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Continuity and Change

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LIST OF CONTENTS

CONFLICT AND COOPERATION IN THE NILE BASIN
Omer Mohamed Ali Mohamed .................................................. 1

THE ENVIRONMENTAL IMPACT OF THE JONGLEI CANAL
IN THE SUDAN
A. M. Ibrahim................................................................. 18

THE JONGLEI CANAL
A.I. el Moghrabi.............................................................. 31

THE CHEMICAL CHARACTERISTICS OF WATER FROM
THE BLUE AND WHITE NILES
Yassain Abdel Salam and D.C. Almond.................................. 43

HISTORICAL ARCHAEOLOGY – AN AFRICAN VIEWPOINT
Ali Osman................................................................. 59

SOCIO-ECONOMIC RESEARCH AND THE APPROACH TO
CHANGE IN JONGLEI CANAL AREA
Mohamed Osman Elsammani........................................... 72

CONTEMPORARY BARI ECONOMY IN HISTORICAL
PERSPECTIVE
Mary Russell............................................................. 81

A COOPERATIVE APPROACH TO DEVELOPMENT
C. P. Gasarasi.......................................................... 100

CONTINUITY AND CHANGE IN THE NILE VALLEY:
A GEOGRAPHICAL VIEWPOINT
H. R. J. Davies.................................................... 133
PREFACE

Since the time of the Sudan Research Unit (1964-72) which was the nucleus of the present Institute of African and Asian Studies, the convening of conferences was one of the major preoccupations of the staff of S.R.U., and lately the I.A.A.S. These conferences have dwelt on various selected themes and topics, which they presented and discussed on a regional and pan-African basis. For instance, in 1968 the position of "The Sudan in Africa" was selected as the topic of the first conference to be organized by the S.R.U. Also the third conference organized by the I.A.A.S. in 1977 discussed the theme of tradition and adaptation across the central Bilad al Sudan.

The present conference follows the tradition of previous conferences of the Institute in a number of ways. However, it is unique in two ways. First, it deals with a matter of vital importance, a matter of life and death i.e. the Nile. Secondly, unlike the previous conferences, the present one does not limit itself to the humanities. The reader will notice that some of the articles presented in these two volumes deal with agriculture, chemistry.... etc.

The articles that were presented in Arabic were published in November 1982, a year after the date of convening the conference. The English articles are now published in two volumes. Mohammed O. Beshir, the convener of the conference, has edited and introduced
these two volumes. We sincerely hope that the interest generated by the conference within the region will find some continuity, possibly in a project that links up the Nile Valley countries and brings them closer.

Numerous institutions and persons have contributed to the success of this conference. In fact without their assistance the conference would not have been possible. In this connection I would like to express our appreciation and indebtedness to the University of Khartoum, Sudanese Socialist Union, Council for Economic and Social Research and the Egyptian Ministry of Foreign Affairs. Financial Assistance received from the above-mentioned institutions has enabled the I.A.A.S. to convene the Nile Valley conference as well as publish its proceedings.

Sayyid H. Hurreiz
Director, I.A.A.S.

June 1984
CONFLICT AND CO-OPERATION IN THE NILE BASIN

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The first legal reference to the term 'international river' was attempted only in the 19th century. On June 9, 1815 the Congress of Vienna used the term as a reference to 'navigable rivers or streams which separate or traverse several states. In 1919, the Versailles peace treaties referred to the rivers that were 'common' to two or more states. Following the Barcelona Convention in April 1921, international rivers were identified as the 'navigable waterways of international concern'.

However, under the pressure of decolonization and the scramble for natural resources, the need for a precise definition of international rivers was felt. No longer was navigation the sole or even the major use of these rivers everywhere. Following World War II, the need became acute. The tendency was to delineate 'international' from 'national' rivers.

Sovereignty was eventually picked up as the salient distinction between national and international rivers. The national river came to be defined as the river which lies wholly from its source to its mouth within the territory of a single state, which has the right to exercise its full sovereignty over it. On the other hand, the states which share a single river, usually referred to as 'riparians' possess an organic unity which practically subjects the river to international regulation. Such a regulation implies the cessation of full sovereignty. However, consent should be given voluntarily; otherwise, the whole basin may be exposed to great dangers as a result of unilateral or bilateral actions.

Recently, international rivers were classified into three categories: international rivers, international river systems and international drainage basins. The first category, international rivers, was divided into: (a) contiguous or boundary rivers which flow between the land territories of two or more states, and (b) successive rivers which flow from the territory of one state into the territory of another state. The international river systems consist of the international river itself, its tributary streams, lakes and canals. The international drainage basin is the whole geographical area which is shared by two or more states and is bounded by the watershed extremities.
2 The Nile Countries: Continuity and Change

The river Nile, however, adds a case of unique complexity to the known definitions. It clearly falls short of the descriptions of the Congress of Vienna as most of its parts are not navigable up to now. Nevertheless the Nile meets almost every level of contemporary definition; it is an international river, an international river system and an international river basin.

It constitutes an international river in both ways; as contiguous or boundary as well as successive. Contiguously, the Nile flows in the territories of Uganda, Sudan, Egypt and Ethiopia. It serves as a boundary between Uganda, Kenya and Tanzania; between Zaire and Uganda; between Ethiopia and Kenya; between Zaire and Rwanda, and between Zaire and Burundi. It is successive because while its sources are mainly located in Uganda and Ethiopia, its course crosses the territories of other states, mainly the Sudan and Egypt, on its way to the mouth in the Mediterranean sea.

The Nile also constitutes an international river system, with several tributaries, streams and lakes. Canals were projected and some are under construction such as the Jonglei canal in the Sudan.

Furtherly the Nile constitutes an international drainage basin. It is the longest river in Africa and the second longest in the world after the Mississippi. The area of its basin exceeds 2.9 million square kilometres extending between latitudes 4° south and 31° north. Geologically, the sources of the Nile, mainly Lake Victoria and Tana, are located in the highlands of Africa, whereas the main course flows towards the deepest area, this is clearly visible in terms of tributary streams at the Sudanese-Ethiopian borders where several of them flow.

The Nile represents a long-rooted symbol of might in African literature as well as a means of livelihood. Religious ceremonies have been intimately associated with this symbol to the extent of making the river a God in ancient Egypt named 'Habi'. The poetry and symbolism of the riparian states are still full of references to the Nile in one way or another. Irrigation and the generation of the hydro-electric power came to be classified as the foremost use of the river for securing livelihood everywhere in a predominant agricultural economy.

The basin is inhabited by a large number of different ethnic and cultural groupings: the Sudan and Egypt in the north are greatly Arabised and Islamized; in East Africa, Swahili and Christianity are dominant in Uganda, Kenya and Tanzania; in the western part of the basin, tribal dialects and Christianity are dominant in Zaire, Burundi and Rwanda; and in Ethiopia, tribal loyalties are still strong, mixed with Christian orthodox leadership for spiritual life. Colonialism also dispersed the basin in terms of linguistic
structure of the second language; English became dominant in the north and east. The French dominated the west and in Ethiopia, both English and Italian are used with Amhara. Continuous external intervention coupled with severe under-development have continued to enlarge historical and ethnic gaps between the states of the basin up to now.

On consideration of these factors, this short paper is intended to summarize the situation in a realistic and constructive manner, by exploring the potential sources of differences which may escalate into serious conflicts. An attempt will be made to advise on a better way of managing the basin in order to ensure maximum benefit for each state and to allow for greater communication between the inhabitants. The methods and the analysis are my sole responsibility and are originally formulated.

THE NILE BASIN

The study of the basin requires various classifications: groupings, individual riparians, foreign policy considerations and existing governing organizations.

A. Groupings:
For historical, political and cultural reasons, the Nile basin can be broadly divided into four groups:

1. East Africa consists of Uganda, Kenya and Tanzania. Historically, these states had been colonized by a common metropolitan - Britain - which continues its influence up to now. All three states speak English as a second language in addition to Swahili. Economically, they are more or less in the same state of development and tri-lateral co-operation resulted in establishment of the East African Community in 1967. Territorially they are all proximate to each other and share Lake Victoria. External intervention and political instability disturb co-operation occasionally.

2. North Africa consists of the Sudan and Egypt. Both countries are proximate. Britain was the last metropolitan power for both of them. English is used as a second language in addition to Arabic. Egypt is relatively more developed than the Sudan, nevertheless, both states sought co-operation after independence and declared a charter for political activity and economic complimentarity in 1974.

3. West Africa consists of Zaire, Burundi and Rwanda. The three countries are proximate. They are all dominated by French culture. Zaire is better off economically and Burundi and Rwanda, as landlocked territories, maintain close relations with Zaire. All three countries share tribal commonalities and had been subjected to a single colonial power, i.e., Belgium.
4. Ethiopia forms a separate group due to:
a. The source of the Blue Nile, the major tributary and others located solely in its territory. Moreover, the geography of the Nile basin does not allow for closer relations with other riparians.
b. Ethiopia is culturally different. It has been exposed to both English and Italian influences in modern times. The Christian religion is largely Orthodox, unlike the dominant Catholicism in East and West Africa. Tribal and other ethnic loyalties are greatly dispersed.
c. Territorially, Ethiopia is a vast country. However, its only neighbouring riparians belong to different groupings: the Sudan (North Africa) and Kenya (East Africa).

Classification by countries reveals the existence of three major divisions = core, secondary and periphery riparians. Core states in this instance, are defined as the most capable of playing an influential role in the basin on the following grounds:
1. The existence of the major sources of the river, Lake Victoria or Tana, in its territory.
2. The flow of larger parts of the Nile and its tributaries in its territory.
3. The greatest need for the Nile for achieving socio-economic development.
4. A substantial population compared to other riparians.
5. Proximity to other riparians representing many groupings as described above.
6. Vastness of territory.
For the same reasons secondary riparians have less influence and concern and peripheries show little concern for the affairs of the Nile.

Accordingly, riparian states are divided as follows:
A. The core sector
1. Ethiopia: In Ethiopia Lake Tana, the source of the Blue Nile is found. Many other tributaries also flow from the Ethiopian plateau into the Sudan. Ethiopia which is bordering the Sudan and Kenya, has a large population. Flood control and the generation of hydro-electric power are seen as vital needs for development.
B. Sudan: Though no source is found, the largest parts of the Nile and tributaries are found in this territory. Its population is comparatively substantial. It is proximate to Ethiopia, Kenya, Uganda and Zaire. Irrigation and navigation are vital for development. It has the largest territory in the whole continent.
3. Egypt: is the most populous and the most advanced riparian. A large part of the Nile flows to its mouth through its territory. By virtue of being the furthest downstream, it depends most on the Nile, especially for
irrigation. Geographically it is weak in the sense that it is only proximate to the Sudan, which belongs to the same grouping.

4. **Uganda**: shares the major source of the Nile, Lake Victoria, as well as other minor sources and tributaries. It is proximate to the Sudan, Zaire, Burundi, Rwanda, Kenya and Tanzania. It has a comparatively large population. The generation of hydro-electric power and navigation are considered most vital for development.

**B. The secondary sector**

It comprises states which are less influential in the basin according to the stated criteria, but which may at the same time be influential in the affairs of the continent. These states include Tanzania, Kenya and Zaire.

**C. The periphery sector**

It consists of states which are the least influential in the basin and less or least influential in the continent according to the stated criteria as well as being in a severe state of poverty. They include Burundi and Rwanda.

In the past, various international considerations contributed to the existence of a vague administration of the Nile. European explorers of the sources of the river paved the way for international intervention in the context of the European scramble for Africa especially during the 18th and the 19th century. This scramble at times caused serious diplomatic crises as was the case between the British and the French at Fashoda in the Sudan in 1898. As a result, the European metropolitan powers (namely France, Britain, Belgium and Italy), worked out a series of legal undertakings between themselves and on behalf of their colonies in order to maintain the status quo in the basin. These undertakings were, of course, promulgated to safeguard their external interests rather than the interests of the riparians.

Over the last hundred years the following main agreements governed the administration of the Nile:

- **a. The British-Italian agreement**: On 15 April 1891, a protocol was signed in Rome between Britain and Italy. According to Article 3, it was agreed not to construct any establishment on the Atbara tributary (between Sudan and Ethiopia) which might affect its flow from the Ethiopian plateau to the main course of the Nile.

- **b. The British-Ethiopian treaty**: On 15 May 1902, a treaty was signed between Britain and Ethiopia. Accordingly, Ethiopia agreed not to undertake or to permit any measure to affect the flow of the Blue Nile, Lake Tana and the Sobat without British and Sudanese consent.

- **c. British-French-Italian agreement**: An arrangement was agreed upon in 1906 between the governments of Britain, France, and Italy. Accordingly, it was agreed to respect
The Nile Countries: Continuity and Change

Egypt's right in the Nile-Basin, as determined by Britain.

d. British-Belgian agreement: On 9 May 1906, an agreement was reached in London between Britain and Belgium, on behalf of the Congo Free State. Accordingly, Belgium agreed not to construct or to allow to be constructed, without the consent of the Sudan, any work which would decrease the volume of water entering Lake Albert (now Moboto Lake).

e. The British-Egyptian agreement: As a result of an exchange of notes between the Egyptian Prime Minister, Mohamed Mahmoud Pasha and the British High Commissioner in Cairo, an agreement was reached in May 1929. Accordingly, strict systems of information management and scheduled flow of specific quantities of water to Egypt was guaranteed by Britain on behalf of the Sudan.

These undertakings, however, clearly reveal that:
1. Less concern had been paid to East Africa. This might be due to lack of interest, the existence of the biggest source of the Nile, Lake Victoria, in addition to the existence of a unified single colonial administration to all the territories, i.e., British.
2. Much concern was shown regarding the division of European spheres of influence and a single use of the river, i.e., irrigation.
3. Egypt and Ethiopia were the early riparians to voice concern for the Nile. Egypt due to its dependence for livelihood on the Nile, early development of nationalist movement and sharing the Condominium Rule of the Sudan (1899-1955) with the British-Ethiopia had been independent for centuries apart from short periods of Italian administration.

The present administration of the Nile basin is based upon:

a. The Sudanese-Egyptian agreement: In 1959, the governments of the Sudan and Egypt signed an agreement for the full utilization of the Nile waters. Basically, the agreement endorsed the 1929 British-Egyptian arrangement. Moreover, it gave rise to a joint institutional network known as the Permanent Joint Technical Commission for the Nile Waters (PJT).

b. The inter-state technical committee for the Lake Victoria catchment In 1967 and 1974, the committee was established in order to coordinate the actions of some riparian states regarding UN-assisted project for a comprehensive hydro-meteorological survey of Lake Victoria and its catchment areas. These riparians were Uganda, Kenya, Tanzania, Sudan, Egypt and later joined by Burundi and Rwanda.

c. The inter-state technical committee for the development of the Lake Tanganyika basin: Burundi, Rwanda, Tanzania, Zaire and Zambia established this committee in 1975, with the aim of developing Lake Tanganyika basin.
d. The inter-state technical committee for the Kagera River basin was established as a result of an agreement between Burundi, Rwanda and Tanzania in 1977, to prepare a plan for developing the water and land resources of the Kagera River basin. It is, however, clear that the present administration is less conclusive compared to the former one.

1. Ethiopia is no longer a participant although it is a core state. The Ethiopian Government has decided not to recognize past agreements with or between the metropolitan powers as binding.

2. The new territories of Zaire (Congo), Rwanda and Burundi have made no common agreement between them other than individually acceding to the membership of the Sudanese-Egyptian Permanent Joint Technical Commission.

3. Uganda became a member of the PJTC with loose communication with the other East African territories, i.e. Kenya and Tanzania.

THE POTENTIAL CONFLICT

Various reasons led to the belief that the Nile constitutes an area of potential conflict:

A. The vagueness of the present management
   It has already been pointed out that the present management of the basin is less capable of articulating overall participation by the riparians. As a result, some core members such as Ethiopia, are left out. Others were persuaded to accept, at least temporarily, a Sudanese-Egyptian agreement, which they did not negotiate.

B. The weakness of the 1959 Sudanese-Egyptian agreement
   In form as well as substance, the agreement proved poor. In the first place, it was stimulated by the short-term objectives of the governments of the Sudan and Egypt to accelerate the construction of the Roseires dam and the Aswan high dam, which were both dependent on external technical and financial assistance. In its format, the agreement lacks provisions for amendment, duration and a mechanism for solving differences. Moreover, it is full of unnecessary technical details which make it inflexible.

The substance of the agreement causes serious differences. Sudanese public opinion became convinced that it merely endorsed the 1929 agreement and that under rapid development the Sudan cannot be bound by either. However, the 1929 agreement was itself the subject of an opposing memorandum presented by the then Egyptian leader of the opposition and President of the WAFD Party, Mustapha El-Nuhhas Pasha, to King Fouad of Egypt on 16 May 1929 against Prime Minister Mohamed Mahmoud Pasha. Moreover, Ethiopia had already rejected the 1959 agreement to
which it was not a party.

C. Lack of reliable data
Despite efforts, the overall means of data collection regarding the basin are still insufficient. Without the full co-operation of all the riparian states, it became impossible to survey the Nile and ultimately, to impose the maximum level of control.

D. The need for external technical and financial assistance
By virtue of their underdevelopment, the riparian states have continuously depended upon external support. In several cases, this need has generated political pressures on the beneficiary. The former metropolitan powers, the United States, the Soviet Union, Israel and some financial agencies, such as the World Bank, have continuously influenced the basin. As long as the riparians lack co-ordinative attitude, this influence may have negative effects on bilateral as well as multilateral relations.

E. Failure to maximize the use of the Nile
Of the several uses of international rivers, joint activity is evident in only two areas: irrigation and the generation of hydro-electric power. Even these are still far from a maximization of benefits. As a result, there is a growing need for developing the other uses of the river. In the absence of basin co-ordination the possibility of conflict is greater when these uses have to be developed and utilized by the riparians individually.

Certain factors, however, have helped to postpone the eruption of conflict:
1. Political instability
All the riparians are exposed to political instability. Some of them have even experienced civil wars as in Ethiopia, Sudan, Rwanda and Burundi. Out of the four core states, only Egypt seems to enjoy a relative stability.

Political instability influences the situation in two ways: First, it disrupts internal plans for socio-economic development. As a result, the need for any particular use of the Nile may not be acute until some time later. Second, it disrupts the foreign relations of riparian states among themselves as well as regarding the external sources of finance and technical assistance. Political regimes under threat of instability, may avoid emphasis on the national objectives of their respective states. Moreover, delegates may remain in office without any real authorization. Thus, the absence of dynamic foreign policy.

2. Lack of consciousness
Illiteracy, weakness and low levels of labour skills are among the indicators of the common state of underdevelopment. High level of illiteracy in the riparians enables only elites, mostly westernized, to dominate the state
machinery. Weakness of communication isolates the masses from the recognition of their common interests. Unskilled labour means to depend on foreign skilled labour whether from another riparian state or from outside the basin. Ultimately, the governments and the peoples, may need some time until they become conscious of their demands.

3. External threats to the basin

External threats to any state means two things: (1) The diversion of resources and attention to that specific threat as a top-priority concern and (2) exploiting the threat, which may be real or artificial, in order to maintain a relative political stability. The main threats to the riparians can be classified into three; (a) Threat from a non-African power, (b) Threat from another riparian state, and (c) Threat from another African non-riparian state. Threat (a) is best seen in terms of Israel’s threat to Egypt, and hence, the Sudan. It is also seen in the presence of Cuban troops in Ethiopia and Angola, as well as in terms of mercenaries’ activity. Threat (b) is seen in terms of Kenyan-Ethiopian border tensions, Ugandan-Tanzanian occupations and Rwanda-Burundi tensions. Threat (c) is reflected by Zaire-Angola tensions and Kenyan-Somali border question.

All these threats in one way or another contributed to the situation of investment in security as a top priority. In most cases, a brief examination based on UN figures summarizes the situation as follows:

<table>
<thead>
<tr>
<th>Riparian/Main Objective</th>
<th>Security</th>
<th>Socio-economic Development</th>
<th>Power</th>
<th>Prestige</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burundi</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Egypt</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Kenya</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Rwanda</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Sudan</td>
<td>(1)</td>
<td>(2)</td>
<td>4</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Tanzania</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Uganda</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Zaire</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>

It is thus shown that:
- Egypt has the most relatively constant foreign policy in the basin.
- Rwanda and Burundi are over-occupied by political instability.
- A lot of similarities are shared by Kenya, Rwanda and
Burundi as well as between the Sudan and Uganda.
- Ethiopia, although a core state, seems to be delaying development; hence, plans for the Nile.
- Though Tanzania is giving priority to development, its role in the basin would rather become educative as it is not a core state.

Emphasis on security indicates that:
- Security is regarded as the most urgent question in view of poor consensus and the wave of modernization in some parts of the basin, especially urban centres.
- It is less costly financially as a short-run objective. Expenditure, though high, may be confined to annual budgets whereas economic development often requires heavy, long-term investment.
- Most of the underdeveloped countries, including many of the riparians, may disguise this need by seeking external support on economic and social grounds. By this means, loans may flow more easily and domestic opposition may, for some time, be bypassed.

Consequently, this situation implies that conflict over the river Nile may explode, if left untreated, under either of the following pressures:

a. Exacerbated foreign intervention - presently is most likely from the United States, Soviet Union and Israel and in the future may be most likely from South Africa, the international financial institutions and the multinational corporations.

b. Growth of public consciousness - is the result of the spread of education and the improvement of communications.

c. Genuine investment - the allocation of substantial resources for development, especially in the agricultural sector and industry, will increase the need to exploit the uses of the river to the maximum.

In the meantime, the interests of the riparians are seen as potentially conflicting regarding the uses of the river in the following manner: (see table page 11).

This situation implies that:
- Egypt is expected to be the most potential area of conflict in the basin. Its relatively advanced stage of development and power can be employed to serve the prosperity and welfare of the basin as well as applying pressure on other riparians. Already, open crisis has been experienced in the case of the Sudan during 1958.
- In many areas the relative homogeneity of East Africa may not be maintained. The economic interests of the developed territories may eventually undermine the positive effects of proximity, culture and history.
- Recreation is not expected to cause problems. This is basically because it is a unilateral territorial
activity, and is still largely conceived of as a luxury. 
- Only the core states tend to show more concern for flood control.
- Irrigation is important for the most downstream riparians; Egypt and then the Sudan.
- The generation of hydro-electric power and fishing attract the concern of all riparians.

<table>
<thead>
<tr>
<th>Index</th>
<th>Use</th>
<th>Major Beneficials</th>
<th>Possible Major Beneficials</th>
<th>Area of Conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Navigation</td>
<td>Sudan, Egypt, Kenya, Ethiopia, Uganda, Tanzania</td>
<td>Kenya, Uganda and Tanzania</td>
<td>Lake Victoria</td>
</tr>
<tr>
<td>2</td>
<td>Irrigation</td>
<td>Sudan and Egypt</td>
<td>Sudan and Egypt</td>
<td>Division of water and timing of flow</td>
</tr>
<tr>
<td>3</td>
<td>Flood Control</td>
<td>Sudan, Egypt, Ethiopia, Uganda</td>
<td>Sudan and Ethiopia</td>
<td>Blue Nile</td>
</tr>
<tr>
<td>4</td>
<td>Pollution Control</td>
<td>Sudan, Uganda, Kenya, Tanzania, Zaire, Rwanda and Burundi</td>
<td>Uganda, Kenya and Tanzania</td>
<td>Hydro plant at present and industrial impact in future</td>
</tr>
<tr>
<td>5</td>
<td>Hydro-Electric</td>
<td>All</td>
<td>Uganda, Kenya, and Tanzania</td>
<td>Jinja plantation</td>
</tr>
<tr>
<td>6</td>
<td>Diversion</td>
<td>Sudan and Ethiopia</td>
<td>(2) Egypt and Ethiopia</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Fishing</td>
<td>All</td>
<td>Zaire &amp; Rwanda</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Drainage</td>
<td>Uganda, Kenya, Tanzania, Burundi, Rwanda and Zaire</td>
<td>(1) Uganda, Kenya and Tanzania</td>
<td>1. Lake Victoria</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2) Rwanda-Burundi</td>
<td>2. Lake Kyoga</td>
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<tr>
<td></td>
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<td>(3) Tanzania-Burundi</td>
<td>3. Lake Tanganyika</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(4) Zaire-Uganda</td>
<td></td>
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<td>9</td>
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</tbody>
</table>
PROMOTION OF COOPERATION

Upon the established basis of potential conflicts, cooperation, in the absence of an international consensus and legislation, can be promoted adequately on two levels:

I. Declaration of guiding principles, and
II. An institutional network.

I. The declaration of principles requires political and voluntary consent on the part of riparians. These principles can be embodied in a charter or a common agreement to be signed by heads of states.

Such an agreement will be valuable if it consists of: (a) the governing principles, (b) procedures of consultation, arbitration and revision, and (c) a management mechanism utilizing the institutional network.

Most of the governing principles chiefly advocate non-intervention in the internal affairs of sovereign states, peaceful solution of disputes and the promotion of interdependence.

However, other specific complementary principles may be needed, such as:
- Willingness to exchange information regarding the river Nile by all riparians to all riparians.
- The exclusion of foreign influence such as by the multilateral consideration and consent, through the institutional network, of any external financing or managing of single projects in the basin.
- Acceptance of a Nile basin organisation with terms of reference.
- The acceptance of specific rules for maintaining equitable benefit in the use of the river, e.g., division of water for irrigation may be based on territory, the length of the Nile and tributaries flowing in that territory, population, present consumption of water, availability of alternative sources and projected future development.
- The cancellation of all existing agreements and readiness to negotiate new bilateral agreements if the use of the river is practically bilateral in areas such as navigation and considering this agreement as provisional until an international law for international rivers is endorsed by the United Nations or a similar world organisation in the future.
- Diversion and pollution should be the responsibility of all since neither can be shared by some riparians without affecting others.
- Other principles may also be needed.

II. The institutional network refers to the mechanism of the organization of the Nile basin, which has to operate in accordance with the guiding principles. A network of
this type is usually established according to terms of
procedures and specific operating bodies. The basic
procedures (as regards voting, finance, headquarters,
language and naming of the bodies) have to receive the
voluntary consent of heads of states, together with the
agreement. Details of the procedures and other matters
(such as the number and location of meetings, appointment
and tenure of international staff, etc.) can be drafted
by lower organs subject to ratification by the upper organ.

Regarding basic procedures, the following proposals may
be worthy of consideration:
A. Voting: by simple majority in lower organs, each state
is entitled to one vote. In the upper organ voting is also
to be by simple majority, but core states (Egypt, Ethiopia,
Sudan and Uganda) should be entitled to two votes each while
the rest are entitled to one vote each.
B. Finance: the following table, which is based upon
contributions to the United Nations budget for 1980, the
Kagera River basin commission, and classification of states,
is suggested. It is also planned in such a way that the
starting budget of the organization may be $10,000,000 and
no single country can dominate.

<table>
<thead>
<tr>
<th>index</th>
<th>riparian</th>
<th>UN assessment of contributions for 1980</th>
<th>classification</th>
<th>proposed contribution</th>
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</tbody>
</table>

C. Headquarters: Subject to the approval of the upper organ
of the organization, Jinja in Uganda, may be a convenient
site. Uganda is a core country and is located in the middle
of the riparians. Moreover, the East African hydro-electric
plantation is located in Jinja.
D. Language: For simplicity and unity, the languages of
the OAU may be used as equally valid official languages by
the organization - Arabic, English and French. The riparian
states speak the three languages. This, however, does not
exclude the possibility of using other local languages and
dialects on a limited basis at the local level for practical
reasons.
As regarding the organs of the organization, the following bodies are suggested: summit, commission and secretariat.

a. The Summit: consists of heads of states, meeting once every four years by rotation in member states. Extraordinary sessions can be called for upon the request of five or more members. It is entrusted with responsibility of approving the four-year plan of the organization, appointing the secretary-general, solving disputes between members, dealing with all questions related to the charter and any other matter which may be referred to it by the commission or the secretary-general.

b. The Commission: It consists of ministers of agriculture, irrigation, power and transport. Others may be added if necessary. Meetings to be held annually on a rotating basis in riparian states. Extraordinary sessions may be called for by five or more members. The meetings are to be presided over by one of the representatives of the host country depending on the agenda. Its responsibilities chiefly include the revision of the annual activity of the secretariat, recommending a secretary-general to be appointed by the summit, preparing the agenda for the summit and processing the development projects of member states.

c. The Secretariat: It consists of international staff, headed by a secretary-general, to be recruited from member states only. Senior jobs have to be approved by the commission upon the recommendation of the secretary-general. Its procedures to be governed by special regulations drafted by a committee of experts for approval by the commission. Responsibilities would include data collection and exchange of information among members, proposing development projects, making feasibility studies by request for members, preparing the agenda and organizing the meetings of the commission, organizing summit meetings and promoting research and training.

