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Ghana. A REPORT

ON THE ESTABLISHMENT OF

A TECHNOLOGY CONSULTANCY CENTRE

AT THE UNIVERSITY OF SCIENCE AND TECHNOLOGY AT

KUMASI, GHANA

by

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SYNOPSIS

Within the University of Science and Technology at Kumasi there is a wealth of technical expertise which, if properly harnessed, could contribute significantly to the economic development of Ghana. In particular, the University could help to find solutions to two of the prime development needs of the country, namely the necessity for expanding non-farm employment in the rural areas and for introducing effective and economic import substitutes.

We suggest that a Technology Consultancy Centre should be established at the University and charged with the following main functions:-

1. Consultancy.

   The provision of a consultancy service available to both the private and public sectors utilising the technical resources of the University as well as associated organisations outside.

2. Research and Development.

   The initiation and co-ordination of research and development programmes carried out at the University on behalf of outside organisations.

3. Co-ordination of Production Units within the University.

   Where no industry or entrepreneur in Ghana is prepared to take up the manufacture of products developed at the University, it may be necessary to set up production units and these should come under the direction of the Centre.

4. Documentation.

   Documentation of both industry in Ghana and of technologies which are appropriate to the country will be required.

The Centre should be established as an autonomous organisation (with the status of a Faculty). The Director will be responsible to a small Management Committee established by the University Council but will have considerable freedom to manage the day-to-day business of the Centre. It will have its own secretarial and accounting staff.

We consider that funds should be provided for a three-year period to set up a Consultancy Centre, after which time it should be able to support itself through Government subvention and commercial contracts.

A capital sum of approximately £ 190,000 with a recurrent expenditure of up to £ 65,000 annually will be required.

TABLE OF CONTENTS

TERMS OF REFERENCE

Under a contract drawn up between the Intermediate Technology Development Group Ltd. and the United Nations Industrial Development Organisation and signed on July 17th 1970, the Intermediate Technology Development Group Ltd. agreed to carry out a Study in Ghana involving approximately two man-months to investigate the establishment and operation of a technology advisory service based on the University of Science and Technology at Kumasi. The agreed terms of reference were as follows:-

Having in mind that the technology advisory service at the Kumasi University of Science and Technology has already identified certain activities to which its staff could apply their expertise, namely various metals, food, building and textile industries and in the conduct of investigations of field situations to determine what new or additional inputs might be required as regards farm finance, work of co-operatives, needs of new and improved tools and equipment, the said technology advisory service could undertake and carry out:-

1. Investigations into production techniques, market potential, marketing.

2. Advisory services both as an extension service and also through paid consultation when appropriate.

3. Feasibility studies for use by interested persons and organisations.

The contractor shall, in collaboration with the Kumasi University of Science and Technology, determine:-

1. The potential field of operation of the University's technology and advisory service.

2. The requirements of an effective work organisation, including the possibility of attaching a consultant to work with and under the guidance of the University.

3. The financial implication of the said technology advisory service both in terms of external finance that may be necessary and of the income generating capacity of the same.

4. The extent and character of practical collaboration of the said technology advisory service with other bodies such as the Development Centre in Accra, the Administrative Staff College of Ghana, the Ghana proposed documentation centre, relative Departments of Government, VITA in the United States of America, British and other Universities, and the contractor.

5. The most effective strategy for launching the technology advisory service and the order of priority in its programme.

INTRODUCTION

The proposals in this report are a sequel to the formation in 1968 of the Kumasi Technology Group, a voluntary association of scientists and engineers at the University of Science and Technology, Kumasi, formed to solve specific technical problems referred to the Group by small business men, manufacturers, farmers and others in Ghana.

The Group comprised between 20 and 30 scientists and technologists representing a variety of disciplines. The members provided their services free, or on a modest expense-covering basis, to the "small men" who do not normally have ready access to technical information. A summary of the commercial and technical information and services provided by the Group during a six-month period in 1968 is given in Appendix I.

In addition to the work of this Group, other members of the University staff were engaging in consultancy work from time to time. Following the formation of the Kumasi Technology Group, there developed a growing body of opinion within the University and its Council that the University could and should begin to make available its expertise to Ghanaian industry on a more comprehensive and systematic basis.

By November 1970, when this report was prepared, the Council of the University had already accepted in principle outline proposals for setting up a technology advisory service as an integral part of the University's activities. This report draws not only upon these proposals, but also upon the views and advice - and considerable enthusiasm - of the University's administration, of heads of Faculties and their staffs.

THE STRUCTURE OF THE UNIVERSITY IN RELATION TO ITS TECHNICAL ADVISORY ROLE

In our discussions with both the Administration and the Deans of the various Faculties it was apparent that there was a general desire to set up some form of technical advisory service within the University although opinions differed on how this could best be done. It was also apparent that the means by which the different Faculties could contribute varied according to disciplines and the facilities available within each Faculty.

There is no doubt that very considerable skills and expertise exist within the University and, although this is already being made available in a limited way to outside bodies through the resource and ingenuity of a number of individuals, great benefit could accrue to the country in general if more of this expertise could be made available to both agriculture and industry throughout Ghana.

Whereas in the past nearly all students passing out from the University had joined Government Departments, it was apparent that more graduates would be entering industry and that possibly in the future some would even be setting up businesses of their own after having acquired the necessary experience outside. A closer contact with industry and agriculture through some form of consultancy service could not only benefit Ghana, but could also greatly increase the experience of the academic staff of the University and thus enable them to prepare the students more fittingly for their future careers.

The capacity of different Faculties to contribute to a Technical Consultancy Centre would vary considerably and some of the more obvious methods are listed below.

Faculty of Agriculture.

Since the agricultural industry is already served by a number of Research Institutes and the extension services of the Ministry of Agriculture, it does not need the consultancy services of this Faculty to the same extent as other industries. However, the Crop Production Department has already advised the Planning Commission, and members of staff have been asked to comment on a number of agricultural proposals. The Faculty have developed improved poultry housing and have started a production unit for the supply of hatching eggs.

Additionally, there would be scope for practical research work to be carried out within the Faculty, both in the development of new techniques and in the establishment of demonstration units. These by themselves would not make a great impact upon the country unless some form of closer liaison could be established with the extension services of the Ministry of Agriculture. For this purpose it might be desirable for one officer to be appointed whose duty it would be to liaise between the University, the Research Institutes and the extension services of the Ministry of Agriculture. In this way a feed-back of information could be obtained from the farming community, and any developments or new techniques evolved at the University could be made available to the farmer through the extension services.

Faculty of Science.

This Faculty is already manufacturing glassware for sale on request to Hospitals. A science workshop, which is responsible for the repair and servicing of laboratory equipment within the University, is contained within the Faculty. There is no doubt that the resources of this workshop, supervised by the academic staff of the Faculty, could develop a large range of simple equipment for use both in Hospitals and in Schools. This equipment could be manufactured either within this Faculty or that of Engineering until such time as industry is in a position to take on production elsewhere. There would also be scope for consultancy work to be carried out on behalf of some of the more advanced manufacturers in Ghana.

Faculty of Pharmacy.

Within this Faculty, which is the only one of its kind in Ghana, there are obviously very considerable opportunities for both research work and consultancy services. Already the Faculty is being consulted by herbalists and is being asked by the Drug Sub-Committee of the National Standards Board to test locally made drugs. Research work is being carried out into the use of local gums and starches in the manufacture of tablets, and there is obviously scope for analytical work. We were told that the pharmaceutical industry in Ghana is sufficiently advanced to take up any developments carried out by the University and, for this reason, there would not normally be the necessity for the Faculty to set up production units. However, tablets could be produced easily and quickly using available equipment which is not otherwise fully utilised. The immediate scope for outside work within this Faculty would be as follows:-

Department of Pharmaceutical Chemistry.

