Gentlemen:

It is my pleasure to welcome you to Botswana on behalf of the Government, and the people of Botswana, and on my own behalf, as you convene in Gaborone for the purpose of holding the 1980 Review Conference of the Science Education Programme for Africa (SEPA). It is, indeed, a great honour for the people of Botswana to host this historic meeting notwithstanding the very limited and, therefore, humble conference facilities available in our country. We regard the presence of the cream of science educators and administrators from Africa and overseas as an appreciation of the importance we, in Botswana, attach to the role of science in education.

Science has been defined as knowledge ascertained by observation and experiment, critically tested, systematised, and brought under general principles. Thus, the valuable knowledge acquired by scientists through research is invariably subjected to long periods of systematic watching before it can be accepted as a principle or law of science. Some of the scientists toiled night and day for years, if not for a lifetime, before their findings were universally accepted as principles or laws of science.

Let me refer, for example, to Archimedes' principle of flotation which states that, "When a body is wholly or partially immersed in a fluid it experiences an upthrust equal to the weight of the fluid displaced." Whatever time and labour it cost the celebrated Greek mathematician of Syracuse to systematically investigate this phenomenon, I can assure you that we have, today, a dependable principle in both academic and applied science.

Until recently, science education has lagged behind quite considerably in this part of the world. This deficiency may be attributed to the negligence of the pre-independence education authorities. We in Botswana, for instance, inherited only one government-built secondary school and the school leavers were, in turn, offered the limited prospects of becoming school teachers, office clerks, or clergymen. As a result, we are literally engaged in a race against time, especially in the provision of science teachers for all sectors of our education system. This conference could not have been more timely. I have no doubt that our science education authorities will benefit significantly from the contributions of the distinguished delegates participating at this conference.

The teaching and application of science should, I believe, be universal in order to promote the advancement of technology. The developing countries, I suspect, in an effort to bridge the ever-widening technological gap between themselves and the developed countries, often resort to appropriate technologies. Appropriate technology has, of course, a role to play. But, it should not be regarded

as a panacea for all our shortcomings in the field of science technology.

It is true that in our era, the level of technological achievement is regarded as a major factor in considering a country's stage of development. But for practical purposes, developing countries require middle-level technology to help implement their development programmes. In Africa, we have to import sophisticated machinery for primary industries, road construction, and mining. More often than not, we do not have enough technicians and artisans to maintain and service these imported machines. This results in breakdowns and, worse still, in the slowing down of our development projects. We desperately need people who will repair and maintain our telecommunication networks, power lines and generators, hospital and school equipment, roads and railways, moveable plant and agricultural machinery. Given the stage of development of most African countries, the emphasis lies in the maintenance and servicing, rather than the manufacture of tools and equipment we use in our development projects.

In our African continent, we live with a number of paradoxes, such as the contrasts of climatic conditions and the uneven distribution of natural resources. Admittedly, there is not much our African scientists can do when one part of a country is soaked with heavy rains whilst the other is a complete desert; when one part of a country is rich with gold and diamonds whilst the other is devoid of any natural resources. But, we can certainly do a lot better if we could control the floods and irrigate the dry areas; if we could devise a better method of resource-

distribution to improve the lot of our people who live in the poorest parts of our countries.

Let me now turn to the most problematic aspect of science education in Africa, that is, the continued lack of qualified science teachers and technical instructors. This problem is not new. It is part of the history of the conditions of service for teachers generally, not only in Africa but also throughout the world. These conditions, which were for a long time unattractive, have hardened the attitudes of local communities against their sons and daughters becoming teachers. Although these conditions have, of recent, improved considerably in relation to those of their fellow workers in the civil service, it will take time for our people to recognise this welcome change.

In a majority of cases, science-qualifying students simply want to become doctors, engineers, geologists, etc. They would like to become anything else but teachers. This unfortunate tendency poses a big problem to a democratic society such as we have. We may not force people to take up careers which are against their inclinations. All we can do is to persuade. Even if we could devise methods of active persuasion, I would very much doubt the wisdom of such a course of action for teaching in a self-centred occupation which requires self-motivation. Since SEPA is also concerned about teacher education, I would hope that this conference will also review the methods by which more students may be motivated to taking up science as a teaching subject.