Structurally, the secretariat may consist of the following departments: (a) research and training, (b) conference services, (c) management and co-ordination, (d) legal affairs, and (e) projects evaluation. The first department is to be entitled with responsibilities for information, training and publicity. Under this department, the secretariat may favourably support the establishment of the following research and training centres under the direction of its permanent representative in these countries.

1. Fishery Institute – To be established in Zaire close to the borders with Burundi and Rwanda or wherever feasible.

2. Navigation Institute – To be established in the Sudan at a convenient location.
3. Irrigation Institute  - To be established in Egypt. Aswan is suggested as possible location.

4. Flood Control Institute  - To be established in Ethiopia. A state closer to Lake Tana is recommended.

5. Pollution Control Institute  - To be established in Tanzania. Dar es Salaam is recommended as a possible site.

6. Power Generation Institute  - To be established in Uganda. Jinja may be a convenient site.

7. Recreation Institute  - To be established in Kenya. Nairobi is recommended as a possible site.

A printing press and information officer may also be under the same department.

The second department (b) is entrusted with organizing meetings and conferences – the summit conference, commission sessions and the internal secretariat meetings. Moreover, it also arranges for the participation of the organization in related activities throughout the world. Coinciding with these responsibilities, a few units are needed: building and equipment, translation, invitation processing and travel arrangements.

The third department (c) is to be responsible for the general administration of the organization. Its specific units may include personnel, budget and auditing and decision execution.

The fourth department (d) is to be responsible for all legal issues concerning the basin. Specific units may be created as follows: attorney's office, advisory services and arbitration committee.

The fifth department (e) is concerned with the detailed processing of projects. The following specific units are recommended: feasibility committee, financing committee, assessment committee and developing committee.

The secretary-general of the organization represents one of its cornerstones. He must be one of the nationals of the member states, with a tenure of four years renewable, i.e. from one summit conference to the next. His responsibilities include the general administration of the organization, to act as secretary for the summit, and to report to the commission and the summit annually and when required by either of them.

CONCLUSION

The river Nile, as an international river, constitutes a unique case of legal and socio-economic complexities. It
meets the various world legal definitions at almost every level. Economically, it flows in a vast basin comprising a number of riparians who own the potential resources for comprehensive use. Socially, several divisible factors are observed between the riparians, especially linguistically, ethnically, religiously and colonial heritage. This natural setting of the river does not actually allow for adequate comparison with any other river basin throughout the world.

The study of the Nile bears to the researcher the question of classification and legal status. One way of classification is to identify various groups within the basin. In this study, however, the identified groups were: North African - consisting of Egypt and the Sudan; East Africa - consisting of Kenya, Tanzania and Uganda; West Africa - consisting of Zaire, Burundi and Rwanda, and Ethiopia. Another way of classification used here is to divide riparians into core, secondary and periphery states. Accordingly, the core sector consists of the Sudan, Uganda, Egypt and Ethiopia the secondary sector consists of Kenya, Tanzania and Zaire; and the periphery sector consists of Burundi and Rwanda. Legally, it is found that present stands on foreign policy regarding the Nile are either still basically colonial or a re-styling of these arrangements without substantial changes as the need might have deserved.

Solid grounds have been established indicating the existence of a potential conflict in the Nile basin. However, several factors have contributed to the delay in the explosion of the conflict. The central factor is the substantial investment of riparian governments in internal security measures rather than national development plans. However, they did not completely prevent the occurrence of some limited public disputes. Moreover, the future course of development reveals how interests may severely conflict if left uncoordinated.

In an age of world interdependence, the riparian states seem to have been left with no option for development other than recognizing the organic unity of the basin. Experience has shown that development is not a mere political manipulation of power by one riparian or another. It is the maximum possible exploitation of the potential of the basin for the common interests of people by the use of the most advanced technology and with a minimum of external involvement. Making use of this experience is taken to imply the adherence of all riparians to working principles as well as the acceptance of an institutional network capable of promoting cooperation.

Adherence, however, implies the voluntary consent of governments and peoples to a new agreement for the basin. Such an agreement will replace the old outdated and incompetent arrangement for development. Moreover, an
institutional network is proposed in this paper with specific bodies and regulation of procedures. Ultimately, an overall organization for the Nile basin is proposed for discussion and evaluation.

Nobody can adequately foresee the future. Regarding the Nile basin, it may be positively or negatively influenced by the following factors: the weakness or strength of Egypt as the most influential riparian; the weakness or strength of the other core states; the growth of Zaire as a possible financial power in the basin and the attraction of the basin to external involvement. Under the present divisible factors and low level of development, the riparians may take a long time to recognize the value of coming together.
THE ENVIRONMENTAL IMPACT OF THE
JONGLEI CANAL IN THE SUDAN

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1. Summary
The Governments of Egypt and the Sudan are at present jointly undertaking the construction of the Jonglei canal project with the object of increasing the Nile yield to meet their future water requirements needed for the expansion in irrigated agriculture. The contract for the excavation of the canal was awarded to the French contractor Compagnie de Constructions Internationales (CCI). Excavation is anticipated to be completed by 1985. After the completion of the topographical and hydrographic surveys, soil investigations and hydraulic model testing of the structures, the preliminary designs have now been finalized. The final design and the tender documents of the structures are expected to be ready for tendering towards the end of 1981. The canal, with a length of 360km, will run from Bor or Bahr el Jebel to the confluence of the Sobat and the White Nile, thus by-passing the sudd swamps. The discharge is only regulated by head works at the off-take in Bor. The alignment of the canal has been so determined that the local population will obtain maximum benefit and minimum interference in their way of life. By taking into consideration the results of ecological surveys and studies, damage to the environment can be minimized.

The expected yield of the project of about 5 billion m³ per year at Malakal, which will be shared equally between Egypt and the Sudan, will allow for the irrigation of approximately 600,000 acres in the Sudan. At a later stage, by developing over-year storage in the Equatorial lakes, the increased average flow will allow for the diversion of an additional 23 million m³ per day. The capacity of the canal has then to be remodelled to allow for the additional diverted flow.

2. Introduction
The conservation of water, the regulation of rivers for irrigation and hydro-power are matters of great economic importance in the world today, particularly in arid areas

* Formerly Commissioner, Executive Organ for Development Projects in Jonglei area.
like the northern part of the Sudan and Egypt. Increase in population and the demand for higher standards of living necessitates that natural resources be developed efficiently for man's benefit.

Of late the international community's attention was drawn to the expected increasing shortage of food especially in the developing countries towards the end of this century. Development and conservation of water resources were appropriately the main theme of the Mar Del Plata Water Conference held in March 1977. It was revealed in that conference that demands for food in the developing countries of Africa have been growing at an annual rate of 3.5% while supply projections show an annual growth rate of 2.5%. This means increasing food deficits. In the future production potential should be tapped and be directed to the urgent need for new strategies for the development of Africa's agricultural potential. In such strategies, water is crucial, both for the creation of new irrigation areas and for better management of existing areas.

An analysis of measured stream flows indicates that the total quantity of surface water in African rivers is of the order of 2,500 billion m$^3$ while total water use is about 90 billion m$^3$, or about 4% of the surface water resources of the continent. In other words, about 96% of the water resources of Africa are at present running to the sea with no productive use while the majority of African people remain undernourished and at the mercy of nature.

The International Water Conference noted the colossal underutilization of Africa's water resources and has called for immediate redress; particularly through control and regulation of lakes and rivers as well as reclamation and conservation of swamps. The latter, although they provide subsistence to local inhabitants, are wasteful because of their vast evaporation losses.

The Nile river system is a source of livelihood for the inhabitants of many countries. It makes possible irrigation schemes in the Sudan and Egypt. In East Africa and Ethiopia the waters of the Nile are a source of hydro electric power for industrial development and may be needed for irrigation in the future.

In this paper the Jonglei canal project, a joint project of Egypt and the Sudan, aimed at the conservation of approximately 5 billion m$^3$ net annually, will be discussed. The benefits, negative effects and the care which is being taken to ensure optimum benefits both for the local population in the southern Sudan as well as for the people of the northern Sudan and Egypt will be reviewed.
3. Jonglei canal project: conservation and development of water resources

Agriculture in the Sudan is the backbone of the economy, accounting for 40% of gross domestic production. The traditional agriculture sector, which is primarily subsistence-oriented, consists mainly of farming and pastoral activities which depend on rain for growth of crops and forage. Rain-fed agriculture constitutes 75% of 17 million acres annually cropped but accounts for only 30% of agricultural production. On the other hand, present irrigated agriculture using only 25% (1.6 million hectares = 4 million acres) of cropped land produces 50% of the agricultural production. Pastures produce the remaining 20%. It is evident from these figures that irrigated agriculture is of vital importance to the development of the Sudan.

The long-term plan for the agricultural development of 70 million acres aims at attaining self-sufficiency in food production and increased foreign exchange through surplus food exports. As the production of rain-fed agriculture is comparatively low and varies from year to year because of annual and seasonal variations in rainfall, expansion in irrigated agriculture is included in the long-term plan to ensure stable production of high-value, high-yielding crops.

At present, the Sudan is committed to using about 16 billion m³ of its share of Nile waters to irrigate existing irrigation schemes, in total about 1.6 million hectares (4 million acres). By the end of the century development of an additional area of 1 million hectares (2.5 million acres) is expected, bringing the total irrigated area to 2.6 million hectares (6.5 million acres). Development of this additional area requires about 8 billion m³ of water. Since so much water carried by the White Nile system is lost in the sudd swamps of Bahr el Jebel, Bahr el Zeraf, Bahr el Ghazal and the Sobat river, efforts are being made to reduce these losses to increase Nile yield for agricultural development in the Sudan and Egypt.

Hydrological studies indicate that annually about 42 billion m³ are lost through evaporation and evapotranspiration in the swamps. In the Bahr el Jebel and Bahr el Zeraf swamps system, known as the sudd, 14.5 billion m³ out of the inflow of 29 billion are lost by spreading and evaporation.

The idea of reducing losses by river spill and subsequent evaporation and transpiration in the sudd regions was first conceived in 1904 and since then, with the accumulation of hydrological data, various plans have been developed, such as the Veenvo-Pibor scheme (1932) and the Bahr el Jebel banking scheme (1958). Those proposals eventually led to the Equatorial Nile Project in 1946 and subsequent
modifications in 1948. The ENP was intended to save losses in the sudd swamps to establish over-year storage in the Equatorial lakes and virtual storage by coordinating its operation with that of Lake Tana Scheme on the Blue Nile and main Nile dams. In accomplishing these objectives, the purpose of the project was only to provide more water for irrigation in Egypt at the time of the year when the natural flow was inadequate. The Blue Nile and Atbara River come down in flood in July and provide more than enough water during half the year, but not enough during the remainder. It is thus during the period of water shortage that additional water was needed in Egypt, and the object of the ENP was to store water during the flood period for release when supplies from the Blue Nile and Atbara River ran short, thus ensuring a reliable and predictable amount throughout the year.

The ENP was studied carefully by the Sudan Government from 1946 to 1954 to safeguard the interests of the local inhabitants in the region. The Jonglei investigation team, which undertook the studies, accepted the proposed project in principle, but urged an alternative operating method to minimize its adverse effects. When Egypt committed itself to the High Aswan Dam, the Equatorial Nile Project was abandoned, since the new dam achieved the ENP's prime function as an over-year storage for Nile waters. However, in pursuit of a more efficient use of Nile water, the 1959 Nile Water Agreement between Sudan and Egypt stipulated that the two republics would undertake projects to increase the Nile flow, giving full consideration to the interests of the local inhabitants. In the spirit of this agreement, the Permanent Joint Technical Commission for Nile Waters proposed in 1974 the present Jonglei canal project to meet the water requirements of Sudan and Egypt in the late 1990s.

4. Hydrology of the upper Nile

The sudd region proper can be considered as beginning at Mongalla, the key gauging or water measuring point. The river enters this region in one channel, and leaves it in one channel towards the mouth of the Sobat River. Between Mongalla and where it meets the Sobat, the White Nile spreads out like a delta, forming vast swamps of papyrus and other vegetation. The sudd has a length of approximately 400 km, while its width varies between 20 and 100 km; the total area at present amounts to about 24,000 km². In periods with lower waterlevels the area of the permanent swamps will be about 10,000 km². In a normal year 29 billion m³ passing Mongalla are reduced to 14,5 billions at the tail of the swamps. The swamps delay the passage of water and vastly increase evaporation. Up to a flow of 65 million m³ per day at Mongalla the river runs in defined channels
and water passing Mongalla reaches Bor without excessive losses. At higher discharges the river spills in a series of valleys or flood-plain such as the Aliab valley which terminates at Lake Papiu where water spilt in the valley returns to the main river. Between Mongalla and Bor the river spills mainly over the left bank, the spill partly feeds the Aliab and partly results in inundations of the flood plains. Between Bor and the Atem head the Bahr el Jebel spills over both banks. The spill across the right bank partly feeds the Atem, while that across the left bank partly flows into the Aliab. Between Atem head and Buffalo cape the river looses itself in a multitude of channels and lakes. Buffalo cape is the end of the Bahr el Jebel system. The discharge there is practically constant whatever the flow at Mongalla is. At Lake No the Bahr el Jebel is joined by the Bahr el Ghazal, coming from the east, whence the river is called the White Nile. After about 120 km the White Nile is joined by the Sobat, rising on the western slopes of the mountains in southern Ethiopia.

Along Bahr el Jebel, White Nile steamers are providing a regular service between northern and southern Sudan. In the sudd, navigation is hampered by the occurrence of floating weeds and floating islands, the latter are of such magnitude allowing people to use them as a temporary bivouac, while travelling down the river. The appearance of the waterhyacinth (Eichhornia crassipes), since 1958, has greatly aggravated the nuisance of the floating weeds. It has been observed that within a couple of years channels get blocked, silt up and completely disappear, while new channels open up. In the wet season the appearance of inundation of the surroundings of the sudd is enhanced by extensive floodings as a result of the so-called creeping flow. With a land slope to the order of 10 cm per km, and soil consisting mainly of heavy, cracking clays, no defined pattern of drainage channels could develop.

Consequently the average rainfall of 800-1,000 mm annually causes widespread inundations, and locally a sheet flow develops to a depth of 0.30-0.50 m, with a velocity to the order of 0.05 m per second. In such circumstances it is difficult to distinguish between inundations caused by the river and those resulting from direct rainfall.

Bahr el Jebel receives most of its water from the Equatorial lakes, of which Lake Victoria is the most important. The outflow from Lake Victoria at Jinja has a reduced seasonal character. Upon the discharge from the lakes, those from torrents joining the river more downstream, are superimposed. As a result the discharge near Bor, just upstream of the influence of the sudd, shows a more distinct seasonal pattern. Over the period 1905-1942 the mean value of yearly maxima of 10 day mean discharges
amounted to $70 \times 10^6$ m$^3$/day, while for similarly defined minimum discharges the value was $50 \times 10^6$ m$^3$/day.

It is a well known fact that in the years 1962–1964 excessive rainfall in the Lake Victoria basin increased the levels of the lake by about 2 m. In fact such a high level was never recorded before. Although the average levels are decreasing since 1964, they still remain high. It is difficult to predict whether the level of the lake will go down and at what rate. Based on different assumptions about the extrapolation of the present trend, it may be expected that the level of Lake Victoria will be back at pre-1962 levels between 1990 and 1995.

Via the outlet of Lake Victoria at Jinja, Lake Kyoga and Lake Albert, the increased levels of Lake Victoria in the early 1960s also affected the discharge of Bahr el Jebel. The increased discharge caused dramatic changes in the sudd region, which largely escaped public attention because of political commotions which plagued the area by that time.

Zeraf island, situated between Bahr el Jebel and Bahr el Zeraf, which used to be densely populated, virtually vanished. Along the fringes of the sudd large areas have been inundated more or less permanently, the lowest levels in the sudd now being higher than the high levels before 1961. Also Jonglei, which originally was selected as the off-take of the Jonglei canal and from which the project derives its name, was completely flooded and is now uninhabited. It is surrounded by large swamps, which makes it unpractical to serve as the beginning of the canal.

The increased discharge in Bahr el Jebel also caused morphological changes in the river. The increased spill to the Aliab, which was moreover more persistent than ever before caused extensive new spill channels to develop. It is not known to what extent conditions will return to former circumstances, by which only at a discharge at Mongalla exceeding 65 million cubic metres per day spilling to the Aliab started. Sediment transport in Bahr el Jebel mainly consists of bed load. At Bor it is estimated at 500 m$^3$ per day. The increased discharge since 1961 caused considerable changes in the bed level of Bahr el Jebel.

The fact that bed load transport is by no means unimportant in the various channels in the sudd is demonstrated by the shift in the stage-discharge relation for the Atem near Jonglei. It is moreover proven by the fact that in recent years both channels of the Atem near Jonglei (east and west Atem) got blocked and silted up as well. Also Bahr el Jebel between Atem head and Lake Papiu got blocked and shows tendencies of getting silted up. The high discharges in Bahr el Jebel in recent years also
increased discharges downstream in the sudd. These increased flows probably also affected the bed level downstream of the sudd. The shifting in the stage-discharge relation for Malakal, also possibly has to be attributed to the fall in bed level.

5. Jonglei canal project
The present Jonglei canal project, unlike the Equatoria Nile project, mentioned in Section 3, does not envisage any modification of the flows from the equatorial lakes, but is simply to divert 20 million m³/day. Studies undertaken by the PJTC indicated that this amount of water could be withdrawn safely without undue changes in the sudd.

Jonglei canal initially was planned to take off from the east branch of the Atem near Jonglei. The complex of works envisaged included a head regulator and shipping lock leading into Jonglei canal, and a barrage in the Atem to guarantee sufficient flow into the canal. However, as explained before, recent changes in the regime of Bahr el Jebel made the choice of Jonglei less attractive. The main reasons are that Jonglei and a wide area around it are flooded and most likely are to remain so for a decade or longer, and that the channels are subject to continuous changes, so that the desired flow may not always be available at the point of off-take, moreover the entrance to the canal itself runs the risk of being blocked. It may be recalled here that in recent years both the east and the west channel of the Atem near Jonglei are completely blocked and silted up and that a completely new channel developed spontaneously, which now carries all the discharge of the Atem and Jonglei latitude.

To guarantee sufficient flow at the point of the off-take near Jonglei and to prevent floating weeds and islands from entering the Atem, embankments would be required along both banks of the Atem, beyond the Atem head, along Bahr el Jebel up to a point not far from Bor. In that case a barrage in the Atem at Jonglei latitude would no longer be required; but comparative studies indicate that shifting the off-take to near Bor constitutes a better solution. Up to just downstream of Bor, Bahr el Jebel flows through a well defined bed and a favourable point for the off-take of the canal would be identified there.

No barrage will be required in Bahr el Jebel, even when the flow falls below 486 m³/sec, a value which on the average is exceeded during 85% of the year, the required amount of 231 m³/sec can safely be withdrawn.

The layout and structures at the off-take of the canal are designed to facilitate navigation and the withdrawal of water. A regulator, a navigation lock and training works are being planned at the intake at Bor as well as training
Fig. 1: Possible alignments for Jonglei canal from Bor to Sobat.
works at the tail of the canal. Crossings across the canal for people and cattle are foreseen.

With the shift of the intake from Jonglei to Bor, the alignment had to be adapted, connecting Bor with the original alignment. It has been selected on the basis of social and environmental consideration, which will be discussed in some detail in Section 6.

6. Evaluation of the project

The benefits of the Jonglei project in terms of more water being available for irrigation are obvious. The 5 billion m³ per year extra water allows for irrigation of an additional 250,000 ha in Egypt and the Sudan. In the Sudan alone the increase in GNP is estimated at 35 million pounds annually. Of course the cost of developing areas to be irrigated has to be added to the total estimated project cost of 92 million pounds (including 18 million pounds for the development of the Jonglei region).

In Egypt and the northern Sudan, there are no immediate disadvantages. This could be different, however, in the southern Sudan, where the Jonglei project is situated. The project is the largest engineering work carried out in the southern Sudan so far and it will affect the environment and human life in various ways and the Government has long been aware of the possible effects of the Jonglei project. For that reason the concept of the Equatorial Nile project, by which in fact a reversal of the natural seasonal fluctuations in the Bahr el Jebel would result, was abandoned. This reversal of flow would have caused a reduction in the riverain (swamp) grazing area by flooding the area south of Jonglei and north of Malakal at the time of year mostly needed by the cattle owning inhabitants of the Jonglei area.

In addition, since under the ENP the flows in Bahr el Jebel downstream of Jonglei would vary through the year between 30-35 million m³/day only, the land between Jonglei and Malakal, as well as the area of open water swamps, would be reduced considerably, thus depriving the area of valuable grazing land and fish potential. Because of these adverse effects, the Jonglei investigation team proposed a revised operation by which fluctuations in flow would remain in phase with natural seasonal variations.

Jonglei canal, as it is conceived by the PJTC and which is now under construction, represents an adaptation of former plans with a view to the interests of the local population. The various local tribes, Dinka, Nuer, Shilluk, are for the greater part pastoralist. On the higher ridges they have their homesteads, where they live in isolation during the wet season. In the dry season the men move with their cattle towards the fringes of the sudd in search of
The Jonglei canal itself will be a new source for fishing. Surveys carried out indicate that the sudd is not very rich in fish. It is open water which offers conditions favourable for fishlife, and especially since the appearance of the water hyacinth in 1958, large areas have been covered with weeds, resulting in deoxygenation; mass mortality of fish has been reported in the sudd as a consequence. In this respect Jonglei canal will offer new opportunities for the fish industry, favoured with good connections to the outside world.

Next to human life, wildlife will also be affected by the construction of Jonglei canal. Extensive surveys have yielded fairly comprehensive knowledge about the various species, their numbers and migration routes which cross the canal alignment. At such places ramps will be made to facilitate the crossing of the canal. Besides, as mentioned above, pools of stagnant water will come into being on the eastern side of the canal from which wildlife will also benefit. In view of the flat slope of the areas such pools could be fairly extensive, offering a new habitat for various species.

Of course, there is some competition between man and animal, and this is likely to intensify with the increase in population and with the growing wellfare of the population. As can be observed in many other places, the opening up of an area hitherto isolated in itself poses a threat to wildlife. To preserve wildlife the creation of parks or protected areas will be necessary. They will have to be integrated with the other elements of development.

The Jonglei canal project is likely to have some influences on the environment. The operation of the canal reduces the flow through the sudd and a reduction of the sudd can be expected to some extent. In evaluating this aspect, it should be borne in mind that even without man-induced changes the sudd is not a static entity. It has always been subject to changes, depending on inflows through Bahr el Jebel. Since the early sixties the extent of the sudd has increased considerably; large inhabited areas were turned to swamp. The disappearance of Zeraf island, once densely populated, is a case in point. Even now annual minimum discharges at Mongalla are higher than the annual maximum discharges before the sixties.

Bypassing part of the inflow through Jonglei canal will help to restore conditions prevailing some decades ago and old grazing areas can be used again. Therefore, during the first years after starting operations, the effects of the extent of the sudd will certainly be beneficial to the local population and to wildlife as well. Thereafter, if the levels of Lake Victoria continue their present trend, the
sudd will be reduced compared to its historical extent. Present information suggests that the reduction will occur mainly in the reach Jonglei – Peake's latitude and along the Zeraf river. Extensive swamp will still remain, however. It is not easy to predict the actual effects of these changes.

For the larger part the dense growths over parts of the sudd are virtually sterile as far as animal life is concerned; the open water of the main channels and of the lakes are carriers for aquatic life and so are the fringes of the swamps for wildlife and cattle. A reduction of the sudd as a result of the canal will probably in the first place reduce the densely overgrown parts of the swamp, and not so much the open water areas, nor the borders of the swamp.

Therefore, in various respects some reduction of the swamp could be tolerated. However, studies are continuing, and more sophisticated devices, like a mathematical model of the sudd, can be utilized to predict the changes that can be expected. Fortunately, present abnormal high levels provide a "grace period" during which such studies can be carried out.

Another risk which a reduction in water levels in the sudd could entail is the effect of the ground water table on the underlying aquifer, which in that case could be expected to have serious effects in the surrounding areas, which to the north can be considered as semi-desert. The sub-soil of the surroundings of the sudd consists for the greater part of impervious heavy clay over the first few metres of depth, which most probably extends also into the sudd. The river channels proper may have sandy bottoms, but to what depth is not known.

Infiltration into the deeper aquifer therefore is an unknown factor, but from the point of view of the soils presumably it is not very large. Groundwater studies have been carried out in the regions surrounding the sudd. It appears that the sudd basin is closed, which is not in hydraulic conductivity with the surrounding Nubian basin, but with the Baggara and Eastern Kordofan basins further away.

Although the data are few, they all point to the fact that groundwater is flowing from all directions towards the central part of the sudd basin and not the other way round. Depth contours of the basin intersect the surface contours of lower elevations, indicating the possibility of discharge from the aquifer to the river channels and lakes in the sudd area. There is thus no room for the fear that the operation of Jonglei canal entails the risk of draining arid zones to the north.

There remains the question whether the reduction of the
extent of the sudd will influence the climate in that area or even over a wider region. From studies on man made large storage lakes, e.g. in Central Asia, Lake Nasser, it is known that the effect on the climate is not noticeable. This is also borne out by the fact that the considerable increase of the sudd in the sixties did not cause an increase in precipitation in the area. This is quite understandable if the quantities of water evaporating in the swamps are compared with the immense masses available in the atmosphere, even in arid zones, and if one realizes, moreover, that apart from the micro-climate in a very limited area, the climate in a region is governed by phenomena acting on a much larger scale than can be influenced by a localized event like an increase or decrease in evaporation in the sudd.

In summary it may be concluded that the Jonglei canal project not only has distinct economic advantages on a national level for both Egypt and the Sudan, but moreover can be beneficial to the Jonglei region proper. Careful planning and a comprehensive policy are prerequisites. In doing so a balance can be reached between the long-term interests of the local population and the preservation of a unique piece of nature.

7. Future development

Jonglei canal project, as it is programmed for implementation now, comprises only the first phase of a plan for the utilization of the water of the White Nile system.

Under the second stage flows in Bahr el Jebel will be regulated by overyear storage in the equatorial lakes. This clearly requires a concerted effort on the part of the different riparian states.

Progress is being made towards expanding the present Permanent Joint Technical Commission for Nile Waters to include not only Egypt and the Sudan but other countries as well. Such cooperation would be to the benefit of all countries involved, considering the enormous potentials for irrigation and hydropower.
THE JONGLEI CANAL

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The Sudan is the largest country in Africa with an area of 2.5 x 10^6 km². The annual precipitation increases from about 20mm, in the arid and semi-arid northern third of the country, to 400 and 800mm in the fertile central clay plains. In the extreme south it varies from 1200 to 1500mm.

The 17 million population increases at an annual rate of 2.8%. The annual per capita income is in the order of US$120. The backbone of the economy is agriculture and livestock production, consequently more than 90% of the population is working in the agricultural sector. Arable land is estimated as about 200 x 10^6 feddans (1 feddan = 1.038 acre). The area presently cultivated ranges from 16 to 17 x 10^6 feddans of which 4 x 10^6 are rainfed.

The main source of water for irrigated agriculture is the Nile, whose waters were historically shared between the riparian countries. The 1959 Nile waters agreement concluded between Egypt and the Sudan specified that the shares of the two countries would be 55.5 x 10^9 m³ and 18.5 x 10^9 m³ respectively. The agreement further stipulated that studies would be undertaken to formulate projects with the objective of increasing the yield of the Nile. The extra yield is needed for the realization of the envisaged agricultural expansion in the two countries. It should be pointed out here that in 1980 the Sudan was already utilizing its share of the allotted waters. One of those projects is the Jonglei canal project.

HYDROLOGY AND PHYSICAL BACKGROUND

The Nile is the longest river in the world with a total length of 6695km. Its headwaters are in the Central African Plateau, the Luvironza, a tributary of the Kagera river, a tributary of Lake Victoria. It then flows into the shallow and swampy Lake Kioga and through the northern part of Lake Albert. Thereafter it descends into the Sudan plains at the town of Nimule. Here, the river is called Bahr el Jebel which is the principal river as far as the present manuscript is concerned. The other two tributaries of the White Nile are Bahr el Ghazal, originating in the Nile-Congo divide, and the river Sobat flowing from the Ethiopian highlands.