Analytical work and control of all Pharmaceutical products (Drugs) and ingredients imported as well as those compounded locally.

Extraction of alkaloids and other constituents from local plants. These could be tested in the Department of Pharmacology for eventual medical use.

Consultancy work on the preservation of drugs and their adaptation to suit the conditions in Ghana.

Production of distilled water.

Department of Pharmaceutics.

Production of: - saline solution for Hospitals.
- Aspirin tablets, A.P.C. tablets.

Department of Pharmacognosy.

Extraction of camphor from local Cinnamomum species.
Distillation of essential oils for local use.

Faculty of Engineering.

All Departments of this Faculty had received requests for consultancy or development work at some time or another. We understood that there is sufficient equipment within the Faculty to carry out such work although additional machinery might be required should production units be established. The Faculty has received requests for carrying out tests on cement products, the conduct of foundation investigations, and a commercial request for a process in which lime could be manufactured from snail shells. In addition, members of the Faculty were designing a plant for manufacturing activated charcoal and collaborating with the Faculties of Agriculture and Architecture in the design and fabrication of an improved block making machine and cassava weeding equipment.

We feel that, with closer contact in industry, many more enquiries would be received and that the academic staff of the Faculty could be strengthened by drawing upon the services of the Production Engineer and the Cost and Works Accountant proposed for the Technology Consultancy Centre.

Faculty of Architecture.

This Faculty is already undertaking a number of research and development projects, largely through the Department of Housing and Planning Research, into the tools, techniques, materials and components required for low cost housing required for both rural and urban development but with particular emphasis on the former.

A rural demonstration team has visited the National Service Corps demonstrating new techniques and two-week training courses are also being run for the same organisation. A number of requests have been received for building designs but little information is requested concerning techniques and methods of building construction since the larger contractors very often have their own research organisations and the smaller contractors in the rural areas are not aware of their own limitations nor of new developments which might assist them.

The Faculty has already established an active development and consultancy organisation but there would be a need for expanding its extension service in order to bring it into closer contact with the smaller contractors in the rural areas. Four more demonstration teams have been requested by the National Service Corps.

Faculty of Art.

This Faculty is also undertaking a considerable amount of research and development work including the manufacture of a local loom in order to assist textile output and the production of bricks, tiles and sanitary ware from local materials. They are developing a brick-making kiln upon which they hope to train National Service Corps staff and it is also considered that there would be scope for production units to manufacture such items as light fittings and jewellery. Requests are often received from commercial firms for the testing of yarns, and five power looms have been ordered, so that a production unit may be set up which will manufacture textiles for sale to stores

in Kumasi and Accra. We consider that the resources of this Faculty could be utilised to:-

(a) Develop simple technologies which could produce ceramics and other building materials using local resources.

(b) Provide a testing service for yarns and other materials on behalf of commercial firms.

(c) Develop machinery and equipment to improve local industries in both the textile and ceramic fields.

(d) Set up small demonstration or production units upon which local manufacturers could be trained.

THE ESTABLISHMENT OF A TECHNICAL CONSULTANCY CENTRE.

A technical consultancy service, based on the University of Science and Technology at Kumasi could make a real contribution to national development and, in so doing, bring the academic and research faculties at the University into closer touch with the development needs of both the country and industry. There are, however, a number of alternative ways in which this service could be instituted.

A Voluntary Organisation.

In the early days the Kumasi Technology Group endeavoured to provide a service to small manufacturers in the Ashanti area and this service was given free and on a voluntary basis. Although this kind of organisation can work well on a local basis when dealing with enquiries from small business men, it obviously would lack the resources to perform such services on a national scale, let alone handle larger consultancy work on behalf of Government or major industrial organisations, or engage in research and development on any significant scale.

A Department of the University.

This could come about as a natural evolution of a voluntary organisation which had been given the official blessing of the University and could well be the logical development of the existing situation. Secretarial and office accommodation would be provided and possibly one member of staff given responsibility for the operation of the service. While this would be an improvement on the existing voluntary organisation and undoubtedly would widen the scope of application, it is felt that under these circumstances the operation would be restricted since the service would be competing directly with the Faculties for funds. It is also unlikely, unless a special appointment were to be made, that the supervisory staff would be able to provide the time to make the necessary external contacts or the authority to negotiate with Deans of Faculties for the services of their staff. The business accounting procedure for a commercial consultancy service would need to be more flexible than any system already existing within the University. For these reasons, we feel that the service should be divorced from the general University administration.

An Autonomous Technology Consultancy Centre.

Following the arguments put forward in the previous paragraphs, it could be argued that an autonomous centre with its own staff, workshops and administration would be desirable and, quite naturally, this centre need not be sited at Kumasi or have, in fact, any close links with the University. Although in the course of time a centre of this kind might develop, we consider that with the scarce resources of capital, workshop equipment, and technical staff that exist in Ghana today, it would be wrong to approach a consultancy service in this way. There is already good workshop and equipment capacity within most of the Faculties and, although the teaching load on Faculty staff is already high, opportunities undoubtedly do exist for staff to take on

consultancy work. We also feel that the consultancy service should grow as a result of demand and that the pattern of this at present is largely unknown. Until it can be identified as a result of experience, it would be difficult to lay down requirements in terms of workshop space and staff.

It should be possible to utilise the best aspects of these three alternatives in the form of a small autonomous organisation which, with a small nucleus staff, would utilise the facilities existing at the University of Kumasi and draw upon the voluntary services both of the University staff and of the various Institutes which would be associated. In this respect, we would largely agree with the proposals already accepted in principle by the Council of the University and which were discussed and approved by the Technology Advisory Service Consultative Board at a meeting held on the 17th October 1970. (See Appendix I).

Before spelling out our proposals in some detail, we should perhaps emphasise the need for freedom of action within a service of this kind. Its requirements are not yet specifically known and will only become apparent through experience. At the same time we would like to draw attention to some aspects in which our thoughts are possibly marginally at variance with the proposals which have already been submitted.

We believe that the consultancy centre, in order to serve the best interests of the country, should be orientated towards import substitution and the investigation and establishment of labour intensive industries to be set up in the rural areas which would thus help to alleviate the unemployment problems in those regions. We also consider that, if this service is to become established, the first priority must be the recruitment of a Director who has experience of Industry, Research, and University, and that this post should have the status (though not necessarily the name) of a Dean of Faculty. It is obvious that the Director will have to engage in negotiations with the Deans of Faculty, Government departments and industry, both to further work of the consultancy service and to set the pattern for its future operations. This will require a man of senior calibre who could discuss matters on equal terms with Deans of Faculty and their opposite numbers elsewhere.

We also believe that the consultancy centre should be self-accounting on commercial lines, although it should not necessarily be expected to make a profit. In its early years it will obviously require outside financial assistance. For this reason the centre would require its own accountant and secretarial service and be established in such a way that accrued profits would be retained in the organisation with a view to later expansion. Having made these two points and at the risk of repeating much that has been included in the Memorandum on the proposed technology centre, we would like to set out in some detail the proposals as we now see them.

ASSOCIATION WITH ORGANISATIONS OUTSIDE THE UNIVERSITY.

It is obvious that one of the first responsibilities of the Director will be to make contact with a large number of organisations, both within and outside Ghana. Priority must be given to contacts within the country and these will fall generally under two main headings, namely those organisations who can contribute to the work of the Consultancy Centre by providing expertise which is not otherwise available within the University and those organisations which could be interested in providing funds for research and development projects or of paying for consultancy work carried out by the Centre.

Organisations which could be Associated with the Technology Consultancy Centre.