We in Botswana have, during the fourteen years of independence, tried to tackle, all at once, all the aspects of our education system: primary, secondary, teacher training, technical, non-formal, and higher education. We are trying to ensure that our education system relates and reflects the values of our society, of which it is, but a part. During this 14-year period of our Independence, we have evolved a set of four principles which should give a clear sense of direction to our educationists in planning our educational strategy. These four principles are *Democracy*, implying a free say for all our people in the political, economic and social affairs; *Development*, meaning the acquisition of physical and human resources to create a strong economy whose benefits all may share equitably; *Self-reliance*, meaning that we should manage our affairs with local physical and human resources without depending on external assistance; and finally, *Unity*, meaning that we should build a united nation with a strong sense of national character, identity, and pride. Our education system is therefore geared to promote the achievement of our development or national philosophy which is an amalgam of the four principles.

I have taken note that "Education for Self-Reliance" has since become the main motto of operation of the Science Education Programme for Africa. I have already said that Self-reliance is one of the four national principles of Botswana. Self-reliance has a major role to play for the education system, its organisation, and financing. It enables the parents or local communities to stand on their feet and provide schools

and equipment if government is temporarily unable to assist. In other words, it is the parents who bear the responsibility of orientating their children towards education. In Africa, governments may provide the moral and material encouragement to assist, but not to take over, self-help schemes. If government were to provide everything, it would defeat the very purpose of self-reliance. Through a self-reliance, unlimited opportunities are open for those individuals who devote time and effort to starting or continuing their education through evening or part-time studies. Self-advancement facilities in the form of libraries, correspondence courses and study-centres must be available to these self-motivating people regardless of age. Self-reliance must permeate the whole pattern of school life. Boarding schools should try to be self-sufficient by producing the food they eat and performing other labour-intensive services for themselves. Finally, school leavers should be given the chance to participate in the community service scheme. This scheme aims to give its participants a broadening, practical, educating experience, and to promote rural development and improve the quality of primary school teaching. This is what Education for self-reliance means to Botswana and to Africa as a whole.

As you get down to the brass tacks of this conference, it is my hope that you will have time to address yourselves to the current problems I have underlined which I think are of relevance to the Science Education Programme for Africa. I am conscious that yours is a difficult task which permits of no easy solutions. I am nevertheless convinced that with the will and determination which have characterised

your organisation over the past 20 years, you should see your way through the challenges and problems Africa experiences in the field of science education.

It is therefore my pleasure to declare this conference open.

In the area of radio and telecommunications, some progress has been made since the first APSP/SEPA meeting when even sub-regional telephone calls were impossible. Although telephone links between most African capitals are maintained by radio and satellites, the situation today is such that the call has to be connected through a European city. Let us hope that it will not be long before the APSP/SEPA approach to learning science begins to produce the type of technologists for Africa, who can solve these and other problems.

Appendix 2

20 YEARS OF SCIENCE EDUCATION IN AFRICA, CHAIRMAN'S ADDRESS
"FROM REHOVOTH TO BOTSWANA: THE LONG JOURNEY"

The Honourable Ministers of Education in the Republic of Botswana, Your Excellencies, Distinguished Guests, Ladies and Gentlemen:

It is with great pleasure that I welcome you all to this historical meeting on "Twenty Years of Science Education in Africa." It is auspicious that this meeting is taking place here in Gaborone, Botswana this year.

The birth of the Science Education Programmes for Africa (SEPA) and its forerunner, the African Primary Science Programme (APSP), and the Representative Council Assemblies and the numerous conferences, seminars, and workshops organised by the organisation, have been held either in West, East, or Central Africa. Some of us were, in fact, worried it was indeed time that SEPA had a major activity in this part of the Continent. It is as if it were the consequence of the great wind of change, politically and otherwise, currently sweeping across Southern Africa, that since holding the 5th Representative Council Assembly in Nairobi, Kenya in 1976, more and more activities have been in Central and Southern Africa. For example, it was only late last year that SEPA jointly organised a meeting on Environmental Education with a sister organisation, the African Curriculum Organisation (ACO) in Lusaka, Zambia. Later this year in October, we will be back in this region, this time in Swaziland for the Seventh Representative Council Assembly.