Seventy percent of the discharge of Bahr el Jebel comes from the Equatorial lakes and 25% from torrential tributaries between Lake Albert and the town of Mongala.
Variations between flood and low flow are small. This is due to a routing effect of the lakes. The variations are due to the contribution of the torrential tributaries. The average annual discharge is $29 \times 10^6$ m$^3$ in the well-defined channel between Nimule and Juba (slope 1m/1km).

Further downstream, Bahr el Jebel enters the sudd swamps; which are probably the largest tropical swamps in the world. The word sudd in Arabic means obstacle or blockage, a very expressive word in the context. Not only has the sudd been almost impassable throughout history, but it has also been a barrier between Arab culture in the north and African culture in the south.

The actual size of the sudd is not known. However, it varies seasonally and annually between 6,000 to 100,000km$^2$. It is from 10 to 40km wide and 650km long. Sedimentation rate is 300-400mg/m$^2$/year. The adjacent region is savanna grassland and thorn woodland. The soil is impermeable alkaline clay and heavy loam. The slope is 10cm/1km.

The swamps can be differentiated into:
- The southern swamp: from Mongala up to 15km north of Bor. When the discharge of Bahr el Jebel exceeds $65 \times 10^6$ m$^3$/day it overspills the distinct alluvial banks and fills adjacent depressions. The largest depressions are the Alliaib valley (west) and Mongala-Jummeza depression (east). The mechanism is a self-regulating nodule. The reach is a featureless floodplain with an average width of 10km.

- The central swamp: an absolutely flat floodplain extending up to 40km. The area of the permanent swamp is about $6 \times 10^3$ km$^2$. The slope is 1-1.5cm/km. The water current velocity is 1m/sec. Depth of the river does not exceed 10m. Due to an increase in the water level of the Equatorial lakes between 1961 and 1965, the area of this reach has increased enormously. At present it is estimated to be in the order of 13 to $14 \times 10^3$ km$^2$. The central swamps extend northward as far as Lake N.

- The northern swamp: similar to the southern swamp. The floodplain extends to about 2km on either side of the White Nile from Lake No to Kosti.

Of the $29 \times 10^9$ m$^3$ of water entering the head of the proper swamp region, north of Bor, only 14 milliard leave the swamps at Lake No. The water is lost by seepage and evaporation. Contours of altitude lie between 420 and 380m asl.

Annual flooding occurs from July to November due to the combined effects of rains and the spill of rising rivers. The flood water spreads into the lower adjacent impermeable clay soil to distances varying between 2 and 80km depending on the micro-relief and the amount of rain and spill. Innundation is further augmented by the sheet flow from the adjacent highlands. During September and October only
a few ridges remain dry, on these the permanent villages of the Nilotic tribes are concentrated.

During the dry season rains and spill start, evaporation exceed water supply and consequently the process of drying out starts. This begins with the shallow fringes inland and moves towards the permanent swamps along the river channels. In other words, the hydrology of the swamps is dynamic with seasonally expanding and contracting temporary and permanent swamps. The temporary swamps, which are inundated for the greater part of the year, are known in the Nilotic languages as 'toich'. These are fringed by intermediate areas subject to periodic flooding and high-lands.

The rivers, the adjacent permanent and toich swamps show considerable general differences. The rivers exhibit the typical characteristics of flowing water and plug-flow. However, local influences are more predominant in the standing waters as compared to rivers, due to the fact that the rate of renewal of water masses is slower. The toich are an essential part of the ecology of the local human population and their livestock as well as wildlife. There are also some indications of their importance as breeding grounds for fish.

Climate
The south Atlantic ocean is the main source region of rainfall over southern Sudan (Howell 1954). Rainfall, however, is of highly seasonal nature. The wet season is between April and November with a peak during July and August. The mean annual precipitation is about 800-900mm. Variability in annual and monthly precipitation is perhaps the most important climatic factor affecting the ecology of the sudd area. The average monthly temperature ranges from 20 to 35°C, relative humidity during the wet season is near saturation at 80 to 90%. In the dry season it drops to 30-35%. The rate of evaporation (Piche) varies from 2.9mm in August to 20mm in February.

Soils and vegetation
A layer of organic origin, up to 1.5m, tops the saturated soil of the permanent swamps. 'This is composed of rhizomes, roots and plant litter resting on humified peat with mineral sediments, which lie deeper down in the river bed. Dark brown in colour, these soils are often slightly acid on the surface but alkaline deeper down. Oxidation of organic matter is very slow.' (Rzoska 1976).

In the permanent swamps the components of vegetation can be distinguished as a fringing wall of reeds three to five metres high, a tangle of climbers, submerged and floating hydrophytes and ferns. Occasionally woody plants are seen.
The species composition includes:
1. On the fringe: Cyperus papayrus, Vossia cuspidata, Phragmites mauritanus and Typha domingensis.

Eichhornia crassipes deserves special mention. It has acquired vast coverage since 1958 replacing competitively, Pistia stratiotes. The extent of this spread and the environmental consequences of control operations, especially chemical means, will not be discussed here.
4. Ferns: Dryopteris gongyloides and Azolla nilotica.
5. Woody plants: Aeschynomene claphoroxylon, Acacia parkinsonia and Capparis spinosa.

The toiches are dominated by Typha domingensis and the grasses Eichinocloa stagnina, E. pyramidalis, Oryza barthri and Phragmites mauritanus.

ECOLOGY OF THE SUDD

A total of twenty-three long-distance excursions have been carried out by the Hydrobiological Research Unit of the University of Khartoum, since 1952. Investigations were carried out on the 1823km stretch of the White Nile from Khartoum to Juba. Samples were collected from the main river, tributaries and adjacent water bodies, open water, between the reeds and under floating vegetation. A summary of the results of at least five excursions is given below:

Water characteristics
As expected the water chemistry of the White Nile reflects the soil characteristics and vegetational types within the catchment area. This is characterized by low mineralization of water as a result of weak lixiviation of the crystalline rock in the upper reaches. Thus the waters of Bahr el Jebel are of a very high chemical quality, resembling many other African rivers. However, a striking feature of the physico-chemical regime is the mode of changes in the content of dissolved gases and nutrients along the length of the river (Talling 1957; Bishai 1962; Monakov 1969 and Moghraby 1975).

During the passage of water through the sudd significant modifications take place. The overall effect is an increase in the total dissolved salts (shown by values for ionic conductivity) and in concentrations of calcium, magnesium, potassium and silicon. Sodium, phosphates and nitrogen, on the other hand, are depleted, while pH values remain
unchanged.

The chemical interactions occurring in the swamps are extremely complex. Papyrus swamps are known to take up chlorine, potassium, phosphorus and inorganic nitrogen, depending on water quality, discharge and current velocity. In other words, ions are immobilized by the swamp vegetation which continues to recycle them perpetually within the system. Trapped ions are only recycled when mats of water hyacinth and occasionally other macrophytes, break off from marginal vegetation, drift and subsequently decay within the main stream (Moghraby 1975).

Conditions in the sudd are different from those in estuarine swamps such as those of the Victoria Nile delta, in Lake Albert. There the swamps store chemicals during the dry season and release them during the rainy season, some to a greater extent than others. This "sludge fan" is important in the return of chemicals to aqueous solution. Storm flow during the wet season results in periodic flushing of the swamp system (Rzoska 1976).

Water current, however, deserves special consideration since its speed governs many physico-chemical and biological phenomena. In addition to longitudinal and cross-sectional variations in current, there is a marked and abrupt decrease in velocity near marginal vegetation. There is a slow or negligible current inside the fringe. Thus the fringes can be considered as a different habitat as opposed to conditions of free-flow outside. The same also applies to the masses of water between the roots of the large floating mats of water hyacinth.

Evaporation and evapotranspiration
Undoubtedly evaporation from such a large body of water has great hydrological significance. However, opinions differ as to whether or not evaporation rates are increased by the presence of vegetation such as exists in the sudd. Migahid (1952) calculated different evaporation rates depending on locality and monthly climate, but concluded on the whole that there were no differences between open water and papyrus stands. Penman (1963) concluded from his own experiments and evaluation of literature that 'transpiration from papyrus and evaporation from open lagoons will be equal'. Furthermore Rijks (1969) found out that evaporation from papyrus stands in Uganda was on 60±15% of the evaporation from open water. On the other hand, broad-leaved species like the waterhyacinth transpire water at a rate which is almost equal to double that of evaporation from open water surface.

Distribution and productivity of hydrophytes
The hydrological regime is the most predominant factor here.
Papyrus is always confined to permanent swamps. This is due to the inability of its soft rhizomes to penetrate hard soils. Papyrus is also sensitive to great variations in water level and water current velocity. Vossia can better withstand soft water currents. This is because its rhizomes are strong and flexible. Consequently Vossia is often found on the fringe of the free-flowing channels on river bends. It is also the dominant species occurring in the numerous oxbow lakes and adjacent lagoons. Phragmites can reach into the toiche in addition to its exuberant presence on the river fringes. Typha mostly inhabits shallow and semi-permanent waters. Papyrus, Phragmites, Vossia, Typha and Eichhornia make up 90% of the macrophytes in the sudd region. This is due to high productivity. The high rate of growth and the efficient utilization of nutrients enables papyrus for example to replace its biomass every 100 to 120 days (Thompson 1973). As much as 7cm of growth increase per day can be achieved during the active life (Migahid 1947).

Entomology
Of the large number of insects collected, about 120 species were of definite or prospective economic importance, including medical, veterinary and agricultural pests. Most of these, such as mosquitoes, chironomids and tabanids are aquatic or semi-aquatic during the juvenile stages. There are about 50 species of mosquitoes and at least nine of tabanids in the sudd region.

Other insects of economic importance are mainly species of Orthoptera, Hemiptera, Lepidoptera and Coleoptera; almost all are terrestrial.

Plankton
The phytoplankton is dominated by the diatom Melosira granulata and its variety angustissima. Lyngbya limnetica and Anabaena flos-aquae are also prevalent. The main stream contains less phytoplankton than the adjacent water bodies and inside the fringe vegetation. The reasons for the presence of such low densities are high rates of turbidity (euphotic zone below 50cm), swift current velocity, low nutrient content and extensive coverage by the water hyacinth.

The pure associations of zooplankton at the lake sources of the White Nile are apparently destroyed in the falls and rapids before reaching the Sudan plains. Bahr el Jebel carries traces of zooplankton and it is rich in detritus. On the other hand a rich fauna is found under the fringe vegetation and in adjacent water bodies. A total of 17 species of Rhizopoda, 39 Rotifera, one Conchostraca, seven Copepoda, 27 Cladocera, two Decapoda and one species of Chaoborus were identified.
Lake Ambadi can be cited as an example of the exuberance of plankton diversity. 205 species of Desmids have been identified (Gronbald, Prowse and Scott 1958), out of which 21 new species and 48 new forms were described. Phytoplankton in Lake No is in the order of 2300 cell/ml.

Benthos
The benthic fauna of the sudd is very poor and is composed of insect larvae, oligocheates, leaches and molluscs. The highest biomass found was 1.5gm/m³ in the vicinity of Lake Shambe. The midstream of Bahr el Jebel is almost devoid of benthos. This may be attributed to high current velocities, large quantities of suspended matter (mostly detritus) and low oxygen content. It is of interest to note that the percentage oxygen saturation of Bahr el Jebel is lower than in the majority of unpolluted rivers in the world (50-79%).

Fisheries
The waters of the southern region are very productive of fish. There are many indications to support this statement, although the paucity of available data makes it unintelligible to calculate standing crop and sustainable yields. At present the exploitation of this resource is a major item in the subsistence economy and the way of life of many people in the area.

The general impression is that the sudd swamps provide favourable conditions for breeding and growth of fish because there are very slight fluctuations in water level in the permanent swamps. Furthermore the rich macroflora is widely dispersed as substratum for oviposition and as sanctuaries and feeding grounds for juvenile fish.

Forty species of fish have been reported from the area (Girgis 1948). Nine of those make 80% of the total commercial catch. The most important species are Distichodus niloticus, Hetrotus niloticus, Mormyrus caschive and Lates niloticus. In addition there are six species of dwarf fishes that inhabit the fringe vegetation.

In general, the species found in the area are characterized by:
   a) high tolerance to low oxygen tension and their ability to use atmospheric oxygen, e.g. Claris, Polypterus and Hetrotis.
   b) Detritus feeders are most predominant, followed by phytophagous fish and predators. Typical planktonivors are not represented.
   c) Slow current dwellers like Labeo and Tilapia are scarce.

Wildlife
The seasonal occurrence of the rich wild fauna of the area is
influenced by the hydrological regime of the system. Situtunga (Limnotragus spekei) and the Nile Lechwe (Ontragus megaceros) can be found in the swamps in the dry season. Elephant, buffalo, Tiang antelope (Damaeliscus corrigum tiang) and oribi (Ouivibia montana) extend their range up to the river's edge during the dry season. Herbivores are followed by the feline predators. Hippopotamus is quite frequent (Moghraby 1973) and plays a role in changing local flow patterns by making deep tracks through the fringing vegetation. The sudd region probably harbours the largest populations of crocodiles in the world. This is mainly due to the vastness and inaccessibility of the region to hunters. Bird life is generally rich along the whole Nile, being one of the main routes of migration to and from Africa.

JONGLEI CANAL PROJECT

Because of the seasonal fluctuations in the flow of the Nile, sufficient quantities of water are not always available for irrigation purposes at a "timely period" in northern Sudan and Egypt. This has initiated intensive studies on the equatorial Nile and its control, since the turn of this century.

The concept of regulating the discharges of Bahr el Jebel was closely tied with storage in the equatorial lakes. Several alternatives have been studied. Eventually the diversion project was adopted. The original Equatorial Nile Project, submitted to the Sudan Government in 1938, consisted of a dam at the outlet of Lake Victoria, a balancing regulator downstream of Lake Kioga and a dam at the outlet of Lake Albert. It was intended to pass discharges reaching $90 \times 10^6 \text{ m}^3/\text{day}$ at Mongala, in the timely season (December–June) and $57 \times 10^6 \text{ m}^3/\text{day}$ during the untimely remainder of the year.

This would have been augmented by banking Bahr el Jebel. River Atem would have been remodelled and banked from its head to the village of Jonglei. From there two canals, each with a capacity of $27.5 \times 10^6 \text{ m}^3/\text{day}$, would by-pass the swamps to join River Sobat. This would have reversed the flood period of the river with consequential harmful repercussions to the local Nilotic tribes.

After 1952, the idea of over-year storage was entertained, in spite of the high values of evaporation. After the completion of the Aswan High Dam the idea of equatorial storage was abandoned in order to retain the natural regime of the river, thus maintaining the toich rangelands for seasonal grazing. The proposed Jonglei canal then was to carry $35 \times 10^6 \text{ m}^3/\text{day}$. Part of the swamps would have dried up.

An agreement was signed in 1967 by which the Technical
Joint Permanent Commission for the Nile waters was to develop the upper reaches of the Nile (studies are still going on). One of their proposals is the present Jonglei canal project. The outlines of the project as approved by the Sudanese and Egyptian Governments in 1976, are:

**Phase one:**
- Excavation of a canal with a discharge capacity of $20 \times 10^6$ m$^3$/day and a total length of 280km from Jonglei up to the mouth of the Sobat. The slope along the canal varies from 7-9cm/km, the average width is about 52m and the depth 4m. The canal is designed to be navigable and to use one of its banks as a compacted earth road.
- The canal structures comprise a head regulator and a tail regulator both incorporating navigation locks. This will shorten the distance from Malakal to Juba considerably.
- A regulator on river Atem at the Jonglei latitude. The dredging and banking of river Atem to improve its stipulated discharge capacity. Excavation of a canal with a capacity of $5 \times 10^6$ m$^3$/day running parallel to the Jonglei canal.

**Phase two:**
- The capacity of the canal will be $43 \times 10^6$ m$^3$/day.
- To use the equatorial lakes for long term over-year storage to equalize their natural flow.
- To improve the carrying capacity of the channels of Bahr el Jebel north of Mongala as well as Bahr el Zeraf to enable them to convey the flow of $75 \times 10^6$ m$^3$/day; with the end result of completely drying up the swamps.

**Present activities**

A National Council for development projects in the Jonglei canal area was established in 1975. It is concerning itself now with the execution of phase one of the project and the economic development of the area.

Activities are divided into sections:

**Natural resources section:**
(i) agronomy; establishing experimental demonstration farms;
(ii) livestock and pasture;
(iii) forestry;
(iv) wildlife;
(v) swamp ecology and fisheries.

**Social development and settlement section** (including public health).

**Industry and transport section.**

**Engineering section:** hydrology, design and supervision of actual engineering works.

**Pros and cons**

This project is one of the largest developmental projects in the Third World. However, there are many arguments for
and against it. The concern of many is that it will cause major environmental changes to one of the largest wetlands in the world. Some are worried that it will upset existing socio-economic systems of agriculture, livestock and fisheries, on which about half a million people depend, in addition to blocking migration routes of domestic stock and wildlife as well as access to tribal grazing lands. Many believe that available base-line information is not enough to justify undertaking such a large scale venture.

It is outside the scope of the present manuscript to answer all allegations in detail. It should be remembered, however, that not all changes are harmful and indeed not all changes are man made. The first phase of the project will result in the dessication of 10 to 15% of the present area of the sudd. It means that we still remain with an area which is about 40% larger than before 1965, assuming that no serious floods are experienced in future. To those who advocate "leaving things as they are" because of the "dearth" of baseline data, we answer by quoting a statement from the background document for the UN conference on Desertification "Action must not wait for complete knowledge. The need is recognized for immediate action in applying existing knowledge."

It is also worth emphasizing that the project does not only aim at obtaining $4.7 \times 10^9$ m$^3$/year of water for agricultural use in the north, but rather at developing the economy and the way of life in an area that has a primitive economy and an almost non-existent infrastructure. A great deal of effort and money are being invested into research and implementing pilot developmental projects to alleviate possible side effects whenever possible. An example of this is changing the alignment of the canal as well as the point of drawoff, from Jonglei to the town of Bor.

However, the second phase of the project, aiming at saving all the lost water and thus dessicating the sudd, will undoubtedly have far reaching effects. Fortunately, the second phase will not be carried out in the near future. Planning and implementation will probably take a number of years after completing the first phase in 1985. Thus time will be sufficient to conclude the on-going studies and to learn from the experience.

Policy makers should in the meantime be made aware of the ecological importance of this vast wetland as well as its potential economic value. It is estimated that each milliard cubic metre of water, when used for agriculture, should fetch $23.8 \times 10^6$ US dollars/year, i.e. the second phase would fetch a revenue of $333.2 \times 10^6$ $$/year. The alternative, of course, is to exploit the sudd rationally for tourism, sport, fishing, bird watching, hunting, crocodile farming and utilizing the macrophytes for making
fuel briquettes, biogas, (and easing the pressure on our woodlands by providing an alternative to charcoal), mulch and compost.

What applies to the sudd also applies to the Bahr el Ghazal swamps and the Machar marshes. The two systems retain as much as \(328 \times 10^3\) m\(^3\)/year of water of the total annual discharge of Bahr el Ghazal and river Sobat.

To the environmentalist the swamps are not only a gene reserve but a very productive and stable ecosystem. Certainly they should not be regarded as weed infested areas, covering potential agricultural land and evaporating water. Rather they must be treated as a productive natural resource; more efficient in utilizing water, nutrients and energy than man-made ecosystems.

SUMMARY

The Nile is the major source of water for irrigation in northern Sudan and Egypt. The need is more acute during the dry season, which coincides with the period of low flow of the Nile. Consequently intensive studies have been initiated, since 1904, on the hydrology of the Nile and its control. Dams have been built on the Blue Nile, White Nile and River Nile. The concept of storage in the equatorial lakes was entertained; in addition to the excavation of the Jonglei canal to by-pass the sudd swamps.

A vast amount of literature is available on the hydrology and hydrobiology of the Nile. Nevertheless the present manuscript is the first attempt to summarize published literature and unpublished notes. I have also attempted to outline the present Jonglei canal project, which is often confused with earlier suggested projects.

I advocate that the need for water and the present state of knowledge would justify undertaking phase 1 of the project, but not phase 2. Future papers (in preparation) will deal in detail with allegations that the excavation of the canal will have drastic ecological repercussions and will affect the way of life of the local Nilotic tribes.

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THE CHEMICAL CHARACTERISTICS OF WATER
FROM THE BLUE AND WHITE NILES

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I. Introduction
Previous studies of the chemical composition of the Nile water (Beauchamp 1956; Rzoska 1956; Talling 1957; Gay 1958; Bishai 1961) were mainly related to the biological activities of the river and no attention has been paid, so far, to geological controls on composition. Our study is intended to link the chemical nature of water in both Blue and White Niles to geological and hydrological environments.

Chemical analysis of water from the two rivers collected at Khartoum during four successive years (1971-1974) were used to study and interpret by graphical techniques (Hem 1959) the chemical characteristics of these waters. The analyses were carried out by the Central Chemical Laboratories of the Ministry of Health in Khartoum.

II. Results
The analyses of water are reported in parts per million of ions, approximately equal to mg/l because of the low concentration values. These units have been converted into milliequivalent per million in figures 7, 8 and 9.
1. Total dissolved solids:
The amount of soluble salts is slightly higher in the White Nile than in the Blue Nile. However, there is an obvious annual and monthly variation in both rivers (Figs. 1, 2). Thus the total dissolved solids of the White Nile slightly exceed 200 parts per million (ppm) in April and July of 1971 and 1972 but appears to be at a minimum (140 ppm) during October, November and December of 1973. The total dissolved solids in the Blue Nile do not exceed 200 ppm and the minimum of 100 ppm occurs in February (Fig. 2).
2. Total alkalinity:
The total alkalinity is considerably higher overall in the White Nile water than in the Blue Nile (Figs. 3, 4) but in detail it varies annually and monthly in both rivers. The maximum alkalinity of the White Nile water (150-200 ppm) usually occurs during May or April which coincides with the flood time of the river. The minimum total alkalinity (100 ppm) frequently occurs during September or October, when the river is low. The total alkalinity is highest in the Blue Nile water (130-150 ppm) during April, May and June but is low (70-80 ppm) in August, September
3. Total hardness
There are annual and monthly variations in the total hardness in water of both rivers (Figs. 5, 6) but hardness of White Nile water is usually less than that of Blue Nile water. Variation in the White Nile is between 60 and 90 ppm. In the Blue Nile hardness of water oscillates between 70 and 120 ppm, but reaches a maximum in June and July, at the beginning of the floods.

4. Cations
The main cations reported in the analysis of water are calcium, magnesium and potassium. The concentration of calcium is high in Blue Nile water and it rarely falls below 10 ppm. The minimum concentrations occur in February and May but the maximum (30 ppm) occurs in June and July. The content of calcium in White Nile water is fairly constant throughout the year (10-15 ppm) and rarely exceeds 20 ppm. There are insignificant monthly variations in magnesium and the concentration varies between 5 and 10 ppm in both rivers. The amount of potassium present in White Nile water is small being slightly higher (10-15 ppm) than in Blue Nile water, which has a monthly average of only 5 ppm. The monthly average content of sodium present in White Nile water is rather high, varying between 20 and 30 ppm, but rarely exceeding 40 ppm. The amount of sodium in Blue Nile water is distinctly lower and generally varies between 10 and 15 ppm.

5. Anions
The principal anions present in the Blue and White Niles are: carbonate and bicarbonate, (expressed as total alkalinity), chloride and sulphate.

The average chloride content in water in both rivers is low (10 ppm). The maximum concentration (25 ppm) usually occurs during the flood time (July and August for the Blue Nile and April for the White Nile).

The average monthly sulphate concentration in the Blue Nile (15-35 ppm) is slightly more than in White Nile water (15-20 ppm).

III. Base exchange index

This index = \( \frac{(x)_{rcl} - (rNa + rK)}{rHCO_{3} + rSO_{4} + rNO_{3}} \)

was calculated for water from both rivers. It can be used to predict the extent of base exchange which has taken place, its value increasing proportionally to the amount of base exchange (Schoeller 1959).
Chemical characteristics of Blue and White Nile water 45

Fig. 1 Variation of the total dissolved solids in the White Nile water 1971—1974
Fig. 2  Variation of the total dissolved solids in the
Blue Nile water (1971—1974)
Fig. 3 Monthly variation of the total alkalinity in White Nile water
Fig. 4: Monthly variation of the total alkalinity in the Blue Nile water.
Fig. 5 Monthly variation of the total hardness of White Nile water
Fig. 6: Monthly variation of total hardness of water of the Blue Nile River
Fig. 7 Semi logarithmic diagram to show the type of White Nile water

Low stage water
October

Flood time
April

Concentration in Equivalent part per million

10.0
1.0
0.1

Ca+2 Mg+2 Na+ k
Cl SO4 HCO3
Fig. 8 Semi-logarithmic diagram to show the type of Blue Nile water.

Low stage water (April)

Flood time August
Fig. 9 Trilinear diagram to show the chemical characteristics of water from the Blue and White Niles

- Blue Nile
- White Nile

1. Flood time
2. Low stage water
The ratio is very small for Blue Nile water (0.07 to 0.1) but it is relatively high for White Nile water (0.4 to 1.4). This indicates that very little modification by base exchange has occurred in Blue Nile water, whereas sodium and potassium ions have to some extent replaced magnesium and calcium in the water of the White Nile.

IV. Chemical classification
Water from the White Nile can be classified as sodium-potassium bicarbonate water (Fig. 7). It is dominated by alkali and weak acids (bicarbonates and carbonates) (Fig. 9). The following cation sequence is characteristic of the White Nile water:

\[ \text{Na} + \text{K} \text{< Mg} \]

The anion sequence is as follows:

\[ \text{HCO}_3^{-} \text{< Cl} \text{< SO}_4^{2-} \]

Water from the Blue Nile can be classified as calcium-magnesium bicarbonate water (Fig. 8). It is dominated by alkaline earths and weak acids (bicarbonates and carbonates) (Fig. 9). The following cation sequence is typical of Blue Nile water:

\[ \text{Ca} >> \text{Mg} >> \text{Na} + \text{K} \]

and the anion sequence is:

\[ \text{HCO}_3^{-} >> \text{SO}_4^{2-} >> \text{Cl} \]

V. Discussion
It is quite clear from these results that the content of soluble salts in both rivers varies both annually and monthly. Such fluctuations are evidently related to climatic and hydrological variations in the catchment areas, but it is at present impossible to specify and correlate such variations due to the limited data available. Fortunately, these temporal variations do not unduly obscure some basic differences between the water of the rivers.

The higher content of total dissolved solids in the White Nile may be due to the high evaporation losses in the sodd swamps (said by Talling, 1957, to be about "half of its waters"). On the other hand, the ionic composition may, we suggest, be broadly related to the rock types which predominate in their catchment areas. Apart from its Sobat tributary, the White Nile mainly drains quartzo-feldspathic metamorphic rocks and granitoid intrusions of the Basement
Chemical characteristics of Blue and White Nile water

Complex (see Table 1), and its high contents of alkalies were probably released by the weathering of alkalies feldspar. Our data do not show whether or not this feature is accompanied by a high content of silicon, but Talling (1957) records Si modest contents of about 5 ppm in the upper part of the river, with an increase to about 8 ppm due to influxes from the Bahr el Ghazal and Sobat tributaries. It appears, however, that the water from Lake Albert is considerably different from that in the main (Lake Victoria – Lake Kyoga) branch in having low Si (0.6 ppm) and high values for C (18 ppm) and hardness. These features may be due to equilibration of the Lake Albert waters with lime-rich young sediments which underlie the Rift Valley floor. In any case, it seems that the Lake Albert waters modify our general picture of the White Nile as a "Basement river", but do not entirely negate it. It is also likely that the initial tendency towards alkalinity* is enhanced by the modifying effect of base exchange (Andrew 1948). This may occur for example in muddy bottom sediments of the sudd swamps, which Talling (op.cit.) showed to cause marked drops in dissolved oxygen and pH. However, many of the changes imposed by the sudd are largely counteracted by the water of the Bahr el Ghazal and Sobat, which join the White Nile downstream of the sudd. Alternatively or additionally the silty and clayey bed of the river between the sudd and Khartoum may produce the high base exchange index remarked on in this paper.

The water of the Blue Nile is chemically dominated by calcium and magnesium, which we suppose to be derived largely from the weathering of the abundant ferromagnesium minerals (pyroxene and olivine) and calcium-rich feldspars present in the rocks of the Ethiopian plateau (Table 1, column 1). No great amount of base exchange is likely to take place in the bed of the Blue Nile because it is composed mainly of sand (Andrew 1948), and there are not extensive swamps along its course.