1. The Forest Products Research Institute.
This Institute is involved in both silviculture, which is unlikely to form a practical part of the work of the Centre, and in wood technology in which department it has already carried out development work into the manufacture of wood slabs in collaboration with the Faculty of Architecture of the University. It has also been asked to assist with the development of kilns for the charcoal industry. The Institute is situated on the campus and the Director of the Institute is represented on both the Consultative and the Executive Boards. The Institute would be prepared to co-operate in placing its facilities at the disposal of the Technical Consultancy Centre.

2. The Building Research Institute.
This Institute is situated on the campus and is already undertaking a large number of consultancy projects in connection with both building and road research. The Institute has interested itself in both brick and lime production, and is studying rural housing and the possibility of setting up local brick works. The Institute has indicated that it would be agreeable to making staff available to the Centre if their expertise is required. It is represented both on the Executive and on the Consultative Board.

3. The Soil Research Institute.
This is situated at Kwadaso outside Kumasi and the Institute already carries out a considerable amount of consultancy work in the form of soil surveys and advice on soils for agricultural purposes including fertiliser recommendations and the conduct of soil tests. It charges for this work, and carries out work on behalf of the Agricultural Development Bank and the Ministry of Agriculture. The Institute is agreeable to carrying out work through the Centre, and is represented on the Consultancy Board.

4. The Crops Research Institute.
This Institute is also situated at Kwadaso and is also represented on the Consultative Board. To date, this Institute has not made any charges for consultancy work done but it would be open to a loose association with the Consultancy Centre; for instance, through an understanding that enquiries which could not be

answered within the Faculty of Agriculture could be referred to it.

5. The Ghana Institute of Management and Public Administration.
This Institute is situated at Legon outside Accra, and has been charged with the responsibility for co-ordinating Management training and, in particular, for providing courses for senior Management within industry and the Public sector. The experience of this Institute would be valuable in advising on the structure and the organisation of a consultancy service at the University.

6. The Management and Productivity Institute.
This is a special fund project. It was started in January 1968 for a five-year period and employs experts in industrial engineering, management accounting, marketing and supervisory training. This Institute is represented on the Consultative Board and has considerable knowledge of industry in Ghana since, of the 725 manufacturing firms in the country, approximately 500 have sent representatives to attend courses provided by the Institute. They would be very happy to provide consultants covering the work the Institute carries out and this could provide a very useful source of Management expertise which at present is lacking in the University.

7. Institute of Standards and Industrial Research.

The Demand for a Consultancy Service.

In the time available it was hardly feasible to undertake enquiries - which to be useful would have to be pretty exhaustive - as to the extent and nature of demand for technical consultancy services in Ghanaian industry. There is, however, evidence that such a service would serve a very useful purpose in Ghana today. The following are the chief organisations with which we discussed the setting up of the Consultancy Centre and which could be expected to make use of its services:

1. Ghana Manufacturers Association.
This Association, which is well represented in Kumasi, has members in both Accra and Kumasi and has in the past benefitted very considerably from advice given to it by members of the original Kumasi Technology Development Group. It is felt that a close link with this Association should be retained through their executive in Kumasi as it is important that the work originally carried out on a voluntary basis should be continued. A statement of the technical problems dealt with by that Group is given at Appendix I. Clearly, if a service is made available it will be extensively used.

2. The Regional Administrations.
It is the intention of Government to give much more authority for regional planning to the Regional Physical Planning Officers and it is felt that assistance could be given by the Technology Consultancy Centre in drawing up plans and carrying out feasibility and resource surveys in the Regions. In the time available we were able to visit only one Administrative organisation outside Kumasi, that at Tamale. Both the Regional Chief Executive and the Regional Administrative Officer expressed very considerable interest in the possibility of utilising the

resources of the University for carrying out resource surveys and in the planning of small manufacturing industries within their Region.

3. Commercial and Joint Stock Banks.
Discussions were held with both the local representatives and the Directors of Barclays and Standard Bank in Accra. It is felt that the Centre should maintain close contact on an informal basis with the banking fraternity in order to acquaint them with the work which is being carried out at the University which could have an interest to industry and which could possibly be placed within industry through the services of the Bank. Likewise, where the University was looking for entrepreneurs to take up developments originated at the University, these Banks may very well have clients who were looking for additional work.

4. The National Investment Bank.
This Bank has its own technical department known as the Development Services Institute which undertakes feasibility studies using either Ghanaian or ex-patriot expertise. It is possible that the University could assist in the conduct of feasibility studies and might, in some cases, be able to replace ex-patriot staff by staff drawn from the University thus showing a saving in foreign exchange. The Development Services Institute has also carried out work on behalf of companies from the United Kingdom and elsewhere, and it is suggested that the Centre should maintain close contact with the operations of the National Investment Bank.

5. The Bank of Ghana and Capital Investment Board.
Both the Bank of Ghana and the Capital Investment Board are interested in supporting an indigenous Consultancy Service such as could be provided by Kumasi. The Bank of Ghana had, in fact, been considering setting up a consultancy "cell" within the Bank to undertake feasibility studies, and would consider the Kumasi Centre as an alternative.

6. The Ministry of Industry.
This Ministry is particularly interested in the activities of the Technology Consultancy Centre and it is possible that subvention of funds from this Ministry could be obtained in order to assist the establishment of small industries and carry out feasibility studies at a subsidised rate.

7. The Ministry of Agriculture.
Although it is not clear in what way the Technology Consultancy Centre could assist the Ministry of Agriculture at this stage, it was suggested in consultations with the Ministry that they should maintain very much closer contact with the activities of the Faculty of Agriculture within the University, possibly by appointing a member of their extension staff whose responsibility this would be.

8. The National Service Corps.
The Faculty of Architecture at Kumasi is already providing technical advice to the National Service Corps. Through the proposed Consultancy Centre it would be possible to offer the National Service Corps a more comprehensive technical advisory service.

Other Ministries such as the Ministry of Education and the Ministry of Health should obviously be approached, partly to obtain their co-operation and possibly for the financing of development projects which could lead to import substitution.

We understand that the German Government intend to establish a technical unit in Kumasi to assist the small artisans who are concentrated in one area of the town. Collaboration with this unit would be an obvious way of forming links with small industries. For this purpose, the Technology Centre should secure the workshop unit which it is understood the Indian Government are making available for use in Ghana. (This is in fact being done).

THE PROPOSAL

We propose that a Technology Consultancy service should be established with the utmost urgency in order to benefit from the enthusiasm and interest that now exist within the University and among potential user organisations. This organisation should consist of a small autonomous self-accounting Centre with considerable freedom of action but responsible ultimately to the Council of the University through the Management Committee. It is not envisaged that in the early stages the Centre would have its own workshops, but it would be designed to draw upon the technical facilities, both in terms of space and manpower, already existing within the University.

The Object of the Service.

The primary purpose of the Technology Consultancy Centre would be to contribute towards the development of the country by making available to industry, Government departments and private individuals the technological expertise and research facilities existing at the University of Science and Technology at Kumasi.

Two of the prime development needs of Ghana are firstly the need to find effective and economic import substitution, and secondly to expand non-farm (i.e. manufacturing) employment in the rural areas. Since there is no other organisation specifically charged with investigating technologies designed to solve these problems, we feel that priority should be given by the Technology Consultancy Centre to these fields of research and development. This is not to say that the service envisaged should restrict itself to these areas of operation, but these objectives should be kept in the forefront because there is the danger that, as the Consultancy Centre develops in experience, its services may become pre-empted by large-scale industry, public or private. In other words, the policy of the Consultancy Centre should be formed by the overriding necessity of developing technologies appropriate to Ghanaian needs and resources both human and material.

Although the staff of the Centre may in itself be small, we anticipate that the work engendered by the Centre will necessitate the recruitment of additional staff within the Faculties, making more time available for practical research, development and consultancy contracts.

Name of the Centre.