Ladies and Gentlemen, some twenty years ago, to be precise in July 1960, world scientists, economists, educators, planners, theologians and philosophers met in Rehovoth, Israel, at an International Conference on "Science in the Advancement of New Nations." These were new nations of Africa, Asia, and South America. In that conference, the participants from the developed countries were anxious that the new nations should use the available technology to enhance their advancement. Topics such as the use of atomic energy; radiation and its hazards; water pollution; population explosion; economics; science; politics; education; and international cooperation in science were cited. However, the late Rev. Solomon Caulker, a theologian and philosopher, who was also the Vice-Principal of Fourah Bay College, in Freetown, Sierra Leone, was concerned at the unrealistic extent to which the conference concerned itself with technology. For him, what the new nations of Africa needed was fundamental education at all levels more than they needed the exotic fruits of technology. He summarized his feeling in his final address to the conference participants when he said:

To all of us has come a whole realisation that science through its constantly changing and growing insight, can be brought to bear and to liberate human mind and the human spirit and to make us all stand with pride and believe that we are members of the human race.

As a result of this forceful intervention by Rev. Solomon Caulker, the Committee on Education recommended that science be taught in all schools--Primary and Secondary. As some of you may know, the late

Rev. Solomon Caulker never lived to see his dream come true, because he died in an air crash on his way home. However, he provided a solid foundation for us and future generations to build upon. May the Good Lord rest his Soul in eternal peace. The Rehovoth Conference was followed almost immediately by another Conference at Endicott House in Dedham, Massachusetts, USA. This conference among other things recommended the development of curriculum in science, mathematics, language arts, and social studies. The ultimate intention then was to create, in Africa, institutional resources that might command the services of African educators to initiate and carry out educational developments on a scale commensurate with African needs.

The historic Addis Ababa meeting took place in the same year as the Endicott meeting and thus further fueling the fire kindled in Rehovoth for the urgency of concerted efforts in the development of education on the continent.

After a rather long gestation period, the African Primary Science Programme (APSP) was born in a meeting of Anglophone-African States held in Kano (Nigeria) in 1965. The main functions of the Programme were to: build specialised institutions for science curriculum reform; develop African manpower resource to carry out educational reforms; and lay the foundation for the transfer of the entire programme to African hands.

As the Programme continued to operate it became clear that it was essential to place it under African direction and administration. This

was achieved with the formation of the Science Education Programme for Africa (SEPA) in 1970, when nine Anglophone-African States assembled in Freetown to consider the whole question of curriculum reform on the continent. In this meeting, special emphasis was placed on the utilization of the local environment for educational purposes. SEPA also broadened the scope of operation of the APSP to include teacher education, secondary education, out-of-school youths education and, to a lesser extent, college education.

This, Ladies and Gentlemen is a brief historical sketch of the conception, birth, and growth of the organisation that brings us here today.

After nearly two decades of organising science education programmes in Africa by SEPA and its forerunner the APSP, it is about time that we review the present position, evaluate our past performance, and draw up realistic plans for the future. It will be recalled Mr. Chairman, that 1980 was the target year for Universal Primary Education by the Addis Ababa meeting and also, it is the first year after the International Year of the Child. SEPA's own focal point continues to be the child, and technology for development in Africa.

Mr. Chairman, looking back now, one may say that the most significant aspect of SEPA's growth is the evaluation of a working philosophy--a philosophy we now call "the SEPA philosophy." SEPA's approach to science education takes the view that science is a medium through which a child develops his natural curiosity, his powers of observation and inquiry, and his attitudes to problem-solving and decision-making. We in SEPA,

consider these as fundamental qualities of an education which has particular relevance to the total African environment and which fosters the child's understanding of his world and his own potentialities. During the development of the APSP units, the learning approach was revolutionalised from the traditional didactic teaching methods to a child-centred, activity-oriented inquiry approach using the available resources from the local environment. The role of the teacher is central to the successful implementation of this approach in the classroom, because it calls for new innovative skills. The main task of the teacher in the new programme is to prepare materials, to coordinate the activities of children, and to ask appropriate questions at the appropriate moments.

In the process of effecting meaningful educational change, SEPA decided to develop novel strategies, materials, and programmes in the hope that any gains so made would be beneficial to the teacher, the learner, and to the society at large. One may say that SEPA, unlike other organisations in the African region, is unique in that its membership rests with the States. This character enables it to be an instrument for inter-African cooperation, facilitating mutual understanding among its members and friends, and a spirit of self-reliance implicit in inter-African cooperation.