VI. Conclusions
Our conclusions are tentative and point to the need for more extensive sampling along the courses of both rivers, and at various times of the year. Despite seasonal variations in the soluble salt content we recognize fundamental differences in water chemistry between the two rivers and suggest:

1. The White Nile is characterized by Na-K bicarbonate water, and this is due fundamentally to the origin of

* Alkalinity = amount of Alkalies (Na-K)
Table 1: Composition of predominant bed-rock types in the catchment areas of the Blue and White Niles

<p>| | | |</p>
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<thead>
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<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>SiO₂</td>
<td>46.6</td>
<td>69.1</td>
</tr>
<tr>
<td>TiO₂</td>
<td>2.15</td>
<td>0.3</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>16.2</td>
<td>16.2</td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>3.8</td>
<td>1.3</td>
</tr>
<tr>
<td>FeO</td>
<td>8.45</td>
<td>2.0</td>
</tr>
<tr>
<td>MnO</td>
<td>0.23</td>
<td>0.1</td>
</tr>
<tr>
<td>MgO</td>
<td>6.65</td>
<td>0.7</td>
</tr>
<tr>
<td>CaO</td>
<td>9.6</td>
<td>3.0</td>
</tr>
<tr>
<td>NaO</td>
<td>2.85</td>
<td>4.0</td>
</tr>
<tr>
<td>K₂O</td>
<td>1.25</td>
<td>2.5</td>
</tr>
<tr>
<td>P₂O₅</td>
<td>0.44</td>
<td>0.3</td>
</tr>
<tr>
<td>H₂O (tot.)</td>
<td>1.8</td>
<td>0.7</td>
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Total 100.02 100.2

1. This average of 46 analyses of Ashangi basalts (from Mohr, 1963) is representative of the most extensive and voluminous rock type composing the Ethiopian trap series. The rocks contain 50-60% of Ca-Na feldspar, 20-25% pyroxene, 10-15% olivine, and 5-10% Fe-Ti oxides.

2. This approximate estimate of the average chemical composition of the (largely Archaean) Basement Complex of Northern Uganda and Southern Sudan is based on analyses of acidic and intermediate gneisses (quoted in memoirs of the Geological Survey of Uganda) combined in the ratio 3:1. These rocks contain, on average, about 70% feldspar (alkali feldspars predominating), 20% quartz, and 10% of ferromagnesium minerals mainly biotite and hornblende.
these waters from a catchment area composed largely of quartz-feldspathic rocks of the Basement Complex. However the modifying effects of base exchange in the sudd swamps and clay-rich bed of the river north of the sudd may have further increased the relative concentration of sodium and potassium.

2. The Blue Nile water is characterized by C-Mg bicarbonates, and water of this type may be expected to have been formed by the weathering of basic volcanic rocks of the Ethiopian plateau. There has probably been little modification by base exchange since the river sediment is sandy and there are few swamps.

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HISTORICAL ARCHAEOLOGY - AN AFRICAN VIEWPOINT

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There is a strong feeling among many of the historians active in African historical training and research, of a noticeable absence of the discipline of archaeology and archaeologists at large, in the process of writing the history of Africa. I have heard this argument twice this year. Once in the proceedings of a large gathering of African historians and archaeologists, at the University of Calgary, Alberta, Canada, on the occasion of the eleventh annual conference of the Canadian Association for African Studies, whose theme was African Studies in the 1980s. The second time was at a small but a very stimulating gathering in the University of Dharam, which heard a good number of papers on Studies in Progress on the Sudan. The essence of this accusation is a belief that these historians hold that African archaeologists are busy

Some definitions

A very simplified periodization of the age of man on earth would be prehistorical periods and historical periods. For practical purposes the line dividing prehistory and history is hard to define, yet as early as 1833 Tournal proposed that the age of man could be divided into prehistoric and historical periods. However the first modern use of the word "prehistory" dates from over one hundred years, in 1851 by Daniel Wilson. As prehistory means predocumented history of ancient man, as a point of interest or reference, history began in 3000 BC. The earliest writing yet found is on clay tablets from the site of Warka in Mesopotamia - modern southern Iraq, but it was not until several hundred years later that writing was used widely for keeping records and for communication. By 2000 BC most of South West Asia was under the political influence of literate people. However, if we have to stick to the definition of prehistory as the time before man learned to write and therefore record his career on earth, the Neolithic stage would be considered as a historical
period in most parts of the Middle East, the Nile Valley and the Mediterranean. But still these early records do not tell us much about the cultures of these areas, and there is no way to know something of their cultural history or their lifeways except through archaeology. In the Sudan, for instance, we have Egyptian inscriptions as early as the third millennium, Meroitic writing beginning in the second century BC and going on to the third century AD, then Nubian, Greek and Coptic from the sixth to the 15th century AD. Yet, all we know about Sudanese history till the sixteenth century AD is what archaeological excavations have revealed and much work is still in progress. It is impossible to call this long period of Sudan history as historical, as it would be untrue to call it prehistory.

So it seems that we have to avoid dividing man's past on the basis of the presence or absence of literacy. It would be more reasonable to divide it either into more periods as the British did when they divide their history into "prehistory" extending from the beginning of life on the Isles to the Roman invasion in the first century BC, "medieval" from the Roman invasion to the fifteenth century AD, 1485 the establishment of the independent British Church, and "post-medieval" or "historical" from there onwards, taking important political events as points of division; or we have to leave aside this generalization and divide the "age of man" in each country on a local basis.

The French archaeologists preferred to divide the "age of man" into three, prehistoire, protohistoire and histoire. While, for instance, in the British Isles prehistory is used to mean all time before the Roman Conquest, most Frenchmen use the term prehistoire for the Neolithic, Bronze and Early Iron ages. It is interesting that in the Abbe Breuil's presidential address to the jubilee meeting of the French Prehistoric Society, held in November 1954, the prehistoire whose perspective and progress he is describing is entirely the study of the Old Stone Age, the period of man's past which some British scholars call "absolute prehistory" or "primary prehistory".

It has always been assumed that archaeology is the means to explore the prehistorical age of man and that history is the means to explore the historical age of man. This assumption is no longer valid. In this age of interdisciplinary science there is no belief in an enclosed discipline! As a result there are a number of disciplines that help to explore the age of man. Archaeology remains the main technique of acquiring the required data, but anthropology, physical and social geology, geography, physics, chemistry and mathematics, among others, all combine to give the whole picture of man, his environment,
and socio-economic complex of prehistory. However, the fact that the same phenomenon works for the exploration of the historical periods of man is still beyond the understanding of many academics, especially historians. It might be difficult, as yet, to demonstrate how geology, physics, chemistry, mathematics and the like help us to understand history, but definitely archaeology does.

The main differences between prehistory and history comes from the answer to the question: Who? and When? The historians answers Who? in terms of personal identities while the prehistorian is forced to ignore almost entirely the part which must so often have been played by dominant personalities. The raw material of prehistory is not men but things of different kinds and diversity. So chronology is not one of the historian's preoccupations, simply because the records which form his raw material are either dated directly or indirectly and from internal evidence. History takes dates in small figures while archaeology always takes big gaps, 100 years and more.

There is a sharp contrast between documentary history and a view of man's past reconstructed from the archaeological record. In the first place, the historian works with accurate chronologies. He can date an event certainly to within a year, possibly even as closely as a minute or a second. Secondly, his history is that of individuals, groups, governments, and even several nations interacting with each other, reaching to events and struggling for power. He is able to glimpse the subtle interplay of human intellects, for his principal players have often recorded their importance or deeds on paper... On prehistoric sites, however, the archaeologist can at best only obtain a generalized and blurred impression of the period when a particular site was occupied. He is dealing with periods of human development and with broad patterns of human cultural change and behaviour. His chronologies are less precise and the dates of occupation and abandonment of prehistoric settlements can rarely be established within such a precise limit as a decade, let alone a year. The artifacts found in the excavations of the archaeology present the results of human behaviour. They are anonymous, and rarely reveal the names of their owners.

Still the claim of some Old World archaeologists as being some kind of historians is conceded, since archaeology, as the study of man's past through his material culture, constitutes a body of techniques which can be applied to 'any' period of the past including those of relatively recent ages which are the proper domain of the historians. The kind of questions which archaeology is fitted to answer in the historic periods are questions concerning technology
and economic basis of living. When the regess of time diminishes the contribution of written sources to the "native of history", or when the details of political events supersede those of day-to-day existence or the trivias of village life, archaeology comes in to fill the gap. In this sense, this branch of archaeology is historical as opposed to prehistoric, in whose domain history cannot give any help.

One inevitable question among the people concerned with study of ancient man is: what is archaeology? In answering this question most archaeologists had in mind prehistory or prehistoric periods of man, and obviously their definition was limited to what they had in mind. New approaches to this science are incorporating the past and the present.

The basis of archaeological theory must include the observation, measurement, and explanation of man's imprint upon his world. The works of man, from earliest times to the present involve changing the environment in an orderly manner, and it is the order in this change that the archaeologist attempts to explain... the sine qua non of archaeology is a concern for the relationships between man's visible and measurable modification of his environment and his invisible and less measured social and ideological life... The proper concern of the archaeologist is the totality of material culture, whether old or new, buried or superficial.

Ivore Noel dealing with the same topic tells us:

It is, I believe, high time that the definition of archaeology be brought up to date, and if I may be permitted to aid the geographers, I would suggest that archaeology be described as the study of the material remains of both the remote and the recent past in relationship to document history and the stratigraphy of the ground in which they are found.

This would also mean that the limitation of the aims of archaeology that resulted as the limitation of its definition, should be looked into. Reconstructing cultural history, reconstructing past life styles and the study of cultural process, are the main aims of prehistoric archaeologists. In historical periods documents help in fulfilling these aims. Yet the historical archaeologist worries about them. He worries about the nature of the documents he uses: How reliable they are? How complete they are? He begins by suspecting his documentary data, sieves out the political part and see if anything is left to tell much about the common people and their day-to-day life and activities. So he is mainly supplementing history.

Many of the modern nation-states are the result of wars. The Arabs who were in Arabia throughout history spread to
other parts of Asia, Africa and the Mediterranean with the coming of Islam and formed an empire, a substantial part of which exists now in the form of about fifteen countries. Europeans defeated the indigenous peoples of the Americas and established their own culture, language and religion as the cultural elements of their new lands. In addition to supplementing the historical record, archaeological study of these nations sheds light on the process of acculturation of the indigenous populations and the conquerors. An example of this aspect comes from the New World, from the recent work at La Purisima Mission in Lompoc, California, fifty miles north of Santa Barbara. Following the destruction of the original mission, Purisima Vieja in 1812 by severe earthquake, the fathers moved to a new site and rebuilt. By 1814 they had constructed a long barracks building formed of continuous two-room units to house the neophytes, each unit occupied by a nuclear family group. The only Indians not housed in this structure were unmarried adolescent girls, who were confined to separate quarters. Careful analysis and comparison of the inventory from the barracks with assemblages from contemporary aboriginal village sites in the same area produced a striking pattern. Aboriginal artifacts from the barracks were divided into two categories, those reflecting male activity and those representative of female activities. Artifacts of male association were extremely rare; only a scant handful of stone knives, points, and scrapers were encountered in the entire structure. Furthermore, waste flakes which would have resulted from the on-the-spot manufacture of stone tools were virtually absent. Female-associated artifacts on the other hand were just as common as in contemporary aboriginal village sites. Bowls, mortars, pestles, baskets, manos, and metals form the vast majority of the aboriginal assemblages from the barracks. Since we know from the historical record that adults of both sexes occupied the barracks, and since the walls and floors of the structure provided close spatial control, the explanation of the differential rate of material culture loss could be made with confidence. Indian males underwent a rather profound change in roles, with herding, farming and crafts replacing the older hunting and fishing pattern. Females on the other hand probably continued to perform domestic tasks not too different from those of pre-contact days. The result is seen in the assemblage from the barracks, with almost total loss of material culture reflecting aboriginal male roles and little if any change or loss in the female-associated sub-assemblage. The study of the present day Nubian culture clearly demonstrates the existence of non-Islamic traits. Yet
documents speak about Medieval Nubia, after the Islamic raids and defeat of the Christian Kingdom of the period, as a land occupied by Arabs and having Arabic culture. Archaeological and linguistic studies have shown that many groups of Arab tribes that raided Nubia and settled were Nubianized. In spite of the treaty, the Bagt, that was signed by the Nubians and the Arabs in AD 652, in which it was agreed:

You (the Nubians) may enter our country as settlers and we may enter your country as travellers and not as settlers. You shall protect those Muslims or their allies who carry or travel there until they leave. You shall return to the land of Islam the run-away slaves of the Muslims; you must not take possession of them nor hinder any Muslim who comes to take them and you must render him assistance until he leaves your country.

We have strong evidence of Arab settlers in Marris (lower Nubia) as early as the tenth century. Their gradual spread is marked by a series of dated Islamic tombstones: Tafa in 832, Kalabasha in 929, Gertas in 933, and Derin in 1027. These Arabs seem to have gradually developed as an administrative and political unit. The Fatimids who ruled Egypt in the years 969-1171 recognized this unit when al-Hakim asked Abi al-Makarim to arrest al-Waleed Ibn Abdel Malek of the Umayyad house, who happened to flee from Kairawan to advocate against the Fatimids rule in Egypt. Abi al-Makarim arrested al-Waleed and he was named Kanz al-Dawla in the year 1006. This was the official recognition of the state of Benu Kanz al-Dawla which played an important role in the history of Medieval Nubia. In this way a Nubian-speaking area was segregated from the main Nubian-speaking area to the south. Moreover a new population with a different language and a different culture dominated it, if not numerically, politically. The newcomers imposed their religion on the Nubian of the area, but they adopted the Nubian language and the Nubian way of life. These two facts, the segregation from the Nubian-speaking area to the south and the influence of the newcomers, were bound to diverge the Nubian language spoken in the area. This is how, it seems, the Kenzi-Dongolawi dialect of the Nubian language of the present day came into being.

Prehistoric archaeology differs from the historical primarily because the former must rely solely on the evidence of artifacts about which nothing is known except what prehistorians are capable of finding out. This is not so in historical archaeology, where there is documentary evidence to identify most of the relics. While the prehistorian tries to classify his data on the basis of its own merits alone, devising quantitative and qualitative categories for different types of ware, for example, such
categories often have neither value nor meaning, for, the
historical archaeologist who possibly finds a document
containing the necessary information of the place, date,
factory and sometimes the potter's original name for his
product. The ability and experience to dig correctly and
the thorough knowledge of the history and objects of the
period of the site being dug, are the first qualifications
needed by a historical archaeologist. Training in social
anthropology is not really needed in the case of the
historical archaeologist and training in history is far
from important. This is not to suggest that anthropologists
are unnecessary, only that initially they do not know the
documentary sources essential to the study of historical
artifacts. However the example cited here to demonstrate
the acculturation of the aboriginals in Lompoc indicates
that there is considerable anthropological and historical
value to the archaeological study of European sites in
North America, a fact that can be true anywhere in the
world.

The work of the archaeologist generally involves the
formation and refinement of concepts, data gathering and
processing, interpretation of the data and, finally,
synthesis. The four tasks are obviously related in a
hierarchial scheme. Concepts enable meaningful synthesis;
synthesis depends on interpretation and interpretation is
ultimately founded on archaeological data, obtained through
excavation. This is the archaeologist's first and main
concern. One disadvantage of excavation is that it is
necessarily destruction, so unrepeatable. This means that
the product of an excavation cannot be experimented with.
However historical archaeologists speak about "above-
ground" archaeology and quite interesting work has been
done in New England and in the States. In this case the
archaeologists were not dealing with excavated evidence;
all of their artifacts are on the surface and field equip-
ment was only pencil, paper and camera. The material
subject of this work was over 100,000 gravel-stones of the
late seventeenth, eighteenth and early nineteenth
centuries.

These artifacts constitute a unique and powerfully
controlled context in which to refine and develop
archaeological method and elaborate archaeological
theory. They are particularly suited to this purpose
since they were the product of a folk culture, and their
spatial, temporal, and formal dimensions can be
controlled to a very high degree. Each stone has a date
inscribed, the location of manufacture is known, and
relationships between styles can be clearly delineated
through our knowledge of their carvers. With such control
on the primary dimensions of archaeological variations
it is possible to measure diffusion rates, to relate stylistic change as it reflects social differences, and to postulate and test a host of other aspects of variation in a class of artifacts as reflects changes in the producing culture.

To test if the shared styles and types of these gravestones indicate social interaction, maps were prepared to display the distribution of gravestones made by individual carvers in south-eastern Massachusetts and adjacent Rhode Island. The resultant patterns of distribution were quite irregular in shape, showing their response to different restraints and incentives imposed by the society. Identical types of maps were prepared to exhibit last name distribution in the same area, using surnames taken from the same stones. Both surname and gravestone-style distribution were virtually identical, lending strong support to the proposition that product distribution in the form of stones, idea distribution in the form of the designs, and the distribution of related individuals followed the same irregular pattern of dispersal. This experiment is repeatable and is supported from historical data. An assumption of coincidence between material objects and related people can be made with greater confidence than is possible in situations where such vigorous controls are lacking.

Linguists and philosophers are great helpers to historical archaeologists. The French scholar Jean Francois Champollion (1790-1832) who deciphered the ancient Egyptian hieroglyphic writings and Sir Henry Creswick Rawlinson (1810-95) who deciphered the Mesopotamian cuneiform, are as important as the many famous Egyptologists and Middle East archaeologists in the Sudan. Archaeologists working in Lower Nubia were faced by a problem which seems to be a population shift or depopulation of the area in different periods of history. Material evidence from the area gives a picture of intensive late Meroitic settlement around the second cataract, and in some cases much farther north, starting about the beginning of the second century AD, but fails to give the political nature of this settlement.

Since virtually no inscriptions written by people of Meroitic origin are found in the Dodecaschoenous before the beginning of the third century AD from the end of the first century BC, one may reasonably conclude that for 200 years this region was closely bound to Roman Egypt as a buffer area against the southern peoples (the Meroites) economically, religiously and politically. When the Meroites returned, they apparently infiltrated the priesthoods of Daka and Philae with the acquiescence of the weakened Roman authorities. Inscription No. 421 from Philae, the earliest text from this period which can be
certainly and exactly dated, shows that Meroites recognized the authority of the Roman Emperor as something nearer and more real than that of their own king. Only ambassadors from Meroe such as Pasan, in inscription No. 416, from Philae also, were careful to distinguish between the Roman Emperor whom he called "the lord of the people of Philae", and the King of Meroe whom he called "our master the beloved son of Isis". Nevertheless many other inscriptions show that leading nobles of Lower Nubia long maintained their Cushite court titles, sometimes journeyed across the desert to live in Meroe for a time, and even had influential relatives there.

These are only examples of how linguists and philologists complement the work of historical archaeologists, and we could get into hundreds of them, while the prehistorian will politely ask them to keep their services to themselves! as he will do with the historians! He would do better with the help of a geologist and a paleontologist! However whether an archaeologist is a historical archaeologist or a pre-historian, he will survey, plan, set up, direct and record a dig in the same standard archaeological way. There is not that much difference in their means as in their aims. When surveying or looking for a site, the historical archaeologist may get some help from documents. Heinrich Schliemann's discoveries at Troy and those of Arthur Evans at Knossos in Crete resulted from judicious use of historical sources and careful observation. The prehistorian has only surface scatter and archaeological logic. But there is no absolute standard procedure for archaeological field work and it must be borne in mind that every archaeological problem requires a slightly different solution. Not only that, but dealing with them, whether they are prehistoric sites or historic sites, requires different approaches.

Historical archaeology, then, is the study of the material remains from any historical period. Such a definition does not create historical archaeology with the presence or absence of writing, although there is a vague correlation between level of cultural complexity and the appearance or acceptance of writing. Historical periods are those periods in which the cultures in question have a documentary record and that writing is having a full impact on both the cultures studied and on the scholarship of the investigation.

Historical archaeology is proposed as a general term, equivalent in many ways to prehistoric archaeology. It is viewed as covering a subject matter which in no sense is a unified historical entity. The unity of historical archaeology is primarily technical and involves the methodology of investigation more than the subject matter
under investigation.

Being a sub-discipline of archaeology as prehistory, culture history, ethoarchaeology, rescue archaeology,... etc., historical archaeology employs the known methods, techniques and approaches of archaeology. And, as all the different sub-disciplines of archaeology have some unique characteristics, historical archaeology has a unique aspect. That is its relationship with history.

The different branches of historical archaeology include: classical archaeology, Assyriology, Egyptology, Biblical Archaeology, Nubiology, Islamic archaeology, Iron Age Archaeology, historic site archaeology, among others. All these names are self-explanatory, except historic site archaeology which needs to be explained, especially since it is always confused with the term historical archaeology.

Linguistically historical means, pertaining to or of the nature of history, while historic means, well-known or important in history. Drawing on Harrington and Fontana it is proposed that historic site archaeology be defined as the study of material manifestation of European culture into the non-European world starting in the 15th century and ending with industrialization, or the present, depending on local conditions. In contradiction with historical archaeology, historic site archaeology deals with a specific historical subject that has temporal, spatial, and cultural boundaries... chronologically it would see its inception in the 15th century perhaps with 1415, the date of the fall of Ceuta signalling initial Portuguese penetration of Africa, as an arbitrary but generally agreed upon point. Geographically its boundaries fluctuated from decade to decade but are fairly well documented. Culturally a more complex problem arises because not only the European cultures in question are involved but also the degree of acculturation in indigenous societies.

The case of Africa

The students of African studies always divide the continent into different regions merely as a convenient point of reference. For the purpose of this paper it is being divided into: North East Africa, North West Africa, East Africa, West Africa, North Central Africa, South Central Africa, and South Africa. Some of these regions have been archaeologically explored since the beginning of this century, while some are scarcely known. However, archaeology and archaeologists are now venturing into the archaeology unknown regions of Africa. A quick glance at the reports published in Nyame Akuma, demonstrates this fact clearly. The cultural development of most parts of
Africa cannot be fitted into the three age system, widely used to classify archaeological periods. That is: stone age, bronze age, and iron age.

In Africa the Iron Age has a special significance. Over most of the continent there was no preceding Age of Bronze. In most of Africa iron was the first metal to be worked by man. In most of Africa iron tools replaced tools of stone, and in much of the Continent these stone tools were not even those of the more advanced, ground and polished kind made by Stone Age farmers. In nearly half of Africa iron tools and weapons replaced stone tools of the kind used by men who were still hunters, gatherers and fishermen rather than farmers and stockbreeders. In most of Africa south of the Equator the coming of the Iron Age marked the beginning of deliberate food production. In much of Sudanic Africa, between the Sahara and the Equator, Stone Age food production was, so far as we know, a sparse and fragile development, spanning little more than a thousand years before the coming of iron. Only in the northern third of Africa, in Saharan and Mediterranean latitudes, did cereal production and stock-raisin spread in the fifth and fourth millennia B.C., at a period comparable with their dispersal through western Asia and southern Europe. And only in these latitudes was a period of Stone Age agriculture succeeded by a well-defined Age of Bronze. Taking the continent as a whole, the ten thousand years before Christ were those in which Africa slept. In the Iron Age it began to re-awake, although the process took a thousand years to spread from one end of Africa to the other.

This means that all African societies south of the Sahara were still living in a prehistoric level during the historical period. The picture becomes more complicated when we remember that many parts of Africa were invaded by different peoples during the historical period. These include Phoenicians, Greeks, Romans, Arabs and lately Europeans. As a result of all this, different branches of historical archaeology developed for the archaeological studies of the different regions of Africa, during the historical epochs. These are: Egyptology in Egypt; Nubiology in the Sudan; classical archaeology in North West Africa; Iron Age Archaeology in sub-saharan Africa; and Islamic archaeology in North East, North West, and East Africa. It is not in the scope of this paper to discuss the outline of these or their historical developments; but a wide range of readings is given in the bibliography for those interested.
Notes

1. The proceedings of this conference are now in press. They will be published in two volumes under the title: African Studies Into The 1980s.
2. This was an informal meeting between scholars and Sudanese and non-Sudanese post graduate students of Sudanese studies from some European universities. They discussed studies in progress on the Sudan.
4. Ibid.
10. Ibid.
12. G. Daniel, 1975. A Hundred And Fifty Years Of Archaeology
25. Ibid.
27. Ibid.
30. Ibid.
33. Ibid.
36. Robert L. Schuyler, 1970. 'Historical and Historic Sites Archaeology'.
37. Ibid.
38. An organ of Africanist archaeologists of America, published three times per year from the Dept. of Archaeology, University of Calgary, Alberta, Canada; and edited by Prof. P.L. Shinnie.
Socio-economic research and the approach to change in Jonglei canal area

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A. The place of socio-economic research

Socio-economic research involves many studies carried out in the area affected by the canal project. Concern about the effects of the canal on the habitat and livelihood of tribes in the area originated with the idea of the canal itself, and have continued to gain momentum. In the writings of Hurst (1952, p 308-309) mention was made of the need to cater, in terms of adaptations, for the expected changes that might affect local tribes as a result of the digging of the canal. In the survey works of the Jonglei Investigation Team, the results of which were published in voluminous reports in the mid-fifties, whole sections were devoted to 'effects and remedies' (Vol. II p 415-702), investigating in detail the many facets of change and the remedial measures recommended.

Against this background it was realised from the beginning by the Executive Organ for Development Projects in Jonglei area, that socio-economic research is one of the basic inputs, in the studies accompanying the planning and execution of the canal project. This is obvious in a country like the Sudan, which has already gone through the experience of resettlement projects based on big irrigation works. For instance New Halfa scheme involved the resettlement of some 50 thousand Nubians, plus other populations of nomadic origin, under new environmental conditions. In the case of New Halfa, as well as other schemes that followed, such as El Suki and Er Rahad, the Government recently became more aware of the importance of socio-economic research as an essential input in furnishing the basic data needed to guide communities affected by change.

This growing awareness of the role of socio-economic research in developmental planning led the Executive Organ for Development Projects in Jonglei Area to initiate a socio-economic research scheme in Jonglei area, in 1974. It was envisaged as optimal to entrust a national body with the task of conducting research in socio-economic fields in the Jonglei area because of cultural, linguistic, political and psychological considerations which might not be equally comprehended by a foreign consultancy firm.

1 The body set by Sudan Government to execute, and monitor the developments ensuing from the Jonglei Canal Project.
The Economic and Social Research Council of the National Council for Research was contracted to start research, with two main objectives to fulfil: first, to conduct research covering the Nilotic tribes affected by the canal, namely: the Dinka, the Nuer, and the Shilluk; and second, to assist in the creation of an autonomous socio-economic research unit, under the 'Jonglei Commission', to carry out additional research as required, and to monitor the findings of research at the implementation stages.

The scope of socio-economic research in Jonglei area is geographically and conceptually defined. Geographically it embraces the domains of the three tribes inhabiting the area, and directly affected by the canal. Conceptually, the objectives to be met by research are twofold, ranging from the attainment of major goals, such as contributions from research findings in the formulation of appropriate social and economic policies and the emergent programmes; to the identification of essential approaches to change, that help in guiding the Nilotes to adjust to new conditions and attain better standards of living.

The topics covered by research during the last four years embraced: demography, land use and human settlement, livestock economy, transhumance movement, agricultural economy, anthropological and sociological aspects, administration, service facilities, commerce, trade, and marketing, credit and co-operatives, transport and communications, and human communications and mass media.

Documents so far produced under the Economic and Social Research Council and Jonglei Commission include:
6. Existing services in Kongor and Bor Districts, 1978.
10. The seasonal migrations of people and their animals in Kongor and Bor Districts, Jonglei Province, 1978.
13. Social-anthropological Aspects of the Jonglei Development


Research findings in the foregoing fields are planned as integral parts of a total whole, bearing their due weight on the drafting of policies and the formulation of programmes.

B. The problem

Through understanding the cultures of the tribes inhabiting the Jonglei area, current socio-economic research achieves one of its objectives outlined previously: furnishing data which lays the basis for the identification of a number of integrated rural development programmes. The latter are intended to be started as small scale community projects; purposely implemented to provide a medium of intervention in the traditional cultures; so as to test the hypotheses concluded from research findings, especially in the areas of change. Based on their results, changes that receive positive responses from the communities are fostered, while those generating conflict are resolved. These intervention programmes are viewed as essential mechanisms in the search for the most practical approach to change.