The University has proposed that the organisation should be called the Technology Consultancy Centre, and there is general agreement that this would be a suitable name.

Functions.

1. Consultancy.
   This could include work for Government departments such as Regional Resource Surveys and investigations into the location

and design of small industries. Surveys of this kind could involve multi-discipline teams assembled from the Faculties of the University and possibly other outside organisations. There would also be a demand for feasibility studies to be carried out for industry.

2. Research and Development.
In this field there should also be opportunities for carrying out research and development projects on behalf of Government, particularly investigations into import substitution in the field of chemicals, pharmaceuticals, and through the manufacture of both school and hospital equipment. Commercial firms could also sponsor research and development projects.

3. The Co-ordination of Production Units within the University.
We feel that the control of Production Units within the University should come under the Technology Consultancy Centre and should be organised in such a way that the Faculties should still retain a technological and some financial interest in the Units. (It is not envisaged that the University campus should become a sort of industrial estate, but it should become a launching pad for manufacturing industry and a really practical point of technical development). There is no doubt that much of the research and development work will have to result in prototype production units in order to interest industry in taking up ideas and, in many cases, it may be in the best national interests of the country that production is carried out by the University in the absence of any other local entrepreneurs. Production Units could also be used to teach students production engineering and management control in the absence of other local industries.

4. Advisory and Liaison Role.
Since the Centre will be the official organisation for all consultancy work within the University, it will be necessary for the Director to maintain close liaison with the Government and industry in Ghana and to ensure that adequate documentation is made of appropriate technologies. This will necessitate a close liaison with research organisations and other Institutions outside Ghana; in particular the Intermediate Technology Development Group in London and V.I.T.A. in the U.S.A. It will also be necessary for the Centre to maintain close liaison with the Banks with a view to a two-way exchange of information, the Banks supplying information on firms wishing to take up new ideas and the Centre informing the Banks of new developments and technologies which could possibly be taken up by their clients. The Centre would also be responsible for establishing small research projects on its own account to identify the needs for research and development projects and for approaching organisations to obtain funds for carrying out such research projects.

5. Supervision of other Units.
From time to time there may be Units established within the University which might marginally involve a number of Faculties and it might be desirable to put these under the supervision of the Technology Consultancy Centre. The development of the Science workshop to both develop and repair scientific equip-

ment for schools and other Institutions outside the University could well fall within this scope.

6. Documentation.
The Centre would be responsible for documenting industry in Ghana and for maintaining information on technologies which are appropriate to the needs of Ghana. We hope that, where the country is considering the establishment of new industries, the Technology Consultancy Centre will be asked to recommend appropriate technologies which are in the best interests of the economy of the country. With this object in mind, the Centre should build up a documentation centre or "bank" of technologies suitable for different sizes of manufacturing concerns.

ORGANISATION.

Status.

The Technology Consultancy Centre should be an autonomous Unit within the University but operating more on the lines of a Research Institute. The Director should have the status of a Dean of Faculty, and he should have complete freedom to manage the day-to-day business of the Centre. The Centre would be self-accounting, with its own accountancy and secretarial staff and situated on the University campus in office accommodation provided by the University.

Responsibility.

Although the Director should have considerable freedom of action, he would be responsible to the University Council through the Management Committee. In the first instance the Management Committee would be composed of:-

i) The Vice-Chancellor

ii) The Deans

iii) The Directors of the B.R.R.I. and F.P.R.I.

iv) The Director of the Centre

v) The Chief Accountant

vi) Two members appointed by the University Council

The Technology Consultancy Centre will be assisted by a Consultative Board consisting of:-

The Vice-Chancellor

Deans of Faculties

The Directors of the B.R.R.I. and F.P.R.I.

Four members elected by convocation.

One member appointed by the Chamber of Mines.

One member appointed by the Ministry of Finance and Economy Planning.

One member appointed by the Ghana Manufacturers Association.

The Directors of the Soil Research and Crops Research Institutes.

The Chief Physical Planning Officer.

One member appointed by the Capital Investments Board.

One member appointed by the Institute of Standards and Industrial Research.

One member appointed by the Management and Productivity Institute.

One member appointed by the Ministry of Industries.

One member from the Ghana Institute of Management and Public Administration.

Other members to be co-opted as the result of experience and who might include representatives from the Ministry of Agriculture, the Ministry of Health, the Ministry of Education and the National Investment Bank.

We suggest that the full Consultative Board should be convened at least once a year to advise on general policy.

Operation.

The Centre will thus be charged with the negotiation for consultancy contracts, both with commercial firms and Government, and be responsible for maintaining close contact with outside organisations and for submitting proposals to Government for both research, development and consultancy work.

The University Council, advised by the Management Committee, would determine the fees to be charged to clients and the distribution of any income generated by the Centre. At this stage the necessity for subsidising some consultancy work to smaller firms in the general national interest should be considered..

The Director should be responsible, through the Deans of Faculties, for recruiting consultants on a voluntary basis both from within the University and from outside bodies when required. He would co-ordinate multi-disciplinary projects such as resource surveys that could be carried out on a regional planning basis.

We were told that where members of Faculties at present carry out private consultancy work they do so with the approval of the Vice-Chancellor and on the understanding that, after payment of any expenses incurred by the Faculties, 5% of the fees are paid to the University and the remainder retained by individuals. We also understand that this division of fees will shortly be changed and will approximate to the existing situation where official consultancy work is carried out by Faculties when 45% of the fees are distributed among the personnel involved, 45% are retained by the Faculty and 10% retained by the University. Some considerable thought will have to be given to the means whereby consultants are rewarded for their efforts, but we feel that some kind of honorarium should be paid and that it would be quite satisfactory if this were paid in the form of a daily rate, depending upon the status of the person concerned. We consider that this would be the only fair solution since some of the work carried out by the Technology Consultancy Centre could, in fact, be below cost. Any direct fee in the form of an honorarium to members of staff would obviously have to approximate to the fees that would be obtained should members carry out work privately. Although the Centre in the first instance would not discourage direct contact between members of the University and industry, the Executive Board would obviously have to review the position from time to time.

All income arising from research and development work

and consultancy work carried out by the Centre would be retained (apart from honoraria) and only distributed to Faculties and the University on the recommendation of the Management Committee and with the approval of the University Council. In this way, we hope that the Technology Consultancy Centre would build up its own capital which would ultimately enable it to carry out research and development work on its own and sponsor both staff and work amongst the Faculties within the University.

Whilst we feel that the Production Units should come under the control of the Technology Consultancy Centre, it is possible that a slightly modified financial arrangement would have to be introduced which would allow the Centre to retain a proportion, possibly 50%, of the profits obtained by the Production Units. This would help to offset the cost of management and supervision, and would also allow a proportion of the profits to return to the Faculty concerned in order to encourage them to take an interest in the work and to foster new development. In the interests of the University as a whole, we would not consider it reasonable for the entire revenue of a Production Unit to return to the Faculty concerned since some of the Faculties, through the disciplines which they involve, are naturally more suited to the establishment of Production Units. The income from these Units should be distributed throughout the University and thus enable other work of a research and development nature to be introduced into other Faculties which are not so favourably placed.

We suggest that the Technology Consultancy Centre should have its own staff consisting of a Director, Accountant and possibly Production Engineer and Cost Accountant, together with supporting secretarial and clerical services. We do not feel that it should be necessary for the Centre to be enlarged to include Research personnel but some provision should be made, when establishing the Centre, for sufficient funds to recruit additional staff to be placed within the Faculties or to relieve the teaching loads of any Faculties carrying out research and development work. These new posts should not be filled until research projects have been identified within the Faculties and they should be flexible insofar as they could either be recruited with the intention of using the new personnel on the particular research project or on taking over some or all of the teaching load of somebody already within the Faculty who has shown a particular interest in a research or consultancy project. It could be that any staff recruited could take over part of the teaching load and thus two people could contribute part of their time to teaching and part to consultancy and research and development work. In this way, it should be possible for the University to allow its staff to participate in applied research or development work which may bring them into contact with planning problems in industry or Government departments. It should also be possible to switch staff for short assignments within the Faculty so that the type of experience is spread as far as possible throughout the University.