Through the Representative Council Assemblies and its various Committees, SEPA has been able to articulate needs, resources, and aspirations of its members with a high degree of authenticity. This is a function that has been of great importance in the formulation of

programmes with non-African international organisations. Through this, SEPA has played specific roles in science education in Africa. Some of these are as a stimulant and catalyst in science education development, dissemination role, and orchestration of assistance and professional resources.

SEPA/APSP programmes over the review period concentrated activities in three main areas, namely: the establishment of curriculum development centres in member countries where they did not exist to provide a mechanism for curriculum renewal on a permanent basis; the development of national manpower in member states; the utilisation of local environment for science education, and the development of science learning materials.

From the onset when the APSP units were being trial-tested, evaluated and adopted in the primary schools in member countries the need for trained manpower became evident. APSP launched an in-service training programme during the school holidays as a temporary measure until the start of large-scale implementation of the units. Then, SEPA developed two programmes--the Science Resident Training Course and the Teacher Training Materials Development Programme. The Science Resident Training Course, now the Science Education Training Course, is presently located at Njala University College-University of Sierra Leone, after a rather brief existence in Ghana. The programme provides training in science education for teacher educators, curriculum workers, and in-service course organisers in member countries of SEPA. The Teacher Training Materials Development Programme has produced a Sourcebook and Handbook

on the development of science units and equipment from locally available resources, again for teacher educators and student in pre-in-service training.

In an endeavor to meet the manpower requirements in educational evaluation, the International Centre for Educational Evaluation (ICEE), was set up by SEPA and the University of Ibadan at the Institute of Education with funding from the Carnegie Cooperation of New York and Ford Foundation.

Following the successful establishment of the new curriculum centre and the new approach to learning of Science in Africa, a task force was set up jointly five years' ago by SEPA and UNESCO. The purpose of this task force was to investigate the learning process of the African child in science and mathematics as a result of a seminar on the Development of Concepts in Science and Mathematics in Young Children in Africa held in 1974. It is hoped that this project will furnish baseline information on the intellectual development of children in Africa.

At this point Mr. Chairman, I would like to say something about SEPA and international cooperation. From its inception, SEPA has maintained a very cordial working relationship with a number of national, regional, and international organisations.

These include the Education Development Centre (EDC) of Newton, Massachusetts, Carnegie Corporation of New York, UNEP, and UNESCO. The Commonwealth Fellowship Training Scheme (CFTS), the German Agency for International Development (DSE), and the United Nations Economic

Commission for Africa (ECA) have been collaborating with us in mounting programmes and providing funds for fellowships in our specialised institutions at Njala University College and University of Ibadan. I am pleased to say, this cooperation has been a most welcome development in Africa. SEPA enjoys a cordial cooperation with the African Curriculum Organisation (ACO), the African Social Studies Programmes (ASSP) (an organisation we share roots with from Endicott House), BASE, and now seeks the cooperation of OCAM.

If I may, I will turn my attention to the Franchophone and North African States. Mr. Chairman, I am pleased to say that a dynamic push is being made to involve these States in SEPA activities. For example, in the recent past, very successful workshops and seminars have been held in the Franchophone Countries in environmental education. SEPA efforts are geared to diffuse into the newly independent states of the Portuguese- and Spanish-speaking Africa and Zimbabwe the SEPA approach and materials.

This meeting in Botswana is a historic meeting. It is historic, Ladies and Gentlemen, because, it represents the totality of the twenty year journey from Rehovoth to Botswana. It is here that we assess our strengths and weaknesses, the impact or otherwise on science education that we have initiated and developed so far, examine our *modus operandi* in light of current development in science education world-wide, and try to set our priorities for the benefit of the children of this continent.