In the context of this strategy, research aims at furnishing an understanding of the Nilotes culture and at detecting areas of change, through establishing some baseline marks in the culture of the area, as initial stages from which changes have started to occur, and henceforth arrive at models of planned change. This is encouraged by the fact that change in many of its facets has started recently in these areas. The dominance of nature and its deterministic role still emerge as the basic variables among others, that shape the culture of the area. Cattle rearing, transhumance movement, patchy tribal agriculture, patterns of human settlement, social organisation, material culture, etc., reflect adaptations to an environment where the mastership of nature is formidable.

C. Planned change

Planned change is governed by a number of factors, most important among which are the philosophies and planning procedures adopted in its realisation. A definition of planning calls for making distinctions between the general sense and the physical sense of planning (Hall, 1970, p 1).

In our case, the emphasis is on the general sense of planning because the aims of the research are to guide local communities in Jonglei area through the changes anticipated to take place as a result of the implementation
of the canal project.

A second distinction entailed by the concept of planning is that between planning with a single objective, and planning with multiple objectives. Although not all physical plans are limited to a single objective, nor all general plans are multi-objective, there is a tendency for this characteristic to hold true in each of the two cases (Hall, 1970, p 3).

The third concept involved is the philosophy of action sought. Planning as a mechanism of change is in its broadest sense an ordered sequence of operations designed to lead to the achievement, of either a single goal or a balance between several goals (Hall, 1970, p 4). The ordered sequence of operations is accomplished in two stages, (i) preparatory work which determines the plan, and (ii) the implementation of the plan. Social action is required at the two stages which brings in the third concept introduced in our attempt at defining the kind of planning aimed at by socio-economic research conducted in the Jonglei area.

We need to dwell more on this last concept of social action, because it highlights the philosophy on which the present paper is built; which attributes much importance to the understanding of social systems, and to the medium of consultation, i.e. the involvement of local communities and their leadership in the planning and change processes. This is implied in the case of Jonglei by two requisites: the first is methodological, embodied in the approaches acknowledged worldwide in administering change; while the second is entailed by the conditions under which the Jonglei canal project has been implemented, namely: the absence of development plans at the time the dredging of the canal started.

With regard to the former we read in the literature of planned change, which aims at adjusting communities to new conditions, or transforming societies to new civilisation horizons, that the participation of the public is an essential safeguard against plan failure. 'As a general recommendation, then, it is possible to say that it is dangerous ever to make any plan, or try to execute any plan, without the active participation of members of the culture of the particular professions, and the administrative apparatus concerned; as soon as any planned change has a specific population group as its object, members of that group - through demonstration villages, pilot projects, etc., must be brought into the planning.' (Mead 1955, p 292). 'The future unlike the past is always new-born. To involve all living persons in constructing the future is to release and facilitate change and growth all around.' (Bennis, Benne, and Chin 1971, p 532).
Because of lack of participation, planning in many cases has acquired a bad image. In addition, experience has shown that informing the public after a plan has been prepared is dangerous and leads later to few changes in the plan if any; since those who prepared it are inclined to defend it. Furthermore, as the image of the 'government' is often very low in the eyes of villagers (normally taken for a system of tax collection) any plan prepared solely by government machinery, raises suspicion and has little chances of being accepted (du Sautoy 1967, p 5-7).

Throughout the various stages of implementation of socio-economic research programmes in the area, the principle of 'planning with the people' was one of the cornerstones on which research was built; being viewed from the angle that 'The Nilotes' are entitled to the right to participate in making the decisions that affect their life. Otherwise such decisions if imposed on them will cause tension and lead to alienation between the authority and the people (People and Planning, p 3).

Arguments are often advanced against the efforts expended in securing public participation as being a process that entails greater expenditure of resources, the use of more staff, as well as time consuming. Yet, the advantages gained outweigh the disadvantages. The former embrace educating the people in the democratic processes, development of leadership and the fostering of its role, more co-operation between the people and the authority; the building of positive attitudes to change in the place of old ones; and the improvement of the problem solving capacity of the individual and the group which can be used in other change situations.

At this juncture, we introduce the second requisite, which calls for the adoption of the above philosophy in the planning of change in Jonglei area; being dictated by the special conditions that accompanied the launching of the Jonglei canal project. Needless to say, the project was decided upon and launched in the absence of complete plans of development. Except for the engineerical part, i.e. the dredging of the canal, for which design works have been guided by available information on hydrology, topography and soils etc; little has taken shape on a similar magnitude in the area of developmental planning; i.e. no readily available plans of development in the fields of livestock, agriculture, fisheries and human improvements, by the time the dredging commenced in the middle of 1978.

True, there is some basic information on many of the natural resource aspects, such as ecology, as well as on human aspects, however there is the obvious difference between physical and human developmental planning. Comparatively, the aggregates in case of the former, with the right scientific inputs, could be manipulated with ease.
Whilst, in case of the latter, the unknown's are many. Besides, the interrelationships between the aggregates are widely varied, the range of alternatives is broad; and the predictability of the behaviour of whatever systems are envisaged is not easy.

All the documentation that existed by the time dredging commenced, concerned objectives that would accrue from the digging of the canal; stated as benefits in the introductory booklets on the project. The gap between the visualisation of objectives, and their materialisation into operative projects is tremendous, with a host of intervening processes.

Because of the peculiarity of the situation, there is a need to adopt a special planning approach in the case of Jonglei; the main features of which are study, plan, implement and guard against repercussions arising from the total process. This entails the physical presence of the planner, much creativity from his side and continuous involvement of the local communities.

It is evident from the above presentation, that forced change through political, economic and resettlement decisions is out of question for the guidance of future developments in Jonglei area. Forced change has proved its failure, under similar big engineering projects.

The Gwembe Tonga resisted the changes associated with technical development at Kariba Dam neither because they are inherently adverse to all change nor because change is a new thing to them. The resettlement programme incorporated all three elements which Spicer pointed to as leading people to resist innovation: it threatened their basic securities; they did not understand the technical facts on which it was based; it came to them as a command from outside (Spicer, 1952, p 18).

It had yet a further negative feature, since they were asked to make enormous sacrifices for which the only human justification lay in the long-term good of a larger national community which would benefit from the dam, and this community was not one with which they identified themselves (Colson, 1971, p 3).

On the other hand, the transference of the Nubians to Kom-Ombo, following the construction of the Aswan High Dam, though completed with fairly adequate preparatory work, prior to final resettlement, reflected many human touches. The Department for the Resettlement of Nubians undertook the difficult job of evacuating the inhabitants from their old villages. The move of the Nubians was accomplished in less than 9 months... Old people, especially those who had never left Nubia, felt threatened by the new way of life, fearing an inability to cope
with the many changes they were to meet... Just before boarding the boats women went sadly and silently to visit their dead. They sprayed the graves with water which to them symbolized mercy and blessing. Visits were also paid to the shrines of local holy men to express devotion and to ask for blessing. Observers of the move were touched by the sad expressions and tear filled eyes of the Nubians at the moment of departure. Some kissed the land, others wept at the walls of their deserted houses, while some filled their pockets or small bags with soil. (El Abd, 1974, p 22, 23, 24).

D. The approach to change

Though the Jonglei canal project does not involve resettlement on a massive scale, as is the case with the above cited examples, yet it might entail collectivization of settlements, reorientation of migration routes, plus positive responses and accommodation from the side of local communities to the development inputs in the areas of livestock, agriculture and service facilities. The success of these programmes will very much depend on the kind of change approach adopted in place of forced change. In line with the planning philosophies advocated previously, the findings of socio-economic research recommend a strategy of change defined as normative - re - educative. The place of this model of change could be seen in relation to the following strategies as identified by Bennis and Benne (1970, p 34).

a) The first of those ... we call empirical-rational strategies. One fundamental assumption underlying these strategies is that men are rational. Another assumption is that men will follow their rational self interest once this is revealed to them ... Because the person (or group) is assumed to be rational and moved by self-interest, it is assumed that he (or they) will adopt the proposed change if it can be rationally justified and if it can be shown by the proposer(s) that he (or they) will gain by change.

b) A second group we call normative - re - educative: Those strategies are built upon assumptions about human motivation different from those underlying the first. The rationality and intelligence of men are not denied. Patterns of action and practice are supported by socio-cultural norms and by commitments on the part of the individual to these norms. Socio-cultural norms are supported by the attitude and the value systems of individuals - normative outlooks which undergird their commitments. Change in a pattern of practice or action, according to this view will occur only as the persons involved are brought to change their normative orientations to old patterns and develop commitments.
to new ones. And changes in normative orientations involve changes in attitudes, values, skills and significant relationships, not just changes in knowledge, information or intellectual rationales for action and practice.

c) The third group of strategies is based on the application of power in some form, political or otherwise. The influence process involved is basically that of compliance of those with less power to the plans, directions and leadership of those with greater power. Often the power to be applied is legitimate power or authority.

The third strategy, which suggests forced change has already been discarded. As for the first one, this is unsuitable, because it demands empirical rational thinking unbound by socio-cultural norms and commitment on the part of individuals, a stage that has not yet been attained by the Nilotes. Hence we are left with the second approach to change, in the Jonglei case.

Initiation of changes that adopt the normative-reeducative model have their take-off points, in those fractures or cracks in the traditional culture, where change, however meagre, can be detected in the form of individual or community needs, providing openings for more change to gain momentum and build up.

Hence the hypotheses put for testing by the socio-economic research conducted in the area, marry three conceptual frames: (a) that through research the socio-economic life of the Nilotes could be revealed with areas of change defined, (b) that the success of planning for development in this area will very much depend on the involvement of local communities in the planning process, and (c) that the attainment of this last goal will be realised through a normative-reeducative strategy of change.

More specifically the above could be expounded as follows:

i. Through socio-economic research, areas of change can be detected. Such areas might be meagre, however they provide important clues for the initiation and formulation of intervention programmes.

ii. There are prospects for the formulation of policies that foster positive change, taking into consideration those elements in the culture that are conducive to change.

iii. In such traditional communities planned change that does not deviate drastically from the established ways of life, includes grass-roots participation, is pursued through a normative-reeducative strategy, has more chances of being accepted by the people, since the priorities of local communities are taken into consideration.
Bibliography


CONTEMPORARY BARI ECONOMY IN HISTORICAL PERSPECTIVE

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This paper is a case study of a group of people, who happen to be Bari, who, by reason of their location at the uppermost navigable reach of the Nile (Bahr el Jebel), have been, and still are, peculiarly exposed to alien intrusion and who, therefore, offer an opportunity to look closely at the consequences, over time, of confrontation between, on the one hand, acephalous clan-based subsistence cultivators and stockkeepers and, on the other, merchants, missionaries and administrators, representing very different economies, driven south by specific hopes of financial, political and even spiritual gain.

This is not an ethnography. Recent writing and thinking about African social structure has stressed the weakness of the assumption of "tribe" as a unit for analysis, however convenient its nurture may have proved to the administration of indirect rule. We are urged instead to regard imperial and colonial incursions as the decisive African event of the past 200 years. The self-sustaining structures of traditional society are more apparent than real, since they have been drawn into dependence on, and subordination to, the dominant capitalist mode. They are, variously, 'disfigured', 'paralysed', and in the neo-colonial phase, 'organically' bound to capitalism within which they have a 'transitional' and 'degraded' function. The international web of capitalism binds them, slight though the threads may appear a thousand miles south of Khartoum, and five hundred miles north of Nairobi.

Colonial paternalism is unmasked and reveals not so much a father as a sadistic parent, and neo-colonialism is not even tempered with paternalism. The theoretical elaboration of this insight has produced several subtly contending conceptualizations, daunting in their level of abstraction, between which I make no attempt to arbitrate. There is a tendency in the West for theorizers to become protagonists, taking on with their theories, a cloak not merely of intellectual but of moral superiority, as though writing about the exploitative relations between First and Third World absolved one from the inevitable sin of belonging to the exploiters.

My intention is very modest: to focus closely on one small area on the periphery of the web spun by international capital and to describe it. I am interested in detail, in
the minutiae of economic decision-making amongst the Bari. In our enthusiasm to chart the direct and determinants of the ground march of history, we must, I think, be careful not to neglect to describe the motley marchers, the stragglers, the deserters, the terrain, the fighting amongst the regiments and the way the onlookers cheered and booed. It is in the untidy complexity of particular history that we see the interplay of forces, the predictable and the less predictable alliances, the struggles for dominance. Pre-capitalist modes of production may be doomed to subordination to the capitalist (Marx, Capital I, p 790) but we must document rather than assume this subordination. The process may be prolonged and not necessarily "because colonial power did not choose to destroy them" (Brett 1973, p 20). In many ways southern Sudan is an instance of failed capitalism and the triumph of the self-sustaining economy. In 1869, Baker was loudly proclaiming his intention "to found a chain of trading stations on the system adopted by the Hudson Bay Company ... every tribe will be compelled to cultivate a certain amount of corn and cotton ... they will then desire to exchange their surplus for our manufacturers" (Gray 1961).

Capitalist optimism continued to characterise British attitudes into the twentieth century. In 1929 we come across an enterprising member of the Sudan political service in Rejaf who writes, "My idea would be to put in a native and supply him with kerosene, tea, flour, rice and such other easily consumable articles and try to work up an export trade in grouts, sesame and durra ... there is decided scope along the White Nile in the Southern Sudan".

"Compulsion" was duly instituted under British rule (Tothill, 1948, p 896). Besides cotton, coffee and oil palms were distributed in 1928 (Tothill, p 896). But in 1936 we read of the cotton gin in Shukoli closing down (Tothill, p 903). In 1948, so little progress had been made that the Equatoria Board had, amongst its aims, to teach people the value of money.

I am equally unhappy at the utopian conceptualizations of the pre-capitalist economy reflected in that vocabulary which has it "deformed" (Meillasoux, 1978) by capitalism. The evidence alone, of institutionalized domestic slavery in pre-capitalist Africa belies this notion, which must be replaced; in theory, with more realistic conceptualizations which take account of piracy, conflict, conquest, flux. I approach the Bari economy not from any foregone conclusion about the ultimate demise of pre-capitalist structures to capital, but as a set of flexible and adaptive responses of people to the problem of survival in a particular and rapidly changing set of circumstances, brought about by the influx of aliens.
Contemporary Bari economy in historical perspective 83

For 140 years, starting in 1841 with the first Turko-
Egyptian trading expedition to Gondokoro, the Bari have,
will nilly, been involuntary hosts to the parties of
traders, slavers, missionaries, explorers, sightseers,
imperialists and administrators who have dropped anchor
at Gondokoro, Rejaf, Lado, Mongolla and Juba and rowed
ashore to cajole, harass, flatter, exploit and manipulate
the local populations into meeting their needs, whether
for food, ivory, tribute, labour, information or converts.
The Bari "tradition" is of coexistence with, and adaptation
to, a constant flow of aliens, usually powerful, sometimes
threatening, but who have nevertheless been used as a
resource and manipulated to local political ends, even while
the Bari, in turn, were themselves being used to broader
political purposes by the intruders.

The acephalous policy - "small autonomous political
aggregates between which there exists no clear principle
of wider political combination", (Buxton, 1957) - maximized
this flexibility and hastened the apparent disintegration
of the ethnic group as a uniformly organized political
entity. This, in turn, led to disparaging comment by
European observers, who liked to find coherent "tribes"
bound by strongly observed, shared rules, preferably under
a dominant chief. Johnston (1902, p 775), refers to the
"miserable" Bari people whose "ramshackle dwellings of a
very low order of architecture" showed "no attempt at
comfort or orderliness". The ethnography of the Bari has
subsequently proved difficult to pin down. In 1954 the
Jonglei Commission confessed that "from the published
literature available, it is not easy to draw up an adequate
summary of the social and political structure of the Bari"
(Volume 1, p 201). The definite British Ethnographic Survey
of Africa in its volume on The Northern Nilo-Hamites
(Huntingford, 1954) devoted only eight tentative pages to
the Bari, and those are fraught with doubt, lacuæ and
contradictions.

Why this ignorance and confusion? Not, I suggest, because
the observers were incompetent, but because Huntingford was
mapping cloud cuckooland, namely the homogeneous ethnic
group with its uniform culture. By 1932, when Beaton
compiled his notes, the Bari had been exposed to 90 years
of successive foreign incursions, which had evoked, not
a united ethnic response, but a series of pragmatic, piece-
meal adjustments to the new opportunities for constraints
in subsistence, which even British indirect rule was not
able to reorder into a consensual whole.

The fieldwork around which this paper is organized was
undertaken while I was teaching in Juba between 1976-1979,
and was confined to those Bari living within walking
distance of Juba. Bari country is much bigger than this,
extending 30 to 40 miles inland from the Nile and occupying 100 miles of river front on both banks. I have been concerned to analyze the use made by these Bari people of this urban presence, as well as of the possible use made by them of powerful interests represented in the town. For a historical perspective of the relationship, I have relied chiefly on the scholarly published English language sources to demonstrate the continuity of the Bari experience of substantial urban concentrations in their midst.

De Pruyssenare described Gondokoro in the early 1860s as a "sprawling insanitary settlement of some seven hundred armed Arab servants, most of whom collected numerous wives and servants from the local tribes". (Toniolo and Hill, 1975, p 57). In 1860, trader Binder brought "one thousand armed attendants with him" and later "summoned" 900 porters to carry his ivory to the river. (Gray, 1961). Gessi (1892) suggests as many as 4000 people in such settlements.

Bari were drawn in great numbers to this new economy of plunder. In 1859, the traders returning to Khartoum from Gondokoro at the end of the season, left agents in charge of a small group of northern Sudanese, who were charged to undertake expeditions to the interior, and "as it was a period of famine amongst the riverain Bari there was little difficulty in persuading many of them, of every age and sex, to act as porters, in the hope of being able to purchase grain". (Kaufmann in Toniolo and Hill, 1975).

By the time Baker arrived in 1871 to annexe Gondokoro and lands southwards to the Turkish Empire, the Bari had become clients of the powerful trader Abu Saoood, who, in return for their services, had augmented their cattle herds to the astounding numbers reported by Baker. Baker, himself, brought a party of 1,200 troops and 400 sailors, plus servants and servants' slaves and camp followers, in all 64 vessels filled with people and possessions, and although he took "stores sufficient to last the European party for four years" (there were 16 of them), the other 1,600 had to find food locally. Little wonder that by August 1871 he had declared the Ottoman Empire to be at war with the Bari and was sacking their granaries and stealing their cattle which, as a precaution, were "kept in a zareeba of ebony stockades as thick as a man's thigh and eight foot high, interlaced with thorns".

The story of local intransigence in the ensuing confrontations is nicely captured in the epithets Baker chooses to describe the Bari in successive pages of his diary (1871): "easily misled", p 228, "intractable savages", p 237, "brutal obtuse savages", p 260, and finally "irrepressible vermin", p 260.

The fact that the intruders presented no united front shaped, and fragmented, the Bari response. They were, from
the start, caught up as allies, first of one and then another, in the head-on bitter conflict between the merchant adventurers (themselves divided rivals for the rich spoils in ivory and slaves) and the imperialists, representing capitalism of a different sort. In displaying resistance to one set of intruders, the Bari were allying themselves with another. They changed sides shamelessly; they used powerful alien allies to settle local scores. They calculated the short term advantage of one alliance against another. They quickly adopted the extortionate demands of the aliens and responded in like manner, demanding landing fees, trespass dues, and charging for the use of the shade of their trees. This dogged pragmatism still informs the Bari response to the situation in which they find themselves.

The Bari are hoe cultivators of millet, supplemented with sesame, groundnuts, beans and maize, which they plant in the rainy season, April to October, and which constitute their basic diet for a year. The rainfall in their part of the country is highly localized and fickle. In Mongalla, on average, over 100 mm falls in each of the wet season, but the standard deviation for each month (calculated over 30 years) ranged from 39% to 46%. June is usually the wettest month, with an average rainfall of 42 mm, but in 1918 only 29 mm fell. Similar figures have been collected for Juba and Rejaf. This has had a considerable impact on the polity, with rainmakers, wielding an apparent skill of great political potential, so much so, that early intruders took them to be kings, which they may, indeed, have gone on to become, had the intruders not undercut their power even as they acknowledged it, by providing crucial alternative strategies for accumulation and influence.

The erratic rainfall also means that the Bari, like so many people north of the equatorial zone, where there is only one short growing season, (Domont, 1957, p. 61 ff) are recurrently unable to meet subsistence needs satisfactorily (Ogbu, 1973). In 1948 a British survey of the agricultural potential of the south described Bari as "liable to great variation and irregularity" of rainfall and hence to "famine - a fate they share with the Nadi. This is unlike Dinka areas, where staples are produced in surplus, or Yei and Zande which, with two annual crops, are "secure against famine" (Tothill, 1948).

It was a hedge against this threat that Bari, in the nineteenth century, and probably before that, kept cattle. Today, they have few cattle, but growing stocks of goats and sheep, which they typically hope to exchange for cattle, when they have amassed sufficient of them. They see themselves as temporarily deprived cattle keepers,
blaming epidemics and wars. The Jonglei Commission Report put the Bari herd, in 1954, at 12,000, or 1.5 cattle per 5.5 person household (Vol. 1, p 229-230, Table 128), and expressed doubt that it could ever be, or have been, as extensive as is popularly thought, citing shortage, on this reach of the Nile, of grazing lands; "physical conditions alone seem to us to preclude the possibility of very large herds of cattle" (Vol. 1, pp 200, 229-230).

The kinship system itself establishes, through marriages, approved channels for the sharing of food stocks in times of famine. Property rights are vested in the clan (the moneykak, land chief, officially distributes, and arbitrates in, what tend to be hereditary lineage land rights). There is usually such an abundance of land, relative to the small tracts that any household can cultivate in a season, that landholding is not a route to power, (though clients can be acquired by the clan through the patronage of landsharing; for example refugees from local wars) nor are land rights or rules of tenure very precisely defined. Low population densities and simple technology robs land of the economic power with which it has been vested in other contexts. The limiting factor is labour, not land. Although particular fertile lands, such as river banks, may be in short supply, landlessness is inconceivable, as is the alienation of land through private property, provided one stays within the clan.

The recurring evidence amongst various ethnic groups in Equatoria of incorporation of outsiders, on unequal terms, through clan patronage, exercised as access to clan lands, suggests that one of the ways of managing the problem of famine in the past was the migration and dispersal of affected clans to ecologically more favourable territory. This would be an extreme solution; more usual is the strategy of making use of the bridging status of women to gain access to the harvest of other clans' lands.

Each clan-centered patrilocal settlement comprises men of the clan and a number of women from different clans. The rule of clan exogamy ensures this spread. Women can expect their fathers and brothers to assist them in times of famine, particularly since women are likely, in the course of visits to their clan of origin, to have contributed some small labour to the household economy. Each clan settlement may thus be seen as set in a complex network of potential economic resources centred upon the women, and leading to the variety of clans from whom (wives) and to whom (daughters) the women are linked.

No vast exchanges are implied. The size of the share of another's harvest is limited by the amount a women is able to carry. No woman is able, by this strategy, to accumulate an unfair share of produce since, her time and
labour are strictly limited. Other things being equal, there would be no purpose in cultivation of father's clan's land at the expense of husband's clan's land. But other things being unequal — drought or flooding, fire, bird, insect or virus damage to crops — each woman has, in her clan of origin, an economic resource which can be exploited. The clutch of wives in any village represents to clansmen an economic stake in as many areas as women are drawn from: married daughters, likewise, represent such a resource.

The value of this arrangement is, in practice, diminished by the probability that wives will be recruited from adjoining settlements, since opportunities to contract marriages arise locally, and, hence, the several clans involved, may simultaneously experience shortages. Towns, as central focuses for wide hinterlands, help to spread, geographically and ethnically, the range of marriage links.

A more reliable source of foodstuff in times of need is the parasitical unproductive town (or fort or camp) with its established network of supply links from a wider world, in which aliens have predominantly featured. The potential usefulness of outsiders as providers modified past Bari hostility to them. This pragmatism continues to shape Bari loyalty to, and alliance with, non-Bari — not collectively, but in a series of individually contracted negotiations.

The problem becomes one of gaining access to these imported resources. For contemporary Bari, this means high political office — an option from which, in the present political flux, few feel totally excluded. More usually, access is by exchanging goods or labour, increasingly through the mediating agency of money.

The town of Juba offers a range of economic opportunities for those of enterprise and ingenuity trying to gain an indirect share in the Civil Service wage bill, almost the only local opportunity for salaried or waged employment (Mills, 1977; Jenkins, 1981).

The Bari share proportionately in this sector, favoured in local government through local association. Of other economic opportunities, they tend to take advantage of the more profitable and comfortable niches in the "informal" sector, avoiding exhausting labour, which they leave to new migrants, chiefly Dinka and Mondari. Thus Bari are never seen yoked to water pails or humping grain sacks from boats at the quay. Bari women express contempt for Mondari women who winnow for Dinka and Northern traders. The Bari proximity to their rural areas allows them the luxury of a wider economic choice.

Bari do participate in the profitable business of tailoring (which is dominated by Bari-speaking Fajelu). There are over 200 pavement tailors in Juba — all men —
who either own (45%) or hire (55%) their machines from northern Sudanese shopkeepers from whom they also rent sites on the verandahs of shops, paying L2 to L10 a month depending on position. Hiring of sewing machines is either by monthly cash payment (L4 to L15 depending on the machine) or, less usual, on a 50% profit-sharing basis.

Profits are difficult to pin down. But tailors, in 1978, easily took in L10, often even L16. The theoretical L5000 per annum, which would put them amongst the region's top earners, is never reached, the cost in effort and self-denial running counter to the prevailing ethic. One tailor has amassed capital of two trucks. Stories of drunkenness and profligacy are more common.

Retail trading in Juba is an established monopoly of northern Sudanese; but small southern retail stalls are increasing, often funded as entrepreneurial sidelines by Civil Servants, who are able to use the new resources at their command to obtain scarce, long distance supplies.

Brewing is a major industry amongst women (Jenkins, 1981), based on a common domestic skill which every woman will have learned as a matter of course. Distilling is particularly a riverain Bari skill. Almost certainly introduced by 19th century Mediterranean traders, it has become sufficiently indigenous to be attributed to the "ancestors", an impression reinforced by the clay and reed equipment with which it is accomplished. Brewing and distilling are highly profitable. For an outlay of as little as L15, a cash return of L60 is assured. However, both the grain and sugar necessary are in constant short supply and the ensuing blackmarket price of raw materials can inhibit participation. Officially, there is control over brewing, through municipally licenced premises (andayat), but unofficially, brewing for trade in private yards is widely tolerated, and provides a major source of household income, used for school fees, school uniforms and for food. The licensed premises are sub-let by the licensees to individual women, who take advantage of the equipment and the established clientele. The licensee is assured of an annual income, from rent alone, of some L2000 per annum; but this will be greatly augmented by returns on personal brewing. Rural Bari close to the town carry the fomentation to the periphery of the town where they prepare and sell drinks. Liquor is also sold in the villages, to raise cash, but clearly the market is limited, except at weekends when townsmen come visiting.

Landlordism is another source of urban income, reputedly by Civil Servants with privileged access to scarce sites and building materials.

Economic options in the town include, unexpectedly, foraging in the detritus of the alien community. Empty beer
cans retail at 4 for 1 pt to tinsmiths who turn them into lamps which wholesale at 75 pt a dozen to traders, who retail them in distant parts for 50 pt. Empty synthetic sacks from traders are fashioned with staples (staplers can be purchased from traders) into shopping bags. Lead from exhausted car batteries is smelted and moulded in paper cones, into fishing weights. Worn motor car tyres are turned into sandals, wrecked vehicles and empty petrol drums into every kind of domestic equipment: braziers, cooking vessels, lock-up trunks, storage jars. Although smithing is a lively and conspicuous part of Bari culture, it is still a traditionally inherited and despised occupation, and its practitioners are still to be found near their traditional smelting ground in Belinian, making traditional items – hoes, spades, spears, knives, arrowheads, bells and beads. Customers still come to them, paying L5 for a hoe in 1978, despite undercutting imported competition.

These conspicuous economic opportunities take place against a background of inventive vitality, as people struggle to share in the cash flow. The proliferation of foodsellers – from restaurants to solitary braziers frying dough – gives an index of the dislocation and fragmentation of households. Middlemen insinuate themselves between producer and customer, retailing bread for a mark-up of half piastre a loaf, retailing roast groundnuts at one piastre a dented, chipped teaspoonful (at 4 kernels a piastre they must be amongst the most expensive peanuts in the world); retailing charcoal in affordable, but highly expensive, piles; retailing cigarettes one at a time. Women buy grain and stand long hours at the petrol-driven mill, then retail the well-aerated flour by the dented bowlful. The division of labour takes place before our eyes, as people insinuate themselves into a task until they become indispensable. This is Juba na Bari, the Bari village of 1929, transformed and extended to embrace the adjacent Bari villages of Kasaba and Lologo.