It has been stated by the University that work done for this organisation will be officially recognised for purposes of professional advancement. We would emphasise the importance of this. Recognition from the top of work carried out on applied research, which is generally of benefit to the development of the country as a whole, would encourage applied research rather than

theoretical studies aimed at academic advancement only.

Whilst it is not easy to see how the voluntary element that formed the original Kumasi Technology Group can continue to exist in an organisational capacity, we feel that should a desire be expressed by certain members of the University to form themselves into a loose group to provide voluntary assistance particularly to small manufacturers in the Kumasi area, the Technology Consultancy Centre could be a means of co-ordinating their work and also of granting small honoraria and covering expenses for any work carried out. It was quite apparent in discussion with the Ghana Manufacturers Association that the very considerable assistance that was provided by the Kumasi Technology Group was much appreciated by them and, although they would not be prepared to pay full commercial rates, they would undoubtedly be very happy to make some contribution towards the out-of-pocket expenses of people who provided technical assistance to them.

Consultancy work obtained through the Centre should not reduce the effectiveness of the teaching capacity of the University; it is for this reason that we have made provision for recruiting additional teaching staff. It is indeed our opinion that, far from reducing the effectiveness of teaching and research in the University, the activities of the Technology Consultancy Centre could greatly enhance the experience obtained both by lecturers and students alike and equip the students very much better for their participation in industry and public service when they leave the University.

Staff.

The initial staffing of the Centre should consist of a Director, an Accountant, Private Secretary, Senior Accounts Clerk, Senior Administrative Assistant, two Clerks, one Messenger and one Driver. The Director should be a man who has experience of industry, research and academic life and, since it would probably be very difficult to find somebody with this kind of experience within Ghana at the present time, it is almost certain that initially the post of Director would have to be filled by an ex-patriate. He should also be of sufficient seniority to be graded on the same level as a Professor or Dean of Faculty. A Ghanaian counterpart should be appointed as an Assistant Director in the first instance and possibly could be seconded to the Centre from one of the Faculties of the Universities for a limited period. Until such time as sufficient experience is obtained within the Centre, we feel that the University might in general benefit by rotating this Assistant Director post amongst staff within the Faculties, thus enabling the maximum experience to be obtained throughout the University of this kind of work. It would also enable the Director, the Vice-Chancellor and members of the University to assess the capability of a Ghanaian counterpart when the time came for the Centre to be taken over entirely by Ghanaian staff. The staff of the Centre should, within the first year, be increased by the recruitment of a Production Engineer and a Cost and Works Accountant, and appropriate supporting staff.

Provision in the first year's budget should also be made for two additional staff with supporting technicians who would be

recruited as soon as research and development or consultancy assignments had been identified. These staff would not be members of the Centre as such but would really be recruited as additional members of Faculties in order to relieve the teaching load. Further staff could be recruited later as research and development and consultancy work required, and consideration should be given to the use of overseas volunteers to fill technician posts.

Office Accommodation.

Office accommodation would be provided by the University and it has been suggested that adequate accommodation would be available in the block near the Shopping Centre.

Housing.

Additional housing for the staff of the Centre will be required and, since housing is short on the University campus, provision has been made in the estimates for building new accommodation.

Priorities.

It must be left to the Director when appointed to determine the priorities of the Centre in conjunction with the Management Cttee. We feel that his attention should be drawn initially to the following work:

(a) Liaison with Ministry of Trade and other Ministries in Accra to identify possible projects which could lead to import substitution. A matter that immediately comes to mind is the need for the identification of imported drugs under well-known brand names which could, in fact, very easily be fabricated by the pharmaceutical industry in this country after identification by the Faculty of Pharmacy.

(b) The co-ordination of the existing Production Units within the University which would include the textile Production Unit within the Faculty of Art, a ceramics Production Unit also within the Faculty of Art which could lead to considerable import savings through the use of local materials in the building industry, and a glass structures Production Unit within the Faculty of Science.

(c) The establishment of new Production Units in the Faculties of Engineering and Pharmacy. These could include the necessary research and development work for the establishment of a Production Unit to manufacture Hospital equipment and the use of the tablet-making machine in the Faculty of Pharmacy for tablet production.

(d) Liaison with outside organisations in order to make known the services which can be offered by the Technology Consultancy Centre of the University both with a view to selling the service to possible clients and also to ascertaining

where additional expertise not available within the University could be obtained. This should include visits to Government departments, industry, and to the Regional authorities in order to identify their needs with a view to putting forward proposals for research and development projects.

(e) The identification of requirements for labour intensive small industries to provide employment in rural areas.

(f) The establishment of a Documentation Centre. This will be a continuing process which will obviously commence with the establishment of the office in order to document industry in Ghana and to provide a Documentation Centre for appropriate technologies whether developed in Ghana or obtained from outside the country.

During this initial programme the Director will quite naturally be heavily involved in discussions with the Executive Board to iron out, through consultation, the very many small problems which will arise as soon as the Consultancy Centre becomes operational. He will also be responsible for recruiting his staff and distributing the work load among them.

FINANCE.

It is not intended that the Centre should be self-financing since there is obviously a large degree of development work which will be carried out in the best interests of the country and which will certainly not yield an immediate return. We suggest that outside sources of finance will be required to cover at least the first three years, by which time it is hoped that the Centre will have accrued sufficient revenue to continue and, at the same time, will have established itself both in the consultancy field and through its value to Government, so that funds may be forthcoming both through direct Government subvention and through commercial consultancy work. It is estimated that the funds required for the first three year period would be as follows:

Capital Costs.

Office Accommodation to be provided by the University.

Living Accommodation:

5 Senior Staff Houses @ ₵ 20,000	100,000	
6 Senior Staff Houses @ ₵ 10,000	60,000	160,000
Office Equipment		12,000
Official Cars - 2 @ ₵ 6,000 each		12,000
		₵ 184,000

Salaries.

	Year 1	Year 2	Year 3
Director (Rank as Professor)	7,500	7,500	7,500
Assistant Director (Ghanaian)	5,400	5.600	5,800
Accountant	4,540	4,720	4,900
Production Engineer	4,540	4,720	4,900
Cost and Works Accountant		4,720	4,900
Two Lecturers	9,080	9,440	9,800
Senior Administrative Assistant	2,720	2,820	2,920
Two Senior Technicians	2,700	5,600	5,800
Private Secretary	2,000	2,080	2,160
Senior Accounts Clerk	1,320	1,380	1,460
Two Clerks	1,260	2,360	2,440
Messenger	430	440	450
Two Drivers	420	1,700	1,740
	41,910	53,080	54,770

Allowances.

	Year 1	Year 2	Year 3
Transport @ ₦ 360 per annum	3,960	3,960	3,960
Children's Allowance @ ₦ 200 p.a.	1,600	2,000	2,000
Inconvenience @ ₦ 40 per annum	200	240	240
Passages @ ₦ 1,500 per annum	3,000	4,500	4,500
	8,760	10,700	10,700

(Accommodation if not provided free at ₦1,000 per annum).

Office Expenses.

Transport and Handling	1,500	2,000	2,000
Stationery	750	500	500
Telephones, Postage and Telegrams	250	300	300
	2,500	2,800	2,800

SUMMARY.

Capital Costs	178,000	6,000	-
Recurrent			
Salaries	41,910	53,080	54,770
Allowances	8,760	10,700	10,700
Office Expenses	2,500	2,800	2,800
Contingencies	1,130	1,130	1,130
	54,300	67,710	69,400

APPENDIX I.