Finally, Mr. Chairman, I wish to avail myself of this opportunity to express our sincere thanks on behalf of SEPA to the governments of the

member countries, and international organisations with whose continued moral and material support, the course of development of SEPA would have been quite different from what we know today. It is difficult to single out all the organisations that have interacted with SEPA in the course of the last twenty years. However, I feel that some organisations and institutions do need special mention here. First, I would like to especially thank the United States Agency for International Development, (USAID) and its implementing agency in SEPA programmes, the Education Development Centre (EDC) of Newton, Massachusetts, for its most generous moral and material support during and after the formative days of SEPA. USAID has continued to support many of SEPA activities. I would also like to thank the Carnegie Corporation of New York, the Ford Foundation, Mobil International, UNESCO, UNEP, DSE for funding some programmes, workshops, or seminars organised by SEPA, the Commonwealth Fellowship Training Scheme, the UN Economic Commission for Africa (ECA) and the German Agency for International Development (DSE) for sponsoring students to the Science Teacher Educators Course and International Centre for Educational Evaluation at the University of Sierra Leone and the University of Ibadan respectively. Finally, I would like to most sincerely thank the Governments and the Administrative authorities in Nigeria and Sierra Leone for agreeing to host the science educators and evaluators courses respectively and for steering their development to fully integrated international University courses within the University statutes.

Mr. Chairman, on behalf of all the members of SEPA and participants to this Review Conference, I wish to express my deep appreciation to the Government of the Republic of Botswana for agreeing to host this historic meeting and for giving us such a warm welcome.

Appendix 3
APSP-SEPA INVISIBLES
BY
N.H.A. COLE, PAST CHAIRMAN OF SEPA

For these historical reminiscences on the evolution of SEPA, one is provided with the rare opportunity of highlighting the intangibles to the seeming neglect of the *raison d'être* for this conference. However, as a past chairman of the Science Education Programme for Africa (SEPA) who was one of those who spear-headed the metamorphosis of the African Primary Science Program (APSP) to SEPA, and nurtured its growth and development through infancy and adolescence into adulthood, one can rightly philosophize that a parent has a right to reminisce over the life of a child who has come of age!

First of all, what are APSP-SEPA invisibles? Obviously, they are the unseen impact of the APSP-SEPA programme that one never becomes aware of whilst being swept by the tidal surge of the programming activities. The APSP-SEPA invisibles are the 'happenings' that add spice to the food of life, the intangibles and the small things that promote harmonious working conditions to stretch one's capabilities to the ultimate without being bored. In other words, the invisibles are the non-science education impact of the APSP-SEPA programming activities in Africa over the past twenty years.

Some of the more obvious examples of such invisibles are the direct impacts on the participants involved with the programmes:

- (i) the change in academic re-orientation from north-south to east-west;
- (ii) the educational learning experience derived from the re-orientation;
- (iii) the resulting strengthening of academic contacts within the continent; and
- (iv) the frequent socio-cultural shocks experienced.

Besides these direct impacts, there were the more diffuse and indirect impacts such as those on the learning situation of the formal and non-formal education systems as well as those on the economic situation of the host country.

Starting with the direct impact of the APSP-SEPA programming activities, the three large international workshops (at Entebbe 1965, Dar-es-Salaam 1966, and Akosombo 1967) to develop science education curricula materials for primary schools based on the study of the local environment, enabled many African educators and scientists as well as their counterparts from the USA and the UK to meet on African soil for the first time and discuss the development of primary science education. As recently as two decades ago, most African universities were still floundering and so most African science graduates and educators were then trained in British or American universities. On their return home and whilst working in Africa, this north-south dialogue was strongly maintained for further studies and even fostered by biennial vacation leave facilities *inter alia*. It was not surprising that African scientists and educators never had any academic contacts with their counterparts in

the same university. With the inception of the APSP programme under the auspices of the United States Aid for International Development (USAID), this academic gap was closed and the east-west dialogue within the continent inaugurated for science education in Africa.

The educational learning experience resulting from the change in orientation enabled many African scientists and educators to make first-hand and meaningful comparisons in curriculum materials, teaching methods, educational planning and strategy with other countries in Africa. There was also the strengthening of the recently established academic contacts made through the east-west dialogue by exchange of information on teaching problems, research problems, and national policy and planning for educational development.

The most dramatic incidence on the east-west dialogue experienced by most of us participants of APSP-SEPA were the socio-cultural shocks encountered at the start of the programming activities. For instance, East Africans could not fathom how West Africans, black peoples as they were, could not understand Swahili, the *lingua franca* from Somalia to Mozambique and parts of Central Africa. To east and southern Africans, this was a language shock. There were other cultural shocks after the formation of SEPA in Freetown in February 1970; some Africans were wondering why the first chairman had to be a European. Were there no competent Africans to manage the science education programme for Africa, even though USAID had willingly sponsored the transfer of APSP into African control under SEPA?