The Bari still feel Juba to be their territory, and move freely between Juba and the surrounding rural settlements without feeling they have crossed some frontier. They are all at home in Juba. Even the people from villages 30 km distant spend nights in Juba every month, if not every week, in the course of trade. The singular Bari economic opportunity lies in exploiting their access to Juba's rural hinterland on behalf of the town.

Bari were trading before the 19th century incursions from the Mediterranean. Thibault, who accompanied the 1841 expedition, reported on the local iron industry which provided weapons with which the natives used to trade among the neighbouring hills. 12 Vinco, in 1851, reported a
trading network to the south, in which Bari exchanged cattle and ivory for copper bracelets (Toniolo and Hill, p 94), but this was after a decade of annual trading expeditions from Khartoum. Shortages and surpluses, then, as now, must have prompted exchanges. The Bari certainly made salt from the processed ash of certain vegetable fibres, and traded it for red ochre with the Lokoya. The very existence of such trade links opened the possibility of thus bartering iron for food in times of famine. Kaufmann reports the Bari bartering iron for grain from the Shir and the Beri, while in "May and June they go south where grain has already ripened, begging and stealing, (Toniolo and Hill, pp 184-185). They also exchanged iron for grain with the traders (Toniolo and Hill, p 182) but by then parasitical intruders with their enormous followings were drastically stretching indigenous food resources, at the same time interfering with the established allocation of labour to cultivation.

The aliens demanded, but also supplied, food, through both piracy and legitimate imports. From the start, some of the bitterest confrontations were over mutual food shortages. The Italian missionaries, there to teach the gospel of love, in 1856, imported bricklayers to erect "a strong encircling wall to defend the mission from the Bari" who were trying to share in their providently imported food supply.

The British administration was obsessed by the necessity to teach people what they liked to call "legitimate trade"; namely the production of salable, durable, exportable surpluses. Bari remember that they first sold groundnuts and sesame to raise money for taxes which the British imposed, and date this to 1930 when, in a phrase, "Rejaf moved to Juba". They were also producing cotton in 1926. The present day Bari trade in perishable foods and household supplies must be of fairly recent origin. The authorities did not seek to control such marketing in Juba, through licences, till the mid-fifties.

It was not until the recent expansion of the town and the bridging of the Nile, that East-bank Bari have been drawn into the voluminous trade which is now so central a feature of Bari economic life. Considerable effort is now directed towards the regular acquisition of cash, to be used either for exchange into food, or to be stored, preferably, in the form of goats, till the need arises. "Need" may be for food, but may be, with almost the same urgency, for small stock to sacrifice at wedding or funeral feasts, or for marriage exchanges themselves. To this end, Bari shuttle ceaselessly between Juba and the surrounding villages, carrying to town something to be sold. On a day in November 1978, of the 188 people an hour crossing into Juba over the bridge, between 6am and 10 am, slightly more
than half were males. Eighty-eight were carrying produce to the market, and sixty were Bari women and girls.

The predominance of women in Bari trade is best understood as an extension of the traditional obligation of women to provision the household throughout the year. Women harvest and store crops. Granaries, built by men, belong to women; every married woman has one to which she has exclusive access. This powerful female right to control the domestic food supply is, in fact, an onerous female obligation to ensure an adequate daily food supply. Bari men unashamedly confess their irresponsibility in the matter; "Women carry things to the market because the men will swallow the money in Juba".

The potency of this present arrangement, for radically altering customary male-domination, is not perceived by the Bari. Marketing is readily delegated even to children, to whom are entrusted decisions on how the money should be spent. But, taken in conjunction with the new economic power of women through brewing, it represents a shift of some significance in women's traditional position. Although Bari marketing is primarily a response to chronic shortfall of crops, the contemporary experience of the buoyant market in Juba may be transforming what began as a subsidiary and seasonal activity, into a more dominant perennial activity. The Bari cautiously refuse, as yet, to let marketing over-ride cultivation, as a demand on their time. But they note the fluctuations in demand and supply and hence price in certain goods; and weigh the economic alternatives carefully, regretting their inability to take advantage of good trade terms during seasonal scarcity "when everybody is too busy in the fields to market" and regretting the necessity to market during seasonal glut when, for example, "the price of firewood falls from 3 to 7 branches for 50 piastres and people have to stay with their wood for a week to sell it. They do not doubt their capacity to raise money through marketing, but they doubt the market's reliability to supply them with food in exchange. Present strategy is to assure cultivated food supply as far as possible, by giving subsistence cultivation clear priority, and therefore to amass as much as possible through the market.

Their scepticism about the market is influenced by their knowledge of the rise and fall of towns. Condokoro, Rejaf, Lado: the stone and brick foundations of since-dilapidated administrative and trade buildings, laid out in rows, are still detectable in the dry season when the grass withers. Having no theory of history or progress, they are not sure how long Juba will last.

Four factors govern the volume of trade with Juba.
1. The availability of labour, as determined by the
cultivation season. Briefly, the cultivation season starts with the first rains in March, when men prepare the ground, assisted by women, who gather the unwanted growth and burn it. Maize is the first crop. Seeds, soaked, are often planted by children in holes dug by adults. In April, when the rains are more regular, durra is sown broadcast. Birds must be kept away constantly - children's work - and women constantly weed the fields. Sesame can be planted at the same time. In May, groundnuts and beans are sown. The weeds are left as protection from the sun. In June, the first maize is harvested. The first durra is not ready till August. This is the true harvest season. Sesame and beans are also ready. Groundnuts are dug up in September. The preparation of crops for storage is vital and time consuming.

2. Experienced needs at home: "Hunger makes us make beds". Besides hunger, the need for cash for taxes, fires, clothes, medicines, and sugar for brewing ensures a fairly constant state of "need"; above all for marriage settlements, which, although fixed by the courts at 12 cows or 24 goats or L160, may in practice be much higher.

3. The availability in Juba of desired goods. Since Juba is better supplied in the dry season when lorries from the north can negotiate the seasonally flooded roads, there is a tendency for trade to increase at this time, especially since this is the agriculturally slack season. Marketing declines in April to June, and stays depressed until October. Bari men are more likely to trade between June and October than at other times, their wives being busy weeding.

4. The availability of something to sell. I have classified the things that are taken to the market by their origin, a) wild, b) cultivated, c) manufactured.

a) The Bari take every advantage of their wilderness, and of nature's bounty, resorting to the cultivation of perishable annuals or manufacturers only in the last resort. Their strategy lends some support to Sahlin's (1974) thesis of the primitive affluence of foraging society. While foraged products comprise 30-40% of all trade goods, and perennially (mainly fruit from trees introduced by aliens since 1841) another 30-40%, manufacturers constitute as little as 5% except when other options are temporarily curtailed. On a day in November 1977 when no perennial fruits seemed available, manufacturers reached 30% - of a rather reduced market stock.

A more detailed description of these marketed commodities gives insight into the minute functioning of this trade. The "wild" commodities include thatching grass, reeds, wooden posts and palm leaves, all collected by men, and used to build and repair the kind of houses in which 78% (Carter, 1979) of Juba's 100,000 people (Jenkins, 1981)
live. Men also make charcoal from trees. Women collect firewood and furze, seasonal wild fruit, medicinal plants and loofahs. More rarely traded are flying ants, small birds, fish (all seasonal), stones suitable for grinding, and honey (collected from manmade hives in trees). The wilderness may also still illegally yield traded game trophies, as it once provided the ivory which transformed Bari history. But this is not an overt element in trade.

These goods are carried to the market - up to 30km distant - on the heads of women. The load is determined by weight and bulk rather than value. There is not a uniform return on each journey. A woman may carry a bundle of thatching grass (L1.50) or 4 bundles of firewood (L2) or a bundle of reeds (L1). But honey, always in short supply, retails at L1 a bottle.

b) Bordering on the "wild" are the perennial fruit trees, which, once established, fruit effortlessly. They thrive only near rivers. On the island Luwe, trees provide a year-round cycle of saleable fruit, bananas, mangoes, limes, guavas and papayas. A hand of bananas retails for L3, a basket of lemons L5, a basket of mangoes L3. But many women take advantage of middlemen who come to meet them at the towns' edge, offering a low but assured price, and saving them the considerable labour of the further journey, the wait at the market and the municipal market tax (5-15 piastres depending on anticipated sales). These middlemen are never Bari; usually Madi.

Cultivated cash crops of exotic perishable annuals tend to be an entrepreneurial activity by young men. Tomatoes, cucumbers, okra, and aubergines are usually cultivated by purposeful individuals - often schoolboys - in what would otherwise be leisure time. They may require irrigation. The notion of an individually owned, because individually worked, cash crop, is becoming institutionalized. Exotic vegetables, always in short supply, fetch a high price. Young girls call on their brothers to prepare a small patch on which they can sow groundnuts to get money for "Christmas clothes": women grow indigenous green leaf vegetables for the family cooking pot and market the surplus. These retail at 1 piastre a pile (30 piastres basketfull). They also grow pumpkins (L1 each). Sweet potatoes (5 piastres each) are grown by men.

c) When people, through season or locality, have no marketable crops, they resort to manufacture, both of "traditional" household equipment like stools, baskets, sleeping mats, goat tethers, clay pots and pipes, and of more exotic items: beds, sun-hats, deckchairs and shopping baskets. These goods are all made from materials gathered in the bush; grass, leaves, wood, clay and animal skins, which are not necessarily easily acquired. The papyrus reeds for mats which women make, take a man a day to collect, up
the river in a canoe. The palm leaves which men of Belinian villages plait into hats and shopping bags and which the women make into baskets, are 2 days' journey away, and are collected by men. There is a firm sexual division of labour. Although men and women use the same materials and the same weaving techniques, and may even both share in producing the same preliminary plaited strip of palm leaves, they disclaim the ability to make the items customarily made by the other sex. Women tend to make the traditional household items, men the "exotic" items.

A more fascinating division of labour is the village specialization which has emerged in this manufacture. Men in one settlement all specialize in the manufacture of one item, either hats, or beds, or reed stools, or shopping bags, etc. This orderly allocation of the market prevents commercial competition between adjoining settlements. Its origin is perplexing. The Bari themselves simply state that it is "custom", arguing that the skills are passed on within the family, children learning from parents, an explanation of persistence but not of origin. At the same time, they vaguely attribute the idea of such manufacturers to "craft" instruction in mission schools - plausibly in accord with known Christian affinity for commerce in Africa, but the trade is older. Mrs Petherick, in 1864 bought several baskets which the women had made. The pattern of village specialization is increasingly perplexing in the light of its inequities. Hats, for example, take about one hour to make, and use up very little palm leaf. Mats, on the other hand, measure 6 x 3, and consume a great deal of palm leaf, and take a day to make. Mats retail for L1, hats retail for 30 piastres. This does not set everybody making hats - it does not even set everybody occasionally making hats (on the assumption of a limited demand for frivolous hats as against essential sleeping mats). Hats are made in one village - only the people from Namingo make hats.

A similar perplexing "irrationality" arises in the making of beds and mortars. Beds take two weeks to make and retail for L6. Mortars take two days and retail for L3. Both these items are made in the same village, Mogiri, from the same tree, but by recognized specialists. When it was put to them that the mortar maker was profiting more than the bedmaker they disagreed. "He only gets L3" they said. "We get L6". Manufacture is not equally profitable. Whether measured in Bari or orthodox Western economic terms. Their profitability seems to figure low in the economic calculus, as though certain economic opportunities having been distributed, one was bound to live with the consequences.

The average monthly income to families through trade,
excluding brewing, in a village in Belinian in 1978 was L40, with someone from the family going to trade every three days, almost L500 per annum. Against unskilled labourers wages of L0.45 per diem at the time, this was a considerable untaxed supplementary income.

Although Bari cite hunger as the impetus to trade, cash earned in the market is not necessarily immediately spent on food, even though that might be its ultimate use. It is accumulated as goats, or is invested in the raw materials for brewing, sugar, durra, dried cassava, yeast. The very profitability of this investment puts these goods at a premium in Juba. Sugar is never available on the open retail market. The acquisition of these items is a matter of establishing entry into supply network, itself a skill calling for sophistication. The unsophisticated are thus unable to brew the most profitable sweet asiliya, but must fall back on traditional manssa abiya, (where an outlay of as little as L15 can bring in L60 on one-and-a-half-barrels). The preparation for manssa takes three weeks, from the first fermentation of millet to the final production of beer, and demands a fair amount of labour during this period for drying, grinding, boiling.

The Bari have been on the periphery of an intrusive market economy for almost 150 years. Rather than posit any process of steady incorporation, I would stress their continuing marginality. There is a 150 year old tradition of calculating accommodation to this intrusion, which they perceive as a series of unpredictable but transitory disruptions, to be exploited piecemeal. The fact that the 'alien' intrusion is now being 'localized' - southern Sudanese increasingly control the administration, including the administration of long distance trade supplies enlarges the opportunity for economic advantage through this channel, but they remain negligible for most people. Subsistence cultivation, despite its unreliability, remains the resilient core of the economy.

The demand for agricultural labour controls the flow of trade to the towns; the seasonal harvest pulls townsmen back to the village. "From July to September there's a period of rest in the fields. People go to town to feed in restaurants. In October people start going back to the fields. In December we shall all join them. When I hear that our people are eating I say, why should I hang around here? Let me get back. There are lots of young people in the villages in December because food is free. If I go in December they kill me with drinks. If I go now they smile everywhere. If I stay a week they can slaughter me a goat. But if I go in July they just greet me. One is criticised for visiting villages during the season of food shortages."
The primacy of cultivation means that eldest sons tend not to be sent to schools where the education they would receive would be inappropriate to their future role as head of clan or lineage (despite the programme of school terms to suit the agricultural cycle). Younger sons are allowed to test their aptitude for education in the knowledge that of the successful few who are accepted into salaried white collar employment, this is a viable economic strategy, though there is some scepticism about the advantages of clerical employment as an alternative to the villagers' mix of cultivation and trade. "We make beds because we fail to escape through education into clean jobs. As eldest brother I had to stay and grow food and look after the family. My younger brother went to school and became a clerk. He has a more comfortable life: when his work is over he rests. But his salary doesn't go far because food is very expensive."

The fact that Bari are now able, through proximity, to trade so intensively with the town without jeopardizing subsistence, gives them a distinct advantage, which somewhat compensates for their low agricultural productivity. Whereas in the past such trade was sporadic and intermittent, it has become regular, almost continuous, as the burgeoning town's appetite for beer, bananas, beds and building materials has expanded with its population. The economy of the peri-urban Bari is booming.

Unlike people further from Juba, Bari are never pressed to sell their more precious durable staples. The profitability of such surplus staples, brought in from afar by other cultivators, is always subject to the overriding interests of established merchants who own the lorries on which people are forced to depend. There is no competition against the Bari for most of the kinds of goods they supply. They are never undercut by more affluent, organized competition. An attempt in 1978 to regularly airlift fresh produce into Juba from Khartoum was within weeks of its initiation, transformed into a dry goods trade. Handmade palm leaf baskets can be purchased for less in London than in Juba. The recent intervention of middlemen into the fruit market has had the effect of raising prices, to the advantage of Bari sellers.

Are the Bari peasants? Without entering into the debate on how to define "peasant", I draw the attention to some salient features of their position. The wilderness, rather than a cultivated surplus, provides the commodities they sell. They never sell their cultivated staples: there is disapproval of the employment of staples in the production of saleable drinks (though not of drinks offered in exchange for communal labour). They manufacture petty commodities within the household for sale outside it.
What then of the proletarianization of the Bari? There is almost no true proletariat, in the sense of dependent wage labourer, in Juba. This is the corollary of the absence of capital other than merchant capital. The organization of the informal sector is through patronage rather than employment. Access is gained to the means of production (bellows, anvils, sewing machines, brewing vats), through personal bonds, in which ethnicity and kinship are often prominent. People very seldom sell their labour, though they constantly contribute it, in implicit exchange for hospitality, opportunity to learn a skill, access to tools, and to create reciprocal obligations. Women call upon one another as unpaid assistants in brewing. People buy and sell products, but not skills and, above all, not time. Pressures to control the acquisition of skills through formal apprenticeship have not yet been experienced, but a pattern close to this seems to be emerging: the master craftsmen may have assistants (often kinsmen) whom he feeds and accommodates but to whom he makes no regular cash payments. They will, however, be allowed use of his tools – the crucial means of production which binds them to him – when they are not in use for him. In this way, they will have limited opportunities for production on their own account. The delimitation of his share of their time is not spelled out in any contract, but arrived at by unspoken consent. At some moment when they have accumulated the skill, the knowledge of the market, and above all the capital to provide their own tools as well as overheads in site and licence fees to the Town Council, they may start to work on their own account.

The entrepreneur, on the other hand, is formally institutionalized in Bari ethnography as the ingutu duma, the big man, whom Huntingford (1954) describes as one who by sheer wealth and success attracts personal followers, who will exchange loyalty and labour for patronage, particularly in marriage settlements. I suspect the ingutu duma emerged in the nineteenth century, entrepreneurship then, as now, finding advantage in the new opportunities for accumulation inherent in the new situation.

Footnotes

1. Dalzell to Gibson 22-29 April 1929, Durham Sudan Collection 602/12/45.
2. For extent of indigenous domestic slavery in Africa see Mungo Park (1799). Also Gessi (1891) p 32.
3. 16 lacunae and 17 discrepancies are noted.
4. Fieldwork was restricted to people of Beliman, Gondokoro, Magiri, Luwe (the large Nile island), Rejaf, Lado and Luri. At the latter a survey was made by Christopher
6. See Wendy James (1975) for an elegant analysis of the politics of rain making.
8. The proposed University of Juba campus at Belinian on "Bari" territory aroused no local opposition or anxiety in 1978, although the possibility of compensation for loss of crops set several entrepreneurs cultivating the proposed site.
9. Inter alia Buxton (1957) and Santandrea (1873).
10. By becoming patrons of established traders whose licences they control, and through access to long distance transport facilities.
11. Comparable profit margins were cited in 1975 though outlay was smaller. See Nile Mirror 244 Nov. 1975. Certain drinks require a much bigger outlay and are profitable. See Venansio Mulu diary (1977).
13. "Rejaf will be transferred to Juba about November next" Dalzell, 4 April 1929. Durham Sudan Archives 602/12/35.
14. "In Rejaf zone the natives are paid 500m/ms per Kantar of unginned cotton" Gibson, Customs Officer, March 1926. Durham Sudan Archives 602/12/31.
15. Interview Mogiri village 13/11/79.
16. "Most people want to marry at home not in court because the court price is too low" Interview Juba July 1979. Since the cash price of a cow can reach L75 in the harvest season (when Dinka are under no pressure to sell cattle and there is a seasonal shortage). The traditional/legal L160 is ridiculously inadequate. "If you want to marry their daughter people won't take money".
17. Based on counts of people entering and leaving Juba on several mornings, in selected months, during 1977-1978. The data are suggestive: but a full 12 month count would be necessary to document the seasonal trade cycle.
18. Except for buoyant firewood and reeds from Rejaf which are ingeniously floated down the Nile besides canoes.
19. For a local example see Giffen (1905) and his mission to extract a surplus through labour at Doleib Hill.
21. In 1926 Crowfoot, Director of Education, stipulated "school terms should be fixed so as not to interfere with cultivation ... boys are wanted in the second quarter of the year to help in preparing land and sowing and in the last quarter to protect crops from monkeys and harvest them: schoolterms should therefore be held
in first and third quarters of the year" (10 Jan 1926, Crowfoot to Civil Secretary, Khartoum. Durham Sudan Collection 422/9.1).

22. In the South in 1977/78 only 0.5% of the age cohort achieved entry into Senior School (Russel, 1978); Educational Statistics 1977-78 Regional Ministry, Juba).


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A COOPERATIVE APPROACH TO DEVELOPMENT
(The Organization for the Management and Development of the Kagera River Basin)

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In 1979 UNCTAD V listed the following African regional and subregional economic and integration groupings in its report: Economic Community of West African States (ECOWAS), West African Economic Community (CEAO), Mano River Union, Council of the Entente, Central African Customs and Economic Union (UDEAC), Common Afro-Malagasi Organization (OCAM), Lake Chad Basin Commission, River Niger Commission, Organization for the Development of the Senegal River (OMVS), Economic Community of the Great Lakes Countries (CPGL).¹

This list does not give a complete picture of the popularity of regional cooperation and integration in Africa for the last two decades. The once famous East African Community (EAC) is not on the list because it had ceased to exist at the time of the report. Another omission on the list is the Organization for Management and Development of the Kagera River Basin. This grouping had recently been formally inaugurated at the time of the report. There have been new developments since. A series of conferences have been devoted to the formation of yet another grouping in southern Africa, comprising Tanzania, Malawi, Zambia, Zimbabwe, Mozambique, Lesotho, Botswana, Swaziland, and Angola.

The object of this paper is to present and analyse the Organization for the Management and Development of the Kagera River Basin within the broader context of the creation of regional and sub-regional cooperation and integration groupings in Africa.

The history of African integration is slightly more than two decades old now. It can be traced back to the late 1950s and the whole of the 1960s decade. When the Gold Coast became independent and other African countries followed suit, the indigenous political actors realized immediately that political independence did not confer on their countries real autonomy from the colonial powers, both politically and economically. Thus the first reaction was

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* The views expressed in this paper are those of the author and not those of the Department of Political Science or the University of Dar es Salaam. This paper does not discuss the developments which took place after Feb. '81.
to resort to the "unity is strength" ideology.

Some politicians like the late Kwame Nkrumah advocated a federal path to forging this greatly desired continental unity. This aspiration for African unity turned out to be a longing for unity qua unity, without putting into serious consideration what it meant to the dominant class forces in these new states. The federalist approach ignored the interests that each of these dominant national class forces had at stake. During the first years of the 1960s, the fever that the prospect of pan-Africanism had raised fell, with the compromise of forming the OAU as a forum to talk matters out, while each member country maintained its national sovereignty. This abandonment of the idea of African political integration came as a response to a real contradiction - that between continental unity and national sovereignty, and, of course, the contradiction between the interests of the different national petty bourgeoisies that inherited state power from the outgoing colonial regimes.

Then came another approach to integration, often called the neo-functionalist approach, consisting of the formation of national integration groupings modelled on the basis of the customs union theory. The idea behind this approach is that functional cooperation based on a set of economic activities, in this case trade, would gradually, through a process of politicization, spill over into political integration in a given region or sub-region.

The customs union theory, itself, has it that a successful regional integration will result from the creation of free trade areas, customs unions, common markets, and economic unions within a given region. These arrangements represent successively higher degrees of integration. In a "free trade area", tariffs and quantitative restrictions are abolished on trade on local products between the participants but each country retains its own tariff against imports from non-members. A "custom union" involves not only free trade between its members but also a common external tariff. The "common market" is a more developed form of integration in which, in addition to free trade, obstacles to the movement of some or all of the factors of production within the grouping are also removed. In the still more advanced form which is termed "economic union", fiscal, monetary and other instruments of economic policy are also harmonized or integrated.

The origin of this approach to regional integration is Western Europe; the founder members of the EEC, to be precise. The stipulated advantage of the customs union approach is that it is expected to provide member states with the benefits of a wider market. The enlargement of the size of the market for firms otherwise producing below optimum capacity sets "economies of scale" working. A large
market is also thought necessary to sustain heavy industries such as engineering and chemical plants. Enlargement of the market, therefore, should ensure the smallest unit cost of production within the integrating area, which will further stimulate demand and consumption and so lead to increased investment and growth. Regional economic integration is also expected to promote economic efficiency through specialization and easing of trade transactions because of changes in the degree and nature of competition and reduction in the uncertainty and arbitrariness of trade policies of individual countries.

A detailed assessment of how realistic these stated advantages of the approach are and to what extent regional integration proceeds from this functional approach, lies outside the scope of this paper. Suffice it to say that even in the case of the EEC member countries, the realization of the benefits has been limited and the problems have been abundant.

According to Haas:

regional integration in Western Europe has disappointed everybody: there is no federation, the nation state behaves as if it were both obstinate and obsolete, and what once appeared to be a distinctive 'supranational' style now looks more like a huge regional bureaucratic appendage to an intergovernmental conference in permanent session.

The few successes registered within the EEC are often attributed to the following unique characteristics of the region:

highly developed price systems permit the exploitation of cost differences; existing industrial structures in each country allow all to benefit from the effects of increased intra-industry specialization; infra-structure similarities discourage the concentration of foreign investments in any single member unit; and the existence of highly developed transport and communications facilities promotes intraregional exchange.

The running out of steam of the pan-Africanist ideology and its federalist approach to integration created a methodological vacuum as regards the forging ahead of the much desired integration in Africa, but very soon this vacuum was filled. Was the EEC model not there to copy? If the six founder members of the EEC nursed their Second World War wounds using the neo-functionalist approach to integration, why couldn't Africa nurse its colonial wounds in the same way and prosper quickly like war-torn Western Europe? Thus a new fever shook the continent. Regional economic groupings formed on the customs union formula borrowed from the EEC mushroomed on the continent. Most of the groupings listed at the beginning of this paper
came into being in this way.

But alas, in these groupings the level of integration, where it exists at all, is far from being satisfactory. Various studies undertaken to assess African regional economic groupings based on the neo-functionalist approach depict them as either ailing or disintegrating. Examples of such studies are Diouf (1979) on UDEAC, CEAO and ECOWAS; Mbogoro (1978) and Mwase (1977) on the EAC.

The identified causes of this bad record are many, but somewhat similar in all the groupings. One of the problems has been the difficulty of effecting equitable distribution of industries among the members of the regional groupings, because the member countries cannot control the investment policies of the financial oligarchy which invests in industries, because it prefers to invest where there already exists an infrastructure which would facilitate the reaping of big and immediate profits. Related to this is the fact that a customs union makes the non-industrialised members within a grouping lose a lot of customs revenue which they would normally collect upon importing from outside the customs union. These problems create at one and the same time "poles of development" and "poles of stagnation" within the regional grouping.

The other problem relates to lack of significant financial flows within the regional grouping because trade is dominated by exports of raw materials to metropolitan countries. These raw materials cannot be bought by the developing countries of the groupings at present, because of lack of technology to transform them into finished and semi-finished products. It has also been argued that ideological differences have impeded the integration process.

This said, one would like to know whether or not the neo-functionalist approach to regional integration in an underdeveloped economy has ever been given enough consideration. In our view, yes. There has been enough debate which has left the theorists on the subject divided. Some have expressed optimism, while others have expressed pessimism. The optimists have said that the neo-functionalist approach to regional integration can work in underdeveloped countries but under specific conditions. For example, Wionczek sees the possibility of successful integration:

an integration programme has to be worked out by the regional grouping. This programme must incorporate the following elements: a treaty for the gradual establishment of customs union; a regional mechanism for settlements and monetary coordination; a regional development bank; a system to co-ordinate incentives for regional and external private investment; an instrument that promotes the aims of industrial specialization by
agreement; and a fund to compensate those countries which are relatively less developed. In addition the functioning of all these elements presupposes that the developed sector of the world economy will co-ordinate its economic aid policies toward the customs union territory.

Green and Krishna think the approach can work, provided that its application is not dogmatic. They suggest that it is possible and valuable to agree on market integration and the location of specific activities within each country without at the same time creating a full economic union. Since this exercise requires institutions for ensuring coordination and continuity, they recommend an overall decision-making body linked to an administrative and research secretariat. This done, coordination and partial unification is recommended. They suggest that, for example, national plans can include the programmes of regionally operating bodies and the relevant sections of national and regional body plans can be prepared jointly. Also national plans can be coordinated, preferably before official publication, to avoid clear duplications, resolve conflicts or fill gaps.

Axline, whose arguments are in many respects similar to those of the other optimists mentioned above, says that while the customs union approach to regional integration is suitable for developing countries, there is need for the "national actors" to consciously keep the "exogenous actors" under control. He identifies exogenous factors as: aid policies of donor countries and international organizations, trade policies of industrialized countries, and the activities of multi-national corporations. He further says that unlike in the case of integration among developed countries, the gains reaped from integration among underdeveloped countries are not "welfare gains, but gains of development and reduction of dependence."

The pessimists on the question of the practicability of the neo-functionalist approach to regional integration in underdeveloped countries can be represented by Jalloh, who, after discussing the incompatibility of underdevelopment with the neo-functionalist approach to integration, concludes that "regional integration is impossible in an environment of economic and political underdevelopment".