REPORT ON THE WORK OF THE

K U M A S I T E C H N O L O G Y G R O U P

June to December 1968

The work of the Group in this period can be divided into 5 categories:-

A : Supplying commercial information.
B : Supplying technical information and advice.
C : Supplying technical services.
D : Educational services.
E : Publicity.

Details of the work done by the Group is shown in the sections below.

Abbreviations: I.T.D.G. = Intermediate Technology Development Group Ltd., U.K.

V.I.T.A. = Volunteers for International Technological Assistance, U.S.A.

Section A: Commercial Information

A1. Information was requested concerning the supply of second-hand textile machinery.
Action : The addresses of two suppliers of such machinery in U.K. were given.

A2 : Information was requested on the availability of machinery for processing plantain stem fibre.
Action: Information was obtained from the Agricultural Research Station, Kwadaso and from the Tropical Products Institute, U.K. on this problem.

A3. The address of a Ghanaian manufacturer of metal frames for suitcases was requested.
Action: The address of a firm in Tema was supplied.

A4. A tailor requested the address of a supplier of paper patterns for men's suits.
Action: A U.K. supplier was found via I.T.D.G.

A5. Information was requested on the bulk supply of cheap disinfectants.
Action: Information and quotations for bulk orders were obtained from two U.K. firms.

A6. A manufacturer wanted advice on the styles of lampshades.
Action: He was lent copies of an up-to-date British and American mail order catalogue.

A7. The address of a supplier of a small hand-operated printing press was requested.
Action: The address of a suitable U.K. supplier was given.

A8. Information was requested on the supply of cheap disposable syringes.
Action: The address of a Japanese firm offering these at one third the price of these imported from U.K. was found.

A9. A business man requested the names of U.K. firms wanting to set up agencies in Ghana.
Action: A list of 22 such firms was supplied.

A10. A small hand-operated rice huller was required.
Action: Information was obtained from the United States (via V.I.T.A.) and from U.K. (via I.T.D.G.).

A11. A local manufacturer required the address of suppliers of machinery to make zip fasteners.
Action: Information on British and U.S. suppliers is being obtained via I.T.D.G. and V.I.T.A.

A12. A manufacturer importing coconut fibre from U.K. wanted the address of the original suppliers in the Far East.
Action: Information is being obtained via the Pakistan and Indian High Commissions.

A13. A local businessman who makes stuffed animals required the addresses of museums in the London area.
Action: A list of addresses was obtained via I.T.D.G.

A14. Advice was requested on the setting up of a cartridge factory.
Action: The enquirer was put in touch with Imperial Chemical Industries Ltd. who provided information to show that this project was not viable.

A15. The address of suppliers of grain driers was requested.
Action: The address of a U.K. supplier was given.

A16. Advice was requested on accounting procedures for small businesses.
Action: A course of public lectures on "Business Management" was arranged.

Section B. Technical Information.

B1. A manufacturer of wood carvings wanted information on prevention of shrinkage in dry climates.
Action: A suitable method of treatment was obtained for him from the Forest Products Research Laboratory.

B2. A business man wanted advice on the selection of machinery and design of a workshop.
Action: He was advised by two Group Members. In addition a catalogue of suitable machines in kit form was obtained via I.T.D.G.

B3. A manufacturer required advice on the trichloreothylene degreasing process.
Action: He was advised by a Group Member.

B4. A cheap substitute for 'Thawpit' was required.
Action: It was pointed out that this proprietary brand was carbon tetrachloride, and a bulk quotation from I.C.I. Tema was obtained.

B5. A request was received for help in setting up a village industry.
Action: A Group member is investigating the possibility of manufacturing and marketing handicrafts.

B6. A shoe manufacturer had difficulty in understanding technical instructions for a modern adhesives process.
Action: He was advised by a Group member.

B7. A manufacturer requested advice on the design of tubular steel furniture.
Action: He is being advised by a Group member.

B8. A garage wanted to know whether petrol was adulterated with diesel oil.
Action: A rapid float method for testing the petrol was suggested.

B9. Advice was requested on a high temperature corrosion problem.
Action: Advice was given by a Group member, and via I.T.D.G. the free services of a U.K. expert in this field was obtained.

B10. Help was requested in devising a course for building apprentices in Wa.
Action: Advice was given by a Group member.

B11. Advice was requested on the suitability of the lightning conductor in a new chapel.
Action: Advice was given by U.S.T. staff (not Group members).

B12. A prospective manufacturer of chemicals for safety matches required background information.
Action: He was advised by a Group member.

Section C. Technical Services.

C1. Analysis of an imported sample was requested.
Action: A chemical analysis was carried out by a Group member.

C2. An electromagnetic switch on a water pump was not functioning.
Action: A Group member found that the switch was incorrectly wired and re-wired the connections.

C3. A newly installed spot welder did not work.
Action: Two Group members showed that the wiring was incorrect, and cured the fault.

Section D. Educational Services.

The Group has recently organised a series of three lectures on Business Management, the titles being (i) Planning (ii) How to approach the bank for a loan, and (c) Elements of Business Management. Small business men are very appreciative of this type of service. More meetings are envisaged for the future.

Section E. Publicity.

The work of the Group and its members has been mentioned in 15 articles in the Ghanaian press. In addition the Group was featured in the B.B.C. "University Report" programme broadcast on 27th and 29th October. A panel programme has been made for the G.B.C. Opinion Platform feature.

The "Pioneer" has now started a regular feature called "Technology Notes" supplied by the Technology Group.

A song popularising "Technology" has been written and broadcast by the B.B.C. The words are being published in the "Pioneer".

APPENDIX II.

MINUTES OF THE MEETING OF THE TECHNOLOGY ADVISORY SERVICE CONSULTATIVE BOARD HELD ON 17TH OCTOBER, 1970 IN THE COUNCIL CHAMBER

PRESENT:

Dr. E. Evans-Anfom, Vice-Chancellor - Chairman
Prof. S. Sey, Pro-Vice-Chancellor.
Prof. N.R. Smith.
Assoc. Prof. E.A. Gyang.
Mr. I.D.B. Corner, Representing Ghana Chamber of Mines.
Dr. S.V. Adu, Representing Soil Research Institute.
Dr. Leo. Addison, Representing Ghana Manufacturers Association.
Mr. C.D.K. Kudiabor, Representing Ministry of Finance and Economic Planning.
Mr. F.W. Addo-Ashong, Representing Forest Products Research Institute.
Mr. J. Boateng (Deputised for Dean, Faculty of Art).

IN ATTENDANCE:

Mr. A.S.Y. Andoh, Registrar.
Mr. T.B.B. Sekyi, Interim Secretary.

ABSENT:

Prof. F[illegible]. Kufuor (with apology).
Dr. Nii [illegible]mon Kotei.
Mr. P.N.K. Turkson (with apology).
Dr. W.K. [illegible]gble.
Mr. Jo[illegible] Amoo Mensah (with apology).
Dr. J.W.S. de Graft Johnson, Director, B.R.R.I. (with apology).
Mr. F. Ofori-Mante.
Mr. A.Y.A. Asante (with apology).
Dr. P. Appiagyei-Danka.
Mr. L.K.A. Idan (with apology).

OPENING.

The meeting was declared open at 10.30 a.m.