As it happened, the second Representative Council Meeting followed in August 1970 in Kampala, and the Chairman and the Executive Secretary of SEPA were met at the airport. Then the riddle was solved, and one could then ask, What's in a name? Although not so relevant then, this question has assumed tremendous connotations today in the light of the recent Liberian situation.

After several international workshops, executive committee meetings, drafting and writing workshops, discussion seminars and council meetings in promoting the east-west dialogue in the continent, some research-orientated West Africans started developing a spurious hypothesis that Ugandans were more like Ghanaians; Kenyans - Nigerians; Tanzanians - Sierra Leoneans, based on some devious socio-cultural patterns that cannot easily be identified for quantification. This can be food for thought for the African Social Science Programme and the New Mathematics Programme (popularly known as Entebbe Mathematics), both of which were inaugurated about the same time as their sister programme for Africa.

Another aspect of the APSP-SEPA invisibles that needs comments, is the impact of the programming activities on the formal and non-formal education systems in African countries. This is more evident on the learners (the primary school children) and their teachers. Many treatises, papers and studies have been devoted to the re-orientation of the learning approach from the traditional chalk-and-talk method to a more open-ended, child-centered, activity-orientated modern approach of learning science, making use of local and often-discarded materials in the

immediate environment. The main purpose in this respect is to indicate the not-so-obvious benefits or the long-term impact that such a learning approach can have on the educational life of the child.

The APSP-SEPA learning approach to science promoted the traditional, non-formal method of learning in indigenous African society which was based on knowledge of the local environment. Survival in the African bush meant a highly discriminatory knowledge of local plants for those that have edible fruits, leaves and underground storage organs, those that have effective medicinal properties often linked with deadly poisonous properties in overdose, and most vital, the avoidance of poisonous or dangerous animals camouflaged in the forest or grassland. During childhood, in the villages of traditional African society the learning process is linked with tales and folklore in order to instil into the child the group customs and practices that enhance survival. When coupled with taboos and societal rites, the child grows up to respect, even if he cannot understand, natural phenomena as lightning and thunder, etc., in the local environment.

In modern society today, the APSP-SEPA approach to learning should provide a solid base to the understanding of science and technology for the child. The investigative approach enables the child to find out much more about the local surroundings than otherwise. In the long run, he should develop the potential and capability to contribute towards the adaptation of modern technology or the improvement of indigenous technology to promote the development process for agriculture and industry in Africa.

Finally, the third and most indirect impact of the APSP-SEPA programming activities were the effects on the economic development of the country hosting an activity. Two decades ago, the majority of African countries could not boast of a tourist infrastructure such as adequate hotel rooms to host a medium-sized regional conference, how much less a world conference. In most cases, the large APSP international workshops lasting six weeks were a tourist booster to the host country, especially in the case of Akosombo where the Volta Hotel was hardly fully used after the completion of the Volta Dam.

Besides the effect on the hotel industry, another indirect impact of APSP-SEPA programming activities in Africa was the development and growth of transcontinental air routes from West Africa to East Africa. Delegates to the first APSP workshops can well remember that travelling from West Africa to East Africa meant transiting in London or some other European airport. Eventually, Ethiopian Airlines extended its flights to Ghana twice a week as the lone ever-always-late airline. Today, Ethiopian Airlines has a controlling interest in the east-west route, supplemented by Pan American, Nigerian Airways, and Cameroon Airlines.

Thus — the impact of APSP-SEPA "invisibles" on people and countries of Africa.

Appendix 4

SPEECH DELIVERED BY DR. RUFUS ALABI,
EXECUTIVE DIRECTOR, SEPA, ON SEPA AND
INTERNATIONAL AGENCIES

Your Excellencies, Distinguished Representatives of the International Agencies, SEPALINGS Old and New, Distinguished Delegates, Ladies and Gentlemen:

It is twenty years ago that the gestation of SEPA took place thousands of miles away from the confines of the African continent. Nineteen years ago, with the aid of international organisations, a forum where African educators could be actively involved in shaping the destiny of the present as well as unborn African children took place thousands of miles from Africa. It is remarkable that SEPA (and its predecessors, by whatever names called) has enjoyed unalloyed support, guidance and co-operation of international organisations. It is well known that without the involvement of these international agencies the journey from Rehovoth via Newton, through Kano and Freetown would have been an exercise in futility. It is gratifying that now that SEPA is reaching a stage of maturity, the bond of friendship and international relationships has not diminished.