We subscribe to this stand, because in our view, regional integration under a lopsided dependent capitalist economy cannot solve the underdevelopment problems for which it is advanced as a solution. Implicit in this stand is the assertion that the motive force behind regional integration in Africa, and indeed in the Third World, lies in the conditions created by underdevelopment, or as Thomas says, "Third World regional groupings find their mainspring in the levels of poverty and underdevelopment of productive
resources. Despite the concern of the optimists over the peculiarities of underdeveloped countries and the prescriptions they have made in order to make the neo-functional model of regional integration work successfully in these countries, almost all the experiments have fared very badly, the extreme form of these bad results being the collapse of the East African Community.

These failures have necessitated some redefinition of the approach, with special reference to where emphasis ought to be put. Thus, Obbo says that,

emphasis should be shifted decisively from trade matters towards joint endeavours in the development of regional industrial and agricultural resources and of a common transportation infrastructure. The traditional preoccupation with reliance on market mechanisms through trade liberalization and external protection have had only a limited impact on growth, virtually none on structural development and through the imbalances they create, have raised political obstacles to co-operation even before substantial economic gains could be secured for the countries in co-operation.

UNCTAD, in whose mandate the issue of regional cooperation and integration among developing countries lies, has redefined the approach in terms of the execution of regional projects. For UNCTAD, regional projects are:

projects which not merely contribute to the attainment of certain national objectives in the country in which the investment is made but also contribute to the complementary or the economic interdependence, or both, of that country with one or more other countries with which it shares a common objective regardless of its scope (it may be a free trade area, a customs union, a common market or some agreement between two or more countries at the project or sector level)... Regional projects mean projects (a) whose viability requires the cooperation of two or more countries in a region or sub-region whether in terms (i) of market, (ii) of production factors, or (iii) of financing research and training services; or (b) whose execution depends on the use of material resources situated in two or more countries or which strengthens communication links between the countries of a region or subregion; or (c) which contribute to coordination of the economic policies of two or more countries in a region or sub-region, or (d) which enable a relatively less economically developed country to make greater use of the opportunities proffered by the system of cooperation to which it belongs.
The latitude of this definition shows a clear shift in the concept of regional integration. Whereas the federalist and the classical customs union approaches envisaged political union and a political community; respectively, as the ultimate goal of integration, this new concept of regional integration is much less ambitious and limits itself to the realm of regional economic cooperation.

This cooperation embraces a variety of sectors. Reviewing economic integration among developing countries, the UNCTAD secretariat recommended that economical groupings should devote special efforts to the co-ordinated development of (a) road, railway and river transport; (b) common river basins for the purpose of providing the less developed regions with cheap sources of energy as well as irrigation possibilities to support their generally inefficient agricultural sectors, and (c) specialized schools, training institutions and health services serving the entire region.

The stipulated rationale behind this type of cooperation is that

... most of such projects are indivisible by their very nature. Consequently they are particularly unsuited for implementation on a purely national basis by the least developed countries, whose small economic dimensions would not permit full capacity utilization of such major investments.

... But even other infrastructural aspects that could be considered purely national deserve being included within the grouping's joint infrastructural plans because this can be the only way in which the least developed countries can be financially and technically enabled to do so.

As regards the financing of the projects, the UNCTAD believes that "regional coordination would make it easier to secure foreign financial assistance, which is hard to obtain for strictly national projects which are often ineffective". This expectation follows from declaration 23 (II) of UNCTAD at its second conference. In the above declaration, developed capitalist countries said they were prepared to support, in the allocation of their financial and technical assistance, initiatives in regional cooperation by the developing countries. The socialist countries of Eastern Europe also said they would extend their support to the developing countries in accordance with their principles. The same commitment featured in the international development strategy for the second UN development decade.

One thing worthy of note at this point is that, although the orthodoxy of creating customs unions has been de-emphasized, regional integration has been encouraged even
further. Capitalist as well as socialist donors give preference to regional projects, and this not without reason. In the case of capitalists, a regional grouping, through the formulation of regional projects, creates a broad and uniform regional market for capitalist exploitation. Thus, according to Sackey, the integration movement in the Caribbean was "dominated by the need to provide the opportunity for expansion of the transnational corporations of the region, and the local classes in alliance with them".  

Sackey also observes, with reference to capitalism, that "regional integration can be used to eliminate socialism in one or more of the members who have socialist orientation or the inhibition of a socialist perspective of national growth and transformation". 20 He argues that "this can be effected through the supranational institutions created and run by the secretariat which are not supposedly directly instructed by individual states". 21

In the case of the socialist countries' preference for supporting regional projects, they, too, find a regional grouping bigger than single countries in terms of widening their area of influence. However, according to their "principles", very few regional groupings if any, have qualified for the assistance.

Besides the above exogenous factors associated with contemporary regional integration in Africa, Sackey identifies an endogenous factor encouraging regional integration to date, despite the many failures of the past. He views regional integration as an aid to governments in their legitimization of power. In this case, regional integration serves as "a tool to divert attention from the domestic political structure to the remote political problems that integration inevitably presents". 22

It is also important to note that the underdeveloped countries and the developed countries are not the only actors in regional integration. In between the two stand specialized agencies such as UNCTAD, UNDP and others, whose role as middle men cannot be taken for granted as we will see in part 2.2. of this paper.

The creation of the Organization for the Management and Development of the Kagera River Basin springs from the belief that the alleged advantages associated with regional cooperation and integration as discussed above, will help to develop the sub-region concerned. We now turn to the grouping in question and we will try to analyse the process of integration within it, its problems and prospects.
A short history of the Organization for the Management and Development of the Kagera River Basin

Activities leading to the creation of the organization started in 1969 when a meeting of experts from the four states of the Kagera river basin — Burundi, Rwanda, Uganda and Tanzania was held at Entebbe on July 9. The aim of the meeting was to look into the possibility of starting a regional development project geared towards studying the hydroelectric potential of the basin and the extent to which this potential would be multi-purpose in terms of the future development of the region. This meeting resulted in the creation of a technical committee composed of one representative from each participating state. It further led to a joint request, by the participating states, for UNDP assistance.

The Entebbe meeting was soon followed by a technical committee meeting in Bujumbura on August 11-13, 1969. The Bujumbura meeting outlined about seven projects covering hydro-electric power, fishing and tourism, and recommended to the participating states that necessary steps should be taken for the successful implementation of those projects.

In 1971, UNDP responded positively to the request for assistance made by the riparian states by contributing about US$671,324² to develop the Kagera river basin. With this financial assistance, consultancy work and the required investigations began.

Since no systematic studies of the basin had been conducted before, data collection became the first priority of the project. It was in the light of this priority that the UNDP, in its capacity as the executing agency of the project, entered into a US$110,000² contract with the Polytechna-Hydroprojekt-Carlo Lotti & Co. consortium on September 29, 1971 for carrying out the first phase of the project — planning the development of the Kagera river basin.

The objective of the project was the preparation of a plan for the optimal development of the Kagera river basin’s land and water resources, for carrying out training activities related to the development of these resources, and the establishment of an appropriate institutional body for the joint management of the development of the resources.

Polytechna-Hydroprojekt-Carlo Lotti & Co. undertook the surveys according to the terms of reference given to it and submitted a report and a set of recommendations which, for lack of space, we will not mention in this paper. Suffice it to say that the gist of the report was a call for further research to fill data gaps and to create a
Kagera river basin authority to manage and coordinate development activities at a regional level.

Mention of the role of UNDP and its hired consortium in the project should not obscure the activities of other participants. The technical committee for the Kagera river project, in its role of counterpart agency to the UNDP, held a number of meetings during this period to monitor the project. Besides, the three states participating in the project duly paid their financial contributions. Tanzania contributed TShs.464,000 ($65,000) in 1971, Rwanda contributed RW.Frs7,500,000 ($70,000) in March 1972, and Burundi paid its contribution of Bu.Frs2,100,000 ($24,000) in January 1973.

Meanwhile, UNDP established contacts with various bodies, including some UN agencies, for the preparation of studies that were intended to be a component part of the second phase of the project. The agencies contacted during this time were: the regional WHO office in Brazzaville and FAO for the health component of the second phase of the project, FAO for the preparation of fisheries studies, the UNESCO office in Nairobi for advice on ecological studies, and WMO for hydro-meterological studies. All this brings us to 1974 on the time-line.

The findings and recommendations of Polytechna-Hydroprojekt-Carlo Lotti & Co., the various consultations between UNDP and the above said agencies, and the technical committee recommendations, led to phase II operations of the Kagera river basin project. The stipulated objective of the second phase was the preparation of an indicative plan based on the existing data and on a minimum of additional data collection, an assessment of potential for development in certain sectors, and the preparation of a limited number of pre-feasibility studies. This plan was required to present to the governments of the three countries the main options open to them, taking into consideration their national priorities. Furthermore, the plan was required to outline the advantages, real or potential, implied in the choice of a truly regional, as distinct from national approach to the basin's development.

This phase drew in more actors. Principal among these was Norconsult (Norway)/Electrowatt(Switzerland) Consortium which signed a contract with UNDP in mid-1974, undertaking to prepare the indicative plan. Others were Geosurvey International Ltd for aerial photography and precise levelling and cross-sectioning topographic surveys of the basin; Tourism & Transport Associates (UK) for a regional study of the potential for international tourism in the Kagera river basin; I.T.U. to investigate the telecommunications problems in the project area; UNIDO in relation to studies on small industries and on banana processing and the
utilization of banana products; and the Belgian Government which through its Administration Générale de Co-opération au Développement (AGCD) signed a protocol agreement concerning a joint request by the Governments of Burundi, Rwanda and Tanzania for the study of hydroelectric power development of the Kagera river at Rusumo.

The protocol was signed at Kigali on 22 October 1976. Following upon this, on 20 June 1977, the Belgian Government commissioned a consortium of Electrobel/Tractionel to conduct studies on the hydroelectric power development at Rusumo falls, including the agricultural implications of the scheme. The contract of this consortium had two phases. The first phase concerned feasibility studies leading to the optimization and choice of the height for the proposed reservoir to replace those susceptible to inundation by the reservoir, while the second phase consisted of detailed studies to permit the call and award of tenders for the construction of the Rusumo hydroelectric scheme.

By May 1977 Norconsult/Electrowatt consortium had submitted its thirteen volume final report, the thirteenth being the indicative basin plan itself. The indicative basin plan reflects three basic premises of the embedded planning strategy. The first premise is that self-sufficiency in food must be the first objective in the development of the region. The second premise is that subsistence agriculture, which is the primary economic activity in the region and uses virtually the entire work-force, is carried out in the extended family mode of production under traditional practices and has little or no capacity for expanding production without inorganic fertilizer to restore and maintain soil fertility. The third premise is that the only important economic asset in the region is hydro-power.

The above studies, reports and recommendations resulted in the agreement for the establishment of the organization for the management and development of the Kagera river basin, also known as the Rusumo Agreement, which was signed by the heads of state of Burundi, Rwanda, Tanzania on 24 August 1977. The agreement came into force on 5 February 1978.

Since the establishment of the organization, a number of developments have taken place. Up to the end of 1976, most of the activities of the Kagera river basin development project had been financed by a UNDP fund coded RAF/71/147. Afterwards, as this fund was exhausted, UNDP drew up a further programme of assistance for the interim period starting from 1 January 1977 to the end of December 1978, under the code RAF/76/034. Through this, a sum of US$230,000 was made available, and it was intended to cover:
fellowship for nationals of the three countries for training in interpretation, the cost of fielding a UNDP-sponsored multidonor mission to the Kagera basin, and also to cover the cost of consultant missions to assist the governments in developing an integrated, coordinated programme for which external assistance could be provided not by UNDP but also by other donors.

In addition to UNDP fund RAF/76/034, the activities of the organization have been supported by the governments' contributions to the secretariat's budget estimates for the period 1 January - 31 December 1979, covering both recurrent and development expenditures, the three governments were required to contribute a total of US$2,603,446 of which Tanzania had to contribute $1,041,378, Rwanda $811,206 and Burundi $650,862.

After 1978, the number of new actors that have influenced the activities of the organization has increased. Uganda, after the fall of Amin, has participated in the organization's conferences as an observer, and is considering taking up its right of accession to the Rusumo agreement. A new consultant mission, Norbert Beyard (France), undertook the said task of developing an integrated, coordinated programme. The mission arrived in Kigali, the headquarters of the organization, on 30 May 1978 to begin its work.

Later on, a consultative conference of donors was held in Paris, for the period 15-17 October 1979, bringing together the following potential donor countries: the Federal Republic of Germany; Austria; Belgium; Finland; France; Italy; U.S.A.; with Australia and Sweden (both of them as observers). In addition, the following international agencies and organizations were also represented: UNCTCD, ILO, FAO, UNIDO, WHO, UNESCO, ITU, World Bank, IFAD, EEC, ADB, ECA, IUCN and UNDP.

In 1980, a multidisciplinary, multidonor mission was organized with a view to assist the organization in the establishment of a detailed programme and the budget of each study to be undertaken, in defining and preparing "bankable projects", and in defining and initiating the studies required for the preparation of a comprehensive plan for the development of the basin. By February 1981, a "good" report had been submitted to the parties concerned.

After a period of about eleven years during which the organization has been growing by phases, a camera's eye presents the following view of the organization: an institution enjoying diplomatic privileges and immunities, composed of two major organs; a commission and a secretariat. The secretariat has three departments: (i) the department of research and statistics; (ii) the department of projects, planning and execution; and (iii) the department
of management and administration.

Each of the member states is required to contribute a certain percentage of the funds for the functioning of the secretariat, and the secretariat is supposed to be a supranational entity.

In the performance of their duties the Executive Secretary and his staff shall neither seek nor receive instructions from any government whether of member states or otherwise or from any other authority outside the organization.

The organization is responsible for dealing with all questions relative to the activities to be carried out in the Kagera basin, notably: (a) water and hydropower resources; (b) the furnishing of water and water-related services for mining and industrial operations, potable water supplies for other needs; (c) agriculture and livestock development, forestry and land reclamation; (d) mineral exploration and exploitation; (e) disease and pest control; (f) transport and communications; (g) trade; (h) tourism; (i) wildlife conservation and development; (j) fisheries and aquacultural development; (k) industrial development including fertilizer production, exploration and exploitation of peat; (l) environment protection. We feel this coverage is too ambitious, in that the activities are too many for the organization. However, a reasonably implementable action programme based on a limited number of priority sectors, has been drawn up. The priority sectors identified by the organization are: agriculture, transport and communications, energy, and training.

The jurisdiction of the organization is the basin itself, which lies between about 0°45' and 3°35' south latitude and 29°15' and 30°50' east longitude. It occupies about 60,000 km² distributed among Burundi 22%, Tanzania 35% and Uganda 10%. The basin has a population of about 6.5 million people.

Some problems encountered

This short history of the Organization for the Management and Development of the Kagera River Basin would be incomplete if we did not highlight some of the problems the organization has faced throughout its growth. As we said earlier, Uganda was initially interested in the Kagera basin regional scheme, but as a result of the 1971 military coup which brought Amin to power, it pulled out of the scheme, which meant a loss of one actor - disintegration at a time when efforts at integration had just begun.

Closely related to the Uganda coup and Uganda's withdrawal were the troubles between Uganda and Tanzania in 1972, involving the bombing of Bukoba and Mwanza towns by Ugandan airoplanes, and the closure of the Uganda-Tanzania
A cooperative approach to development

border. This resulted in the discontinuation of air connections between Bukoba and Entebbe and therefore between Bukoba, Kigali, and Bujumbura, thus necessitating the rerouting of all the project's mail via Dar es Salaam and Mwanza, hence causing long delays in communication. At the time the project's temporary headquarters was in Bukoba.

There was more political unrest that affected the activities of the Kagera basin project, namely: the strained relations between Rwanda and Burundi. Joubert describes the problem thus: "Our work was hampered to some degree by the various tensions within and between the participating and neighbouring countries. The strained relations between Rwanda and Burundi, especially after the events of 1972, do not facilitate co-operation in international projects". 34

There is yet another example of short-lived political tension which threatened the regional integration process, although not directly. This time the tension was between Burundi and Tanzania. On 2 July 1973, Dar es Salaam and Kigoma dockworkers decided to boycott the handling of all cargo to and from Burundi, demonstrating their indignation and condemnation of the raids that the Burundi troops had been perpetrating against Tanzania. However, the boycott ended on 23 July 1973, following a tripartite accord signed in Dar es Salaam between Presidents Nyerere, Mobutu and Micombero, in which the Tanzania Government undertook to restore normal relations after President Micombero had acknowledged the incursion into Tanzanian territory by Burundi troops and had promised to pay compensation for loss of life and destruction of property.

The other political event that affected the activities of the Kagera river basin project was the overthrow of the Rwandan Government in July 1973. This overthrow and the political uneasiness which preceded it were largely responsible for the interdiction of aerial photography over Rwanda, and consequently for the failure to carry out this operation over Rwanda and west lake region by Geosurvey International during the dry season that year. This seriously upset the project timetable.

From point of view of UNDP, delays in obtaining governments' answers on specific issues constituted another problem in the functioning of the Kagera river basin project. The 1973 project manager explained this problem thus:

... Since every step in the project must have the official concurrence of the three governments, and since usually at least one of them (with the exception of Tanzania) answers only after exceedingly long delays and repeated reminders, our moves are considerably slowed down. Usually a verbal agreement, or verbal comments are given promptly by the officer in direct charge, but
the official answer must go through official channels, where it is considerably delayed.

Other problems relate to the difference in the national interests of the three countries in the project. The responses of the three countries to the indicative basin plan prepared by Norconsult/Electrowatt are a good illustration of this difference. For example, Burundi complained that the Gitega hydroelectric project was evaluated on the basis of inadequate data and was denied the priority it deserved, taking into consideration the fact that the country primarily relied on the project for its independence in power generation.

On the other hand, Tanzania was unhappy with the consultant's report on the grounds that the indicative basin plan recommended the exclusive concentration of the project on the production of energy for the manufacture of fertilizer, a priority which it considered as a waste of resources, because natural gas which had been discovered in Tanzania could be used for fertilizer production. The position of the Tanzania Ministry of Water, Energy and Minerals was described thus: "...We are definitely opposed to the idea of using electricity to produce ammonia-based fertilizer. Gas could be used instead of electricity which should be used to meet other important demands".

As for Rwanda, its priority has been the railway line feasibility study to link Kigali and Dar es Salaam to unlock the former. Acknowledging the existence of differences in the response of the three countries to the indicative basin plan, Berthelot wrote:

It seems the member states do not entirely agree with the indicative plan - Tanzania is in favour of the Kagera power but not exclusively for fertilizer production. Rwanda and Burundi seem undecided.

This difference in national interests has continued unabated to date. A May 1979 report shows this clearly:

... Despite quite a friendly prevailing atmosphere it appears that the three member states have sometimes different views as regards priorities and programme execution. There was also a tendency to question the authority of the Executive Secretary although the Statute of the Organization designates him as the Chief of the executive body. Originally there was also a certain misunderstanding on the most efficient approach to the donor community. Even though UNDP undertook to give a clear picture of what it recognized to be the best approach based on its experience, it was not always completely followed by Rwanda and Burundi in particular.

The Organization for the Management and Development of the Kagera River Basin has experienced the problem of delayed payments to the financial contribution by some member
countries, and this has had some negative effect on the carrying out of the organizations' activities. For example, by 30 June 1978, the organization's record showed arrears of US$134,959, of which $91,487 and $43,472 had not yet been contributed by Rwanda and Burundi, respectively. The same problem was reported in May 1979: 

... It appears that although the stature of the Organization has been endorsed by the Commission and the member states, the contributions of the member states are still unpaid in the amount of 60%. In this respect, UNDP underscored the imperative necessity for the member states to pay their contributions prior to the conference of donors...

One more problem worthy of mention here is Egypt's reported unhappiness about the implementation of the Kagera river basin project, on the grounds that the project might interfere with the normal flow of water into the Nile. However, apart from the concern this alleged unhappiness raised in certain forums of the project, it did not retard any of the activities of the project.

These and other problems, like frequent shortages of local staff because the governments often found it difficult to second their qualified staff to the project, dearth of much needed data, inadequacy of all sorts of equipment, have characterized the last eleven years of regional integration efforts within the Kagera river basin. Mention should also be made of the delay in securing financial and technical assistance from foreign donors.

**A critical analysis**

A critical look into the regional integration process within the Organization for the Management and Development of the Kagera River Basin leads to a number of questions. One of those questions is: what motives led to the creation of the organization? We will try to identify some causal variables we consider to have set the integration ball rolling.

First of all, it is very clear from the objectives of the 1969 Entebbe conference that ab initio the scope of integration was never intended to reach any point near the creation of a federation of the riparian states concerned. Therefore, considering the urge to form a federation or a union as a cause for creating the organization is out of the question. The neo-functionalist element of recourse to regional economic cooperation in selected sectors is very clear at the outset. The question that arises is: Why this recourse to regional economic cooperation at that particular time?

We share Jalloh's assertion that in underdeveloped countries, "political and economic underdevelopment creates
conditions for which regional integration is advanced as a solution. We therefore make the proposition that when Burundi, Rwanda, Tanzania and Uganda convened their first consultation conference at Entebbe in 1969, they were being pushed by the realization that underdevelopment was persisting and even being exacerbated despite the political independence they had lived with for some years. They realized that in their national economies, the characteristics of underdevelopment, namely: unevenness of productivity as between sectors; disarticulation of the economy; and domination from outside were continuing unabated. So, in our view, the creation of the organization came as an effort to counter underdevelopment on a collective basis in some kind of "trade union" of the poor. However, since underdevelopment in the present epoch is caused by exploitation in the context of a capitalist mode of production, it logically follows that solving underdevelopment problems calls for a breakaway from this exploitative mode of production into a different mode of production, where production relations are non-exploitative. Following the same logic, one finds that scientific socialism is the sole lasting solution to underdevelopment problems.

Is this logic discernible in the activities and aspirations of the organization? The answer is no. Judged by the letter of its agreement, the organization does not indicate any conscious attempt to move away from the capitalist production relations prevailing in its member countries. Worse still, it even shies away from stating categorically that the coming together of the countries concerned is a result of a basic finding - that underdevelopment engendered by imperialism continues to be a menace to the peoples of the sub-region.

Thus, in the preamble to the Rusumo agreement, the rationale given for the establishment of the organization is stipulated in terms of a desire "to further develop and reinforce the existing cooperation between the three countries"; a commitment "to develop the potentials, in particular, hydropower, fishing, agriculture, mining, industries and tourism"; a recognition that the Kagera river basin constitutes a geographical unit offering "a valuable base for fruitful cooperation between the riparian countries"; a resolution "to make use of the satisfactory work done by the Technical Committee and to advance their joint efforts effectively towards the realization of the desired development of the area"; and the conviction of "the necessity to have a multinational institutionalized Organization with strengthened structures to effectively attain the desired objectives".

If we were to take the above reasons for the establishment
of the organization as causal variables, we cannot help pointing out that these are weak, secondary causal variables. For us, underdevelopment and dependence constitute the fundamental causal variable. Yet, on the identification and clear statement of this fundamental causal variable, the agreement remains decided mute. Is this an accidental omission? Our answer is no. If commitment to combat underdevelopment (emphasis added) does not feature anywhere in the agreement, it is because such a commitment is synonymous with combatting imperialism. If the financial, technical and other resources to implement the projects envisaged in the basin are expected mostly from imperialist donors, would it not be unwise to state categorically that the would be donors are the target? In this case would the donor provide tools for his own destruction? So, with this rather naive way of thinking the real cause for regional integration is conveniently left out in the agreement.

This cowardice is very much undue, because capitalism needs projects like the one envisaged in the Kagera river basin in underdeveloped countries where the organic composition of capital is low, in order to overcome the problem of the tendency of the rate of profit to fall. Therefore, a statement of intent to combat underdevelopment would not deter the capitalist donors from supporting a scheme when they know for sure that participation in the scheme would revitalize the process of realization of surplus value. Conversely, such a silence would not at all help in securing funds from capitalist donors for reasons of philanthropy if it became clear that the proposed projects were not profitable to the donors.

This omission of the fundamental causal variable from the text of the Rusumo agreement is compensated for by mention of it elsewhere. For example, at the conference of the commission for the organization, Prime Minister Sokoine acknowledged a desire to get rid of underdevelopment thus:

... We strive for co-operation not only because we are committed to the achievement of African unity, but also because we believe it is only through mutual co-operation that many of our poor countries in Africa would even be able to liberate our people from forces of underdevelopment. (emphasis mine)

Another factor that might have influenced the establishment of the regional organization is the need for easy access to economic and technical assistance in a situation where these are an object of high competition. As we said earlier, the aid policies of governments of advanced countries and international organizations are such that regional economic groupings are given priority. Thus, in order to secure such aid the countries concerned constituted themselves into
a grouping to enhance their eligibility for aid.

The other factor leading to the establishment of the organization is what we earlier referred to as the desire for unity qua unity, embodied in a quasi-moral feeling that Africa should still unite even though not in the form of a federation—that piecemeal approach whereby close cooperation at sub-regional level would gradually lead to a broader African unity. The ghost of pan-Africanism has never ceased haunting the African leadership.

Does the establishment corroborate James Sackey's thesis that often governments need regional groupings as an aid to legitimization of their power by using the groupings as a tool to divert attention from domestic problems? There is no proof that this might have been the case. However, the period immediately before and after the signing of the Rusumo agreement saw a significant campaign for regional cooperation from the top echelons of leadership in the three countries. It would be interesting to note the timing of the signature of the agreement establishing the organization in relation to other events. At that time, the East African Community had just broken up, so that Tanzania had lost its membership in the East African grouping. However, this coincidence does not explain anything as regards whether or not Tanzania felt the need to fill the gap created by the loss of a regional framework within which, and perhaps under the cover of which, to operate. In the case of Rwanda and Burundi, both of them were under regimes that had come to power through coups in a not too distant past so that for them the establishment of legitimacy was a concern of top priority. Therefore for these, partnership with Tanzania might have been a reassuring political avenue, especially because of Tanzania's strategic position as a doorway to the Indian Ocean and its relatively long history of political stability.

Thus, if Sackey's observation is right, the question of legitimization of power as a motivating factor to integration would apply more to Rwanda and Burundi than it would to Tanzania. The latter's interest would rather be sought in its trade prospects in a situation where the community had ceased to exist. Tanzania's second five year plan had put emphasis on industrialization in the consumer goods sector, which was expected to expand and even produce for export. If this were to be the case, Rwanda and Burundi would be potential clients, and belonging to the same regional economic grouping would have placed Tanzania in an advantageous position, in terms of competing for this market. However, even if this had originally been the idea, the traditional trade ties with western countries such as Rwanda and Burundi have persisted with only negligible changes.
A cooperative approach to development 119

We have said earlier that the establishment of the Organization for the Management and Development of the Kagera River Basin did not proceed from a federalist approach. What kind of theoretical approach do we then discern from the said establishment? Clearly, the approach employed is a neo-functionalist one, except that the idea of creating a customs union is not part of the approach. It responds to Green and Krishna's recommendation to depart from dogmatism by identifying specific economic activities in the countries forming a regional grouping, and coordinating these activities using an overall decision-making body linked to an administrative and research secretariat. As we said earlier, specific sectors, viz. agriculture, transport and communications, energy, and training have been selected, and an inventory of priority activities in these sectors has been made for subsequent collective implementation. A commission which is the overall decision-making body has been formed and it is linked to the organization's secretariat.

What still seems to be lacking is the harmonization of national development plans of the three countries on the one hand, and that between the organization's plan and the three national plans on the other hand. Not until this stage is reached can we say that the Green-Krishna neo-functionalist model has been fully implemented.

We failed to get any evidence of significant harmonization of planning among the three countries currently constituting the membership of the organization. We were only able to discover certain isolated aspects of the aggregate activities supposed to fall under the jurisdiction of the organization in national plans. For example, volume II of Tanzania's third five year development plan registers the Kagera river basin scheme as a project. Also the Shs325 million work on the 347km road linking Tanzania's Central Railway line to Rwanda is included in the plan. Rwanda, on its part has included a survey of the Rwanda side of the proposed Rwanda-Tanzania rail link in its five year development plan.

The planning approach adopted by the organization does not point to eventual harmonization between the organization's plan and the national plans of the member countries. At present, the organization's planning has been assigned to a "multidonor/multidisciplinary mission" composed of about fifteen experts. The national development planners of the three countries are not there to compare notes on their respective priorities and overall planning strategies. In view of this, the resulting plan acteur is likely to be lacking in qualities that would enable each of the member countries to smoothly adjust itself to it. This difficulty of adjustment might be
exacerbated by other factors like overlooking certain ideological considerations.