1. The Vice-Chancellor welcomed members to the meeting, especially those who had come from outside and said that the purpose of calling the meeting was to get their views and ideas which might help the University formulate the final proposals with regard to the establishment of the Technology Advisory Service (T.A.S.). Proposals for the establishment of the T.A.S., he said, had been thoroughly discussed and accepted in principle by the Council of the University, as it was felt strongly that at this stage of the country's development it was incumbent upon the University to place its expertise and facilities at the disposal of industry and the general public. This idea of the

University rendering services to the public was not new, for "The Technology Group" - an independent group composed of some members of staff - had for some time been rendering services to small-scale industrial establishments and to individuals. The Faculties and Departments of the University had also been doing likewise. But it was now considered necessary to establish a University Organisation which would be the clearing house through which the University would render such services.

As this organisation would be financially supported, it would make it much easier for members of staff to offer their services to the public. In this regard a memorandum on the establishment of the organisation (copies of which had already been circulated to members) had been prepared, setting out in broad outline the objectives and functions of the T.A.S.

He said although the E.C.A. had indicated an interest in the establishment of organisations of this nature in some countries in Africa, a start had already been made by the University before the E.C.A. formulated proposals for their establishment. The University would therefore go ahead with the implementation of its proposals without the E.C.A.'s aid, but in the meantime would welcome any of their ideas that would help further what it intended to do.

He then invited members to give their comments on the idea of the University establishing such an organisation. The representatives of the Ghana Chamber of Mines, the Ghana Manufacturing Association and the Ministry of Finance and Economic Planning expressed their gratitude and appreciation for the establishment of such an organisation in the near future and considered the whole exercise as laudatory.

The representative of the Ministry of Finance and Economic Planning said that with the establishment of such an organisation, schemes could be worked out to help small-scale industries, as obtained in India. If such an organisation were established, he said, certain jobs given to outsiders on contract could be done locally, thus saving time and much needed foreign exchange.

The representative of the Soil Research Institute (C.S.I.R.) wished to know how their facilities could be used by the T.A.S., as the Institute had already in operation a consultancy and advisory service. In reply, the Vice-Chancellor explained that the representative was invited to serve on the Consultative Board in an advisory capacity, and that such requests as could be handled only by the Institute would be directed to them.

2. COMPOSITION OF THE CONSULTATIVE BOARD:

Cogent reasons were adduced to justify its composition, which reflected some of the areas the T.A.S. would be dealing with. Following a brief discussion, it was agreed that additional members could be co-opted to serve on the Board if and when necessary.

The representatives of the under-mentioned bodies were to be invited to serve on the Board for the following reasons:

I. Capital Investments Board.

The meeting was informed that they knew the fields in which investments were being made. The T.A.S. could therefore obtain from them the fields in which feasibility studies could be undertaken. The results of such studies could be sold to interested persons.

II. Institute of Standards and Industrial Research.

It was reported that this Institute recently came out with the utilisation of iron. It was therefore suggested and agreed that Mr. Lartey, the Director, be invited to serve on the Board.

III. Management and Productivity Institute.

Members were informed that the employees of this Institute very often visited factories and consequently knew some of the problems that faced industries. Some of these problems could be made available to the T.A.S. for solution.

IV. In sum, the composition of the Consultative Board was to be as follows:-

1. The Vice-Chancellor.
2. Deans of Faculties.
3. The Directors of Institutes of Building and Road Research and Forest Products Research.
4. Four members elected by Convocation.
5. One member appointed by the Chamber of Commerce.
6. One member appointed by the Chamber of Mines.
7. One member appointed by the Ministry of Finance and Economic Planning.
8. One member appointed by the Ghana Manufacturers Association.
9. The Directors of Soil Research and Crops Research Institutes.
10. The Chief Physical Planning Officer.
11. One member appointed by the Capital Investments Board.
12. One member appointed by the Institute of Standards and Industrial Research.
13. One member appointed by the Management and Productivity Institute.
14. Additional co-opted member(s).

3. DISCUSSION OF THE MEMORANDUM ON THE PROPOSED T.A.S.

Members were asked to make comments on the above memorandum and the following comments, amendments etc. were made:-

i) Technology Advisory Service.

It was proposed:

1. that the organisation should embark on projects on its own initiative.
2. that it should handle requests from large outside bodies.
3. that it should handle requests from small groups and individuals outside.

ii) Under item A(iii) the two parts were to be designated (a) and (b) i.e.

(a) Feasibility Studies, which may be commissioned by prospective business men.

(b) Feasibility Studies conducted to show that a particular venture would pay if it were undertaken.

iii) Extension Service.

Following a brief discussion, it was agreed that not much money could be made from extension services apart from fees charged for board and lodging. In answer to a question, it was reported that the Management and Productivity Institute had once organised a course in the University.

iv) Name of the Organisation.

After a lengthy discussion, it was agreed that the organisation should be designated "Technology Consultancy Centre".

v) Nature and Operation.

a) No comments.

b) The Director of the Forest Products Institute said that his Institute and the Building and Road Research Institute were willing and prepared to place their expertise and facilities at the disposal of the T.A.S. provided that they would always be associated with it.

c) No comments.

d) Should be deleted.

e) Was amended to read: "The Organisation will be self-supporting and fees will be charged for the services it renders".

f) Was amended to read: "While the Organisation will not discourage direct contacts between individual

senior members (Experts/Consultants) and industry outside, it will be the clearing house through which the University will officially accept requests/ enquiries etc. and commission research/investigation as well as offer advice."

g) No comments.

h) No comments.

i) Was amended to read: "Care will be taken to ensure that work for the service does not reduce the effectiveness of any senior member as a teacher or research officer."

vi) Consultative Board.

a) Composition - discussed already (see item 2 on page 2).

b) Functions of the Board.

"This Board may meet once a term to receive reports and review the activities of the Centre" was amended to read "This Board shall meet at least twice a year to receive reports and review the activities of the Centre".

vii) The Management Committee.

A member wished to know whether in the absence of a Dean, somebody could be deputed to attend a meeting of the Committee. It was then suggested and agreed that this was something that should be decided by the University internally.

viii) Financing the Service.

The Vice-Chancellor informed members that the E.C.A. had indicated their interest in the organisation envisaged by the University and would be making a survey of countries in which such organisations could be established; so if the University made a good start, it might receive financial support from them.

A member then suggested that the Ford Foundation and U.N.I.D.O. could be approached for financial help. The Vice-Chancellor then said this could be done when details of the establishment of the organisation had been worked out after the visit of the Intermediate Technology Group and of the Vice-Chancellor of Strathclyde University. It was further stated that financial help might also be sought from the Government if and when necessary.

4. PUBLICITY.

It was suggested and agreed that as wide a publicity as possible should be given to the activities of the Organisation by way of distributing information sheets to industries and other relevant bodies.

In conclusion, the Vice-Chancellor said that members of the Board would be informed of developments after the visits to the University of the Intermediate Technology Group and the Vice-Chancellor of Strathclyde University.

There being no further discussion the meeting terminated at 1.00 p.m.

INTERIM SECRETARY

APPENDIX III.

ITINERARY

3.11.70.	Mr. G. McRobie arrived Ghana.
4.11.70.	Discussions with U.N.D.P.
5.11.70.	Visit to Kumasi. Discussions with both the Vice-Chancellor and the Pro-Vice-Chancellor of the University.
6.11.70.	Sir John Palmer arrived. Discussions with U.N.D.P. Resident Representative: Mr. G. Menzies. Deputy Resident Rep.: Mr. D. Beynon. Discussions with U.K.High Commission: Mr. J. Howard.
7.11.70.	Arranged to fly to Kumasi but flight cancelled.
8.11.70.	Flew Accra/Kumasi.
9.11.70.	Meetings with:- 1. Vice-Chancellor: Dr. E. Evans-Anfom. 2. University Chief Public Relations Officer: Mr. T.B.B. Sekyi to draw up a programme. 3. Regional Chief Executive: Mr. H.R. Annan. 4. Mr. F.W. Lukey - Physics Department.
10.11.70.	Visit to: Faculty of Agriculture - Prof. B.T. Stephanson. Asst. Prof. Mr. G.P. Tewari. Mr. R.G. Kese. Faculty of Science: Prof. F.A. Kufuor. Faculty of Pharmacy: Prof. A.N. Tackie. Dr. B.W. Hadzina. Other Departmental Heads.
11.11.70.	Visit to: Faculty of Engineering: Prof. E.B. Kwakye. Mr. P.A.K. Awotwi. Faculty of Architecture: Prof. L. Christians. Prof. R.L. Fullerton. Mr. S.B. Amissah. Mr. F.A. Abloh. Mr. T.G. Ingersoll. Mr. S.L. Spencer. Faculty of Art: Prof. H. Mell. Prof. E.V. Asihene. Mr. L.A. Baah. Mr. W.C. Owusu.