Today and in the presence of the august gathering here present, SEPA still leans on the assistance, funding and otherwise, of these international agencies, for the bulk of those activities that make SEPA a formidable organisation on the African continent.

Distinguished Ladies and Gentlemen, elsewhere and on previous occasions during this workshop laudable praises have been showered on the multitude and array of international agencies that have played significant roles in the development of this great organisation, SEPA.

The list of such organisations appears in the introductory portion of the official programme of this workshop.

Whereas it is true that most of SEPA activities have been solely supported over the years by these organisations, it is our intention to continue to maintain the professional link between SEPA and these international bodies.

The presence of a large contingent of international and specialised agencies at this meeting is a living testimony to the credibility and the accepted expertise of SEPA.

In an ecosystem, biological, organic, or international, the principle of symbiosis is one that we cannot overlook. It has worked over the years.

From Addis Ababa, Tbilisi, Belgrade and indeed at every point in the landmark of educational policy-making conferences, SEPA has maintained a contemporary link and interacted with progressive and forward-looking organisations, a few of which are represented at this meeting.

Like the struggle of Jacob with the Angels, we shall not allow this opportunity to pass us by without taking the full benefit of the presence and the words of wisdom issuing from the fountain of these international

agencies.

SEPA as an inter-governmental African organisation cannot and will not function in isolation of the thinking, projections and programmes of associated international organisations.

Distinguished Ladies and Gentlemen, it is in recognition of this policy of our international co-operation that we have created this special forum for exchange of ideas and will siphon those useful ideas which are cardinal guiding principles of these international organisations and infuse such useful materials into the body corporate of the *modus operandi* of SEPA in the last portion of this millenium.

SEPA intends to imbibe as much as possible from their programmes and incorporate into its own programme such laudable components that will enhance the prestige of SEPA and make it work in unison with the tempo of the programmes of these agencies.

For the greater part of its existence, SEPA activities have been centered mostly in the English-speaking countries. Recently, dynamic approaches have been made to spread SEPA activities into the vast areas of Francophone Africa and also into Arab, Portuguese, and Spanish Africa, as well as the recently independent and 'near independence' countries on the continent.

Distinguished Ladies and Gentlemen, this bold venture calls for collaborative exercises among African-based organisations as well as

receiving further thrust from the world-established international agencies.

If it appears that SEPA has selected just a few of the international organisations, it should not be regarded as a slight on other agencies that are not listed in this short programme. The few international agencies and, of course, the presence of the supreme body in Africa, the Organisation of African Unity, the high powered representative of the UNESCO, the Economic Commission for Africa, is sufficient to make us look up with pride and say that, at twenty years, SEPA has made its mark.

In addition to these organisations, we have not lost cognizance of either our old reliables, our new found land and our prospective collaborators.

It will do us proud if the international organisations and specialised UN agencies will give us in an unequivocal language:

- (a) the appraisal of the strength and weakness of SEPA;
- (b) their own specific programmes on science education in Africa where they consider that SEPA can have an input;
and
- (c) areas of collaboration with their agencies.

In conclusion, Ladies and Gentlemen, whatever programmes, projections, and of course visions which these organisations have for SEPA will go a long way in guiding our hitherto stumbling feet in the right direction of attaining scientific pre-eminence both immediately and in the very many years ahead of us.

Mr. Chairman, Sir, your Excellencies, Distinguished Representatives of International Specialised Agencies, we implore you that your interjections should not only deal with the successful aspect of SEPA. We have succeeded so far in exercising periodic evaluation exercises which have acted as cautions, safety valves and guiding principles to whatever steps we have ventured into in the last twenty years. At this point in time, we sincerely need your support and indeed your guidance for better and more effective performance of the role that we intend, by God's grace, to perform; not only for this generation but also for generations unborn.

I thank you Ladies and Gentlemen.