12.11.70. Visit to:
Forest Products Research Institute:
Mr. F.W. Addo-Ashong.
Building Research Institute: Mr. J.W.S.
de Graft-Johnson.
Ghana Manufacturers Association: Mr. Doe.

13.11.70. Visit to:
Soil Research Institute, Kwadaso:
Dr. H.B. Obeng;Dr.Adu.
Crops Research Institute, Kwadaso:
Dr. H.K. Agble.
Regional Planning Office: Mr. R.L. Hagan.
Standard Bank, Kumasi. Mr. D.C. Ryan.

14.11.70. Visit to:
Bonwire, Ahwiaa and Ntonso to see local craft centres.

16.11.70. Discussion with Mr. Adoo i/c. Science Workshop at the University.

Flew Kumasi/Accra.

17.11.70. Discussion with U.N.D.P. Staff.

18.11.70. Visit to Ministry of Economic Development and Planning: Mr. H.P. Nelson.
Barclays Bank. Mr. T.D. Miles.
Ghana Institute of Management and Public Administration: Mr. R.E. Winful.

19.11.70. Visit to:
National Investment Bank: Mr. S. Odame-Labi.
Standard Bank Mr. C.A. Harding.
Management and Productivity Institute:
Ministry of Industry. Mr. C.R. Addai
Ministry of Agriculture. Mr. Sraha.

20.11.70. Visit to U.N.D.P.

Flew Accra/Kumasi.

21.11.70. General discussions in Kumasi.

22.11.70. Flew Kumasi/Tamale.

23.11.70. Visit to:
Regional Administration Office: Mr. J.A. Braimah.
Mr. K.C.Y. Anakwa.
Agricultural Development Bank:
Mr. K.M. Turkson.
Colton Development Board: Mr. J.K. Tandah.
Standard Bank Mr. Van Driel.
Ministry of Agriculture. Mr. S.A. Mensah.
Rice Mill.
Christian Service Committee: Mr. John Dieterly.

24.11.70.	Further visit to Regional Administration Office. Visit to: Groundnut Oil Mill. Pinto Factory. Cotton Ginnery. John Holt and Company. Flew Tamale/Kumasi.
25.11.70.	General discussions with Faculties at Kumasi. Visit to the Ghana Manufacturers Association: Mr. Kari Kari Mensah.
26.11.70.	Visit to Vice-Chancellor. " " Registrar. Informal discussion with Members of the Kumasi Technology Group.
27.11.70.	Meeting with Technology Consultancy Management Board. Visit to small manufacturers in Kumasi.
28.11.70.	Informal discussions - Kumasi.
29.11.70.	Flew Kumasi/Accra.
30.11.70.	Sir John Palmer departed.
30.11.70.	Visit to: Principal Executive Secretary, Prime Minister's Office: Mr. V. Bartels. Capital Investment Board: Mr. E.M. Baou.
1.12.70.	Visit to: Ghana Institute of Management and Public Administration: Mr. G.N. Jai. Mr. A.E. Winful.
2.12.70.	Visit to: Bank of Ghana: Mr. Frimpong-Ansah. Cabinet Office: Mr. David Awotwi.
3.12.70.	Mr. McRobie departed.

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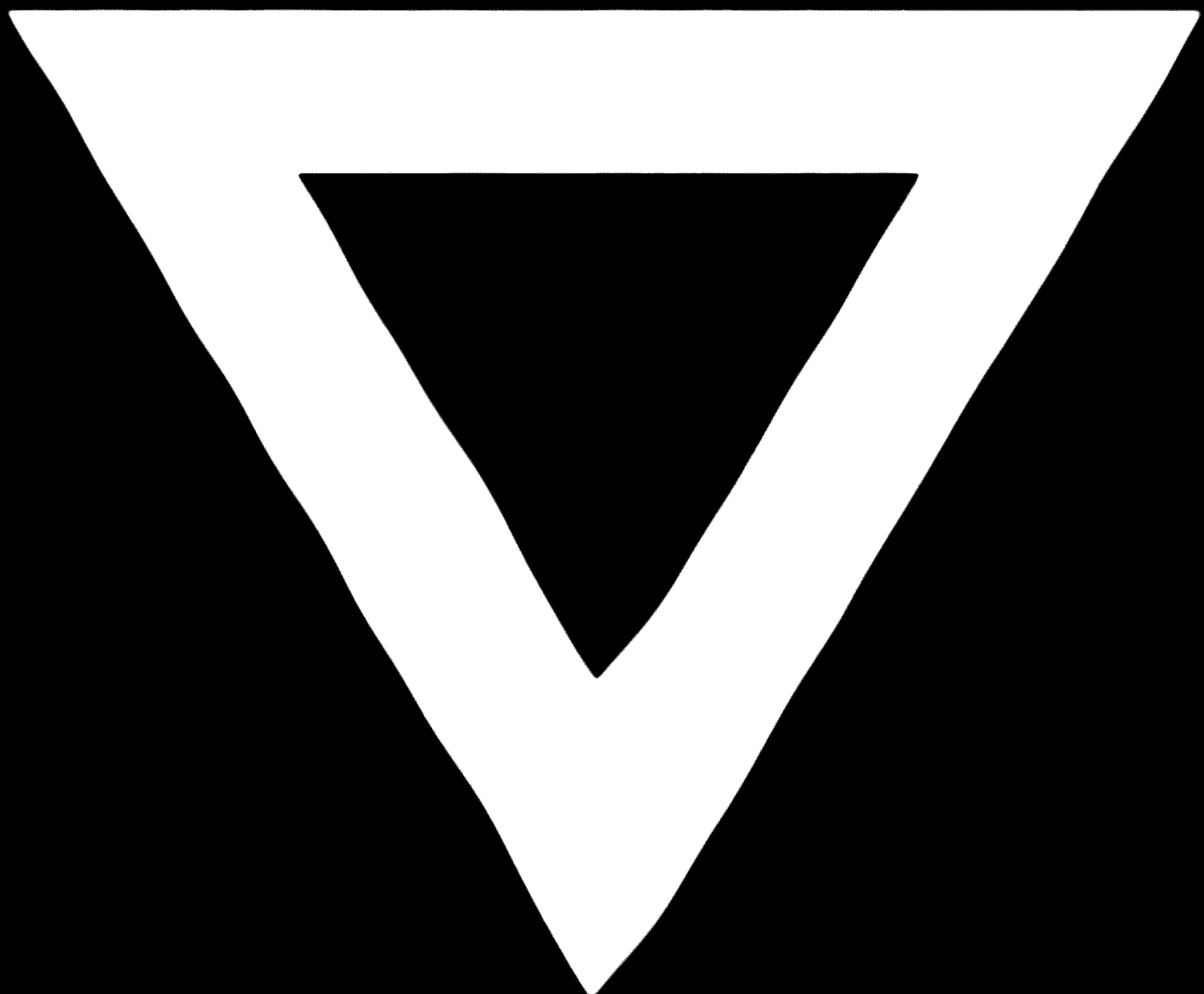

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