This question of ideology as a variable in the harmonization of planning calls for a minute of reflection. National development plans are normally a reflection of the political ideology in force. It so happens that the member countries of the organization do not share the same political ideology. Tanzania, at least in theory, has decided to follow a socialist philosophy of development and this gives its national development plan a socialist orientation. Rwanda and Burundi have not yet committed themselves to a socialist course and this makes their national plans, and therefore their priorities, different from those of Tanzania. We therefore find an in-built impediment to planning harmonization in the grouping.

Lack of harmonization between the organization's plan directeur and the national development plans complicates the task of equitably allocating resources to regions in each of the countries. Once the basin's plan directeur is ready, it will be affecting the regions and the sections of the population which fall within the basin for each of the member countries. This means that those regions and populations will be the immediate beneficiaries of the organization's development fund, and this is an advantage over the regions and populations outside the basin. Yet, the financial contributions to run the organization are incurred on a national basis, and not by the sections of the population within the basin only.

In this case, the need for planning the national economies rationally and equitably arises. The national development plans, when allocating development funds to the areas falling within the basin should take into account the resources the organization has allocated to those areas, and devise a formula to level up regional allocations accordingly, lest the regions within the basin are over-funded and made beneficiaries of two overlapping development planning systems. This kind of necessary check and balance won't be possible unless the organization's plans and the national plans are harmonized.

Furthermore, an overview of the objectives of the organization shows that its activities are a multi-sectoral aggregate of what several national ministries in each country are assigned to do. This phenomenon points to the possibility of unnecessary duplication but the reverse of this is also possible. The reverse of duplication of work can happen in the form of negligence, if a ministry believes that the carrying out of a certain task is the responsibility of the organization, or vice versa. This can impair the development of the affected sector. We notice here again the necessity for coordination between the organization and the ministries of the member countries at the
level of planning. We strongly feel that the national planning experts of the governments concerned should have a very decisive say in planning for the organization rather than a "multidonor/multidisciplinary mission". This does not mean that participation should be denied to some experienced planners from outside the national framework.

The neo-functionalist approach to regional integration, à la Haas et al, also emphasizes the element of equitable distribution of the gains of integration among member states. In this regard, the Rusumo agreement has certain provisions to cater for equitable distribution, such as the equitable distribution of senior jobs in the organization. For example, on the question of the secretariat's staff, article 8 of the agreement stipulates that "the Executive Secretary shall be appointed by the Commission for a period of four years in rotation (emphasis mine) amongst the member states "and that "such other staff will be appointed by the commission on the basis of qualification and experience bearing in mind the equitable distribution (emphasis added) among member states". Similarly, article 9 stipulates that "the three departments of the secretariat will be headed by Directors, one from each state".

But tenure of senior posts is not the only area where inequitable distribution can take place. The most sensitive area is how each country relates to the projects carried out on a collective basis, in terms of the derived development gains. This is where we feel the agreement is not clear, and we feel this lack of clarity may, in future, be a source of conflict. Article 2 of the agreement considers a project, work or programme to be of an inter-state nature when:

1. It involves the territory of more than one of the member states;

2. The services or benefits to be derived may be transmitted through, or received entirely or partially in the territory of member states or state, other than that of the state where the project, work or programme is to be undertaken;

3. It is likely, in the judgement of the organization, to produce substantial effects, whether these be beneficial or prejudicial, in the territory of a state or states, different from that of the state where the project, work or programme is to be undertaken.

Except for the first condition, the other two advanced as qualifying to legalize the inter-state nature of a project pose problems of potential risks of inequitable distribution of gains. This is so because the two conditions give any member with a more exploitable resource potential a loophole to mobilize collective effort to exploit those resources
to its own advantage. This is not impossible, for in many cases some sound explanation as to how a certain project is "entirely" or "partially" beneficial to the other partner can be formulated. This possibility of rationalising the inter-state character of economic projects would enable the country with bigger resources potential to benefit more from the expertise and the funds of the organization, and since the projects would be carried out in its territory, such a country would have the advantage of taking over these projects in case the organization broke up. Such a country would also enjoy the multiplier effect of such projects on its territory.

The ambiguity surrounding the distinction between national and regional projects has already been voiced. At the first consultative conference of donors the USAID representative noted that many projects proposed by the organization "appeared to be of a more national than regional nature". Also, the representative of the ADB underlined the "difficulty to conceive agricultural projects in the framework of the basin programme, since these projects may be mainly of a national nature". If past experience is anything to go by, the current problem faced by Kenya, Uganda and Tanzania in the equitable distribution of assets and liabilities of the defunct East Africa Community is partly exacerbated by the fact that each of the member states cling to the assets that were physically present on its territory prior to and at the time of the collapse of the community. Therefore, the question of calculated equitable distribution of assets in terms of territorial allocation of projects cannot be overemphasized.

By pointing out the lacunae that make the organization an imperfect neo-functionalist model of regional integration, we do not imply that, if they were not there, the organization would be a useful tool to get rid of the fundamental problem of underdevelopment. As we pointed out earlier, regional integration is no remedy for underdevelopment in a capitalist environment. As we will try to show, the organization is inherently incapable of combatting underdevelopment because of the character of its major actors; namely: neo-colonial states, developed capitalist states, capitalist private enterprises, and governmental international organizations and agencies.

Starting from the theoretical premise that the fundamental problem in the region is underdevelopment and that regional integration is wrongly believed to be the solution, let us now look at the implications. If underdevelopment is a product of capitalism in the region, it follows that underdevelopment can only end if capitalism as a mode of production is eradicated. It is a known fact that capitalism can only be eradicated through a socialist revolution, which
UNDP/ICD relationship might mean is that, in fact, UNDP might be a broker linking up underdeveloped countries with capitalist firms so that the latter introduce their exploitative businesses in the name of development. In this case the myth of neutrality is shattered and UNDP becomes unequivocally disqualified as a reliable participant in the struggle against underdevelopment.

With the governments and UNDP jointly giving direction to the activities of the organization in the region, this And where did the governments and UNDP go while prospecting for donors? The answer is obvious. To western countries and the traditional governmental international organizations and agencies as listed on page 124 of this paper. Most of the potential donors did not make any immediate pledges. Some said they needed more time. Time for what? Time to evaluate the rate of profits involved. Is it true that the capitalist firms involved in the basin will have a market for the various commodities needed such as vehicles, survey, camping, earth moving and drilling equipment, railways engines and coaches, communications, laboratory and printing equipment, insecticides, housing materials, agricultural implements, etc...

But investing in the Kagera basin projects may not be the sole or even the most economic way of capturing this market and making maximum profit. The same donors are involved in the basin by virtue of their participation in the CPGL, a regional grouping comprising Rwanda, Burundi and Zaire. They also have been approached by the eastern and southern African grouping in-the-making, of which Tanzania is a member. Thus, by being donors to these two bigger groupings, they automatically have control over the Kagera basin.

In fact, given the relative importance of the two groupings mentioned above, the future of the organization looks rather gloomy, because it seems that ultimately the Kagera river basin will become an area where two bigger groupings involving the same donors overlap. For this reason, the donors might discover that their access to the basin for purposes of investment is automatic, with or without the organization as a channel for their capital and technology.

Another factor that threatens the future of the organization is a possible division of commitment. Once
of one of the firm's engineers showed that he was a refugee of Rwandese origin. Class struggle against underdevelopment would not bother about national origin, provided that the individual was ready to use his skills to further the class cause.

The other problem is that governments, as institutions, tend to be conservative, and conservatism acts against the introduction of radical changes. This point becomes clear when one looks at the nature of the exogenous actors in the integration process within the Kagera river basin. No sooner did the riparian states conceive the idea of regional economic cooperation than they approached the UNDP, an institution with a tradition of helping developing countries. For them, this move was natural and procedurally correct. The idea of approaching an institution such as COMECON simply didn't arise. Or even if it had, at that time, it would have been vetoed by the ruling petty bourgeoisies. We do not want to entertain here the hypothetical case of whether or not Communist organizations or states would have been readily willing to help at that particular juncture.

This conservatism has several consequences. An actor like the UNDP may not be as effective in fighting against underdevelopment as many people think. A struggle against underdevelopment is by its very nature a class struggle. It is an interested (emphasis added) struggle with a class bias. The UNDP is theoretically but may not practically be a neutral specialized agency. From this theoretical neutrality alone, it follows logically that the agency would not join hands with the oppressed against oppressors, because in so doing it would be defeating its key attribute of neutrality. On these grounds, therefore, UNDP seems to have in-built characteristics disqualifying it from being an actor having the capacity of fighting underdevelopment - a struggle which is necessarily biased because of its class nature.

But to express UNDP's unfitness as an actor in the struggle against underdevelopment in terms of its neutrality is perhaps too polite a way of putting it. Gemini's Ken Laidlaw views UNDP as "an ideal organization from which companies can gain valuable insights into potential profit-making arrangements within developing countries". In 1979, UNDP entered a formal relationship with a group of multinational companies known as the Industry Council for Development (ICD). Some of the members of ICD are famous multinationals like Unilever, Shell, Nestle, Fiat, Booker-McConnell, N.V.Philips and Tate and Lyle. ICD covers agro-chemical projects, agricultural machinery, seeds development and housing. What this institutionalized
have to produce. This necessary production of cash crops will thwart the bias on food crop production. Failure to pay for those inputs will result in the multinationals involved stopping the supply of fertilizers and so the drop in food production will continue unabated. It should be remembered that the proposed improvements will be tried under the constraints of continued dependence in capital and technology.

The other strategy envisaged to raise the production of food is irrigation. However, irrigation schemes like the Rusumo dam decrease the area of available land for cultivation, thus affecting the potential total yield adversely unless a superior technology is introduced to make up for the reduced arable land. Rwanda is likely to experience such a decrease in arable land and a possible evacuation of a portion of its population, depending on the height of the Rusumo dam, and this was one of the issues that led to the Mwanza summit meeting held on 8 April 1980. the foregoing remarks about individual projects show that the overall strategy, even in its technical sense, leave alone its philosophical outlook, is full of serious contradictions.

Concluding remarks

Of all the causal variables suggested in connection with the creation of the Organization for the Management and Development of the Kagera River Basin, the most salient is the urge to counter the ills of underdevelopment in the region. Underdevelopment, however, cannot be successfully combatted using means that further integrate the region concerned into the capitalist "north". The neo-functionalist approach on which the organization is based does precisely that. It has an in-built vertical integration dynamic which links the region to the capitalist "north", thus exacerbating exploitation and dependence. Therefore, for as long as the region maintains capitalist relations of production, no fruitful regional cooperation and integration can be expected.

Successful integration in the region will be possible when the countries concerned have gone through a socialist revolution. At that time, the vertical integration that needs for technical, financial and other forms of material assistance necessitates, will be redirected to the socialist "north". At that time, proletarian internationalism will mediate between the unequal capabilities of advanced and retarded working classes, and assistance of the former to the latter will be forthcoming, unlike today when the developed east of the "north" does not want to waste its resources by investing them in a hostile exploitative
the proposed eastern and southern African trade area comes into being, Tanzania will be busy nurturing this more strategic grouping and in so doing might neglect its commitments in the relatively less important Kagera basin grouping. Rwanda and Burundi might also be more attracted to the activities of CPGL in partnership with Zaire, so that, with these divided commitments on the part of its members, the Organization for the Management and Development of the Kagera River Basin would run out of steam and collapse.

To come back to the question of conservatism on the part of the member states of the organization and the UNDP, it is interesting to note that before convening the first consultative conference of donors, a list of potential donors was made, with a bias of western capitalist countries and international organizations. After that, a sub-committee on donors conference scrutinized the list and retained 20 names, of which Yugoslavia was the one and only socialist country. Later on, the commission added the USSR, China, North Korea, Austria and Australia.

Our interest lies in the addition of the USSR, China and North Korea as an afterthought. However, for reasons we are ignorant of, these three socialist countries did not attend the Paris donors conference. The reason could be that they turned down the invitation, on the understanding that the development strategy envisaged works in favour of capitalism. If this is what happened, we think the three socialist countries were right. Why?

We have already said that the neo-functionalist approach to integration in countries that are by and large still characterized by capitalist relations of production has an in-built exploitative mechanism which benefits the capitalists, and socialist countries cannot participate in such integration schemes without getting entangled in those exploitative mechanisms.

Regarding the viability of individual projects, there are divided opinions. For example, while the organization speaks in favour of the construction of large hydro-electric schemes like the Rusumo project, there is a view that small hydro-power plants are ideal in the context of the Kagera basin.

In the agricultural sector, we would like to point out that the projected use of inorganic fertilizers will not necessarily upgrade subsistence agriculture in order to achieve the required three per cent increase in food production to sustain the increasing population growth. These inorganic fertilizers, even if produced within the region, will require imported inputs for which the peasants will have to pay. In fact, provision of an agricultural credit is envisaged. The only way the peasants can pay for these inputs is to sell cash crops which they will also
objective and subjective conditions - a task which lies beyond the scope of this paper.

Without implying that the neo-functionalist approach would bring about fruitful integration in the region at present, we have, all the same, pointed out certain imperfections in the chosen model. We think that the suggestions we have made, especially those relating to harmonization of planning and equitable distribution of benefits would avert dangers of conflicts which might ultimately lead to disintegration even on the political plane. Since the organization already exists, it would be unreasonable to let it crumble. There are other uses to which it can be put, other than that of combating under-development. For example, the countries which created the organization need each other at times of war, famine and other kinds of natural as well as man-made hazards. This is enough reason for having an institutional framework of a multinational character to undertake smooth coordination of necessary tasks. However, the tasks assigned to the organization reflect lack of realism on the part of its founders and perhaps overenthusiasm springing from the still active ghost of African unity. We feel that the sectors and activities assigned to the organization should be reduced to a necessary and manageable minimum.

Having rationalized the necessity to maintain the organization, albeit in a different form, the last question we should concern ourselves with is whether or not the forces at work allow for this rationalized survival. One of the factors standing as the sine qua non of the survival of the organization is concurrence of interest among the ruling classes of the member countries. We have already observed that the national interests of the member countries have at times been at variance, and a certain degree of severity of these differences might lead to the disintegration of the organization. We have also pointed out that the member countries belong, at one and the same time, to other regional groupings of a more strategic importance. Tanzania is a member of the eastern and southern African regional grouping in-the-making, while Rwanda and Burundi belong to the CPGL. This divided membership might result in reduced commitment to the activities of the organization, leading to a gradual natural death of the organization.

More significantly, however, the life of the organization depends on whether or not its activities can be financed. We have already pointed out the problem of failure, on the part of the member countries, to pay their financial contributions regularly. We have further pointed out that the organization heavily banks on the hope that foreign donors will provide the required capital and technical
environment. It is in the context of such vertical integration that the horizontal integration on a regional basis can be economically and politically viable.

We know very well that this position is highly provocative. Do we have to wait until we have gone through socialist revolutions before we can "pool" our resources and maximize their use through regional cooperation? Do we need socialism? Does a socialist revolutionary situation exist in our countries? These and other questions are appropriate and they should be asked.

To the pragmatist who correctly argues that it does not make sense to wait until we are socialist before we embark on regional cooperation, we say: fine. But such cooperation does not have to further expose the region to the multinationals which form the Industrial Council for Development, through a formal supranational organization which reveres the middlemanship of specialized agencies, which pose as impartial and dedicated to the development of the Third World. It is sometimes questionable whether or not these agencies make any difference between growth and development. The approaches they advocate are often growth-orientated, geared towards quantitative but not qualitative change.

It is quite clear that projects like tsetse eradication need a regional approach because without this the danger of cleared countries being re-infested is very high. So would things like the training of skilled manpower through regional exchange of students and teachers. But this kind of cooperation and coordination can be conveniently carried out by ministries concerned, without having to create a separate supranational organization. In fact as pointed out earlier, the regional, as opposed to national character of many of the projects envisaged is very dubious.

When we say that in a socialist environment regional integration would make more sense than it does now, we mean that the national boundaries would be de-emphasized. The working classes at the helm of state power would be more interested in the internationalization of non-exploitative production relations, so that the priority would be to improve the level of the productive forces for the benefit of those toiling classes themselves. In this case, the horizontal integration of the productive forces and the vertical integration of these forces to the more advanced productive forces of the east of the "north", would benefit the working classes in the region through non-exploitative economies of scale. This is impossible at present. So, indeed, the region needs socialism for any fruitful cooperation and integration to put an end to underdevelopment. Whether or not there exists, at present, a revolutionary situation in the region, in the Leninist sense, we cannot say without taking stock of the prevailing
A cooperative approach to development 131

20. J.A. Sackey, ibid.
22. J.A. Sackey, ibid.
23. East African Standard 20 April 1971 (converted into US$ from the original statement of £325,000).
25. Uganda dropped out of the Kagera river basin scheme after the 1971 coup which brought Amin to power.
26. UNDP project manager's progress report, op.cit.
27. For a more detailed summary of the contents of the Norconsult/Electrowatt report, see Findly Burns Jr's report no EC 132/226/2APRI (47).
31. Article 8(d), "Agreement for the Establishment of the Organization for the Management and Development of the Kagera River Basin".
32. See "Agreement...", ibid.
33. At the time of writing this paper, Uganda was still out of the jurisdiction of the organization.
35. In the project manager's progress report of 30 September 1973.
36. See the Burundi Government's comments of 3 January 1978 "Observations du Gouvernement de la République du Burundi sur le Rapport Intitulé: Potentiel Hydroélectrique du Burundi y Compris des Bassin en dehors du Bassin de la Rivière Kagera (Vol.3)".
assistance for the envisaged projects. At present, very few pledges have been made by the capitalist donors. We have further said that since the same donors approached by the organization can have access to the basin by virtue of their involvement in the CPGL and the eastern and southern African grouping, they may decide that they do not need the organization in order to penetrate the region. Because of this, they might "regret their inability" to support the organization, and this would be the end of it.

These few factors, either singly or in a combined form, seem to indicate that, our wish for the survival of the organisation notwithstanding, its future is rather precarious.

Notes

1. See UNCTAD V, Manila, item 18, annex 1, May 1979.
CONTINUITY AND CHANGE IN THE NILE VALLEY:
A GEOGRAPHICAL VIEWPOINT

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The skylines of Cairo and Khartoum have been radically changed over the past twenty-five years. The population of greater Cairo is today estimated at eight and a half million, whereas twenty-five years ago it was only two and a half million; and the three towns of Khartoum, Khartoum North and Omdurman have increased from a quarter of a million in 1955 to about one million today. Urban growth rates of 7% p.a. are common in Africa, which means a doubling of urban population every ten years and in the unlikely event of these rates being maintained, the three towns would contain nearly four million people by the end of this century.

Great changes have also been experienced in the rural economy of many parts of Sudan and Egypt since 1955. This period has seen the irrigated area of the Gezira doubled through the Manaqil extension; the establishment of Khashm el Girba, Guneid and Kenana schemes; the completion of part of the Rahad scheme; and an enormous increase in pump schemes replacing much of the shadouf, sagia and basin irrigation. At the same time mechanised agriculture has expanded dramatically across the savannas from its first beginnings at Ghadambaliya in the Gedaref area in the 1950s. Many other areas have been opened up on the clays and sands of Kordofan and Darfur through the provision of better water supplies by digging rainwater reservoirs ('hafirs') and sinking bore holes. Equivalent dramatic rural developments in Egypt have included the construction of the High Dam converting the Nile valley of Egypt north of Aswan into a veritable irrigation ditch with none of its former floods and droughts, so that in Egypt irrigation everywhere can become perennial. This period has also seen the development of Liberation Province to the west of the Delta and of the New Valley in the Western Desert.

Politically too change has been apparent, manifested in the agrarian reform programmes with their periodic shifts of emphasis in Egypt, or in the Sudan where the civil war was ended by the Addis Ababa Accord of 1972 with resulting regional reorganisation at every level in the country.

Urban and rural dwellers alike have had to face up to a constant stream of new economic, social and political


41. From a report on the organization's conference held in Arusha, Tanzania, 7-11 May 1979.

42. A.A. Jalloh, op.cit., p.52.

43. See the "Agreement ...", op.cit.

44. Prime Minister E.M. Sokoine's opening speech at the first meeting of the commission for the organization for the management and development of the Kagera river basin held in Arusha 30 March 1978.


47. See "Agreement ...", op.cit.

48. See "Agreement ...", ibid.


50. K. Laidlaw, ibid.

51. Minutes of the 4th commission meeting, sub-committee on donors conference.
and other essential imported commodities often to the
detriment of the whole of the rest of the country. Certainly
in the rural areas it is easier to opt out of change and
to stick to the old familiar ways than it is in the urban
centre. However, some writers have pointed out that rapid
urban growth caused by the migration of very large numbers
of rural dwellers may in some senses lead to a "ruralisa-
tion" of the city (C.N.R.S., 1972).

This paper will now turn to four components of life in
the Nile Valley, and will endeavour to explain the elements
of "continuity" amidst the apparent "change". These
components are: the desert; the Nile; the Nile Valley's
relationship with the outside world; and relationships
within the Valley itself.

The question of desertification or drying out in the
African interior has been a source of scientific interest
since Livingstone's observations on Lake Ngami in the 1840s:
These (banks) are low on all sides, but on the west there
is a space devoid of trees, showing that the waters have
retired thence at no very ancient date. This is another
of the proofs of desiccation met with so abundantly
throughout the whole country. (Livingstone 1857)

In more recent times the case for climatic change was put
foreword by French writers from observations in Senegal
(Hubert 1920) during the first decade of this century. The
question was again raised in the Sudan by the Government's
Soil Conservation Committee (Sudan Government 1944), and
in the 1960s by Sudan and Chad in the deliberations of
UNESCO. This period culminated in the 'Sahel drought' which
so severely affected the countries near the southern margin

The causes of the apparent desertification have been
hotly disputed. Climatic change towards drier conditions
and man's misuse of the land have both been blamed. In the
latter case it has been pointed out that there has been a
rapidly rising human and animal population resulting from
imported medical and veterinary services, and much improved
water supplies due to the excavation of hafirs and the
sinking of bore holes and deep wells. These together with
a failure to adjust cultivation and grazing practices have
led to an over-exploitation of resources along the desert
margins. It may be significant that Stebbing, reviewing
evidence in the 1930s in West Africa, cast doubt upon
climatic change (Stebbing 1935; 1937). Again, after the
Second World War, in a report for the Sudan Government
(Stebbing 1953) he remained sceptical and concluded that
if the desert was, in fact, advancing south, it was man's
activity which was to blame. This view in its extreme form
is represented by the Ehrlichs (1970) who state that the
"Sahara Desert itself is largely man-made", a view to which
few would subscribe.
challenges, and yet at a glance at the events over the last hundred years or so makes it plain that change is not new. In 1880 the Turkiya was very much in control in the Sudan having begun with Mohammed Ali's invasion of 1821. It was ended with the capture of Khartoum by the Mahdist forces in 1885. This in its turn was to be followed in 1898 by the establishment of an Anglo-Egyptian Condominium. Each of these events was to move people around the country, alter and make new demands upon rural and urban dwellers alike. Under the Condominium many rural dwellers were brought into contact with the money economy for the first time and had to learn to face some of the effects of events in other parts of the world with resulting fluctuations in both incomes and demands for their products. In a similar fashion the Egyptians, after having to cope with the modernisation process begun under Mohammed Ali and enthusiastically carried on later by Ismail, had to adapt to British administration from 1881. Even after independence in 1922, British influence remained strong in the country with a military presence until the 1950s. Change over the past hundred years in Egypt was to culminate in the revolution of 1952.

Yet in the middle of change there is always continuity. Situations are dynamic: at any point in time the landscape is in transformation from what it was into what it will become. No changed set of circumstances, no matter how revolutionary they appear, can operate without taking into consideration and being moulded to some degree at least by existing circumstances. This can be seen plainly in connection with the brief comment above on the Sudan and Egypt. As in 1880 so in 1981, most Sudanese are still rural dwellers; agricultural exports are still the backbone of the economy; the failure of the 'rains' is still a subject of concern for all; and the Nile is still the decider of fortunes for many citizens. All this is true today in spite of hopes from oil and attempts to develop industry and to diversify the Sudan economy. Similarly, in Egypt the Nile is still the source of life and livelihood for most of its citizens and its position astride the Suez isthmus is still the overriding factor in Egypt's international relations.

It seems perhaps that the rural dweller sees this "continuity" whereas the urban dweller is more aware of "change", often revolutionary change as a consequence of leaving the countryside and its established ways for the unfamiliar world of the city. The failure to find an identity amidst changing circumstances could be one of the reasons why urban centres are so often associated with unrest and why Third World Governments are so careful to placate the dwellers in the capital by holding down food prices and by trying to ensure the availability of petrol
Yet the evidence for climatic change is all round us, for how else can great landscape features such as the clay plains of central Sudan and the Qoz country be explained? Remnants of desert sand dunes reach as far south as Qoz Dango in 10°N, a zone today with up to 1,000mm of annual average rainfall, but with land forms in superficial deposits which probably imply a rainfall of 150mm at their formation.

Paucity of data and disagreements over its interpretations have meant that so far only very few tentative conclusions about earlier climates in the Sudan and Egypt can be made. However, it seems likely that some 50,000 years ago the climate in the Nile Basin was akin to that of today. From 40,000 BP an intensively arid period, or periods, is entered. It seems likely that at some time during this dry period the Low Qoz was created implying an equatorial shift of some 450km of both present wind and rainfall belts. Evidence from Jebel Marra suggests a movement in excess of 500 kms. Between 25,000 and 20,000 BP the climate was considerably wetter in the Sudan. Thereafter, another period of intense drought took place which pushed the isohyets in the Sudan 200 kms nearer the Equator than today. This period continued down to 15,000 BP and this was probably when the High Qoz was laid down. This rhythm of dry and wet was continued with another wet period down to 7,000 BP. There was then an apparent dry period of 1,500 years, followed by a further wet period from about 5500 to 2500 years BP. During this period it has been suggested by Arkell (1961) that rainfall at Khartoum may have averaged 500mm p.a. compared with 150mm at present. Over the past 2500 years the climate appears to have been fairly close to that of today in the Sudan. (Grove and Warren 1968; Warren 1970; Williams and Adamson 1973; Wickens 1975; Goudie 1977; Williams and Faure 1980)

Egypt with its proximity to the Mediterranean and its winter rains has had a similar pattern to that of the Sudan, but with some notable differences. After the early drought when the Low Qoz was being first accumulated in Sudan, Egypt from 17,000 BP to 8,000 BP experienced rather heavier winter rain than at present, particularly in the Red Sea area. Rainfall in the Western Desert also appears to have been more significant from 5,000 to 3,000 BP. During the earlier wetter period annual rainfall totals of 150mm have been suggested for parts of the Red Sea hills, which today average 20mm and for the later wet period rainfall at Jebel Uweinit averaged 50mm p.a. against 5mm at the present day. For the last 2500 years the climate of Egypt has been similar to the present (Butzer 1966;1976).

Although looked at in the long term the climate of the Nile Valley over the past 2500 years may display a character
not dissimilar from that of today, nevertheless a number of periods of rather higher or lower rainfall can be distinguished. In the Sudan a somewhat drier period may have occurred in the 10th to 12th centuries AD and in the 15th century, whereas it was generally a little wetter than today between 1600 and 1800 (Nicholson 1980). Pocquet, who passed through the Sudan in 1699, described the Gezira as well wooded and well cultivated (Foster 1949). If Browne's observations during his stay in Darfur in the 1970s are correct, then the rainy season would appear to have been a little longer (Browne 1799). However, there were drought years in the 18th century. Bruce reported that the rains of 1773 were much better than in 1772 and describes signs of desertification in the Gezira north of Hasheisa (Bruce 1790). His map puts the northern limit of the southern rains much where it might be at the present day. Similarly, the impression derived from reading the accounts written by Mohammed Ali's officers suggests a better vegetated Gezira than today (Caillaud 1926-27; Prudhoe 1928-29). But we must be careful not to read too much into this as man's activities in the Gezira have made serious inroads into the vegetation since then.

There was also another damper period in the last quarter of the 19th century. During the 20th century reliable meteorological observations have been made. A broad general overview would suggest that there have been three sequences of dry years: just before the First World War began in 1914; during the 1940s when it was reported that in some years the Machar marshes nearly dried out at the end of the dry season (Davies 1962); and the latest dry period (Sahel drought) from 1968 to 1973. Since then there has been something of an upsurge with 1978 being one of the wettest years on record for some stations (Shakesby and Trilbsbach 1982; Davies and Khogali 1982).

However, it must be concluded that not every station shows these tendencies. Gedaref (Fig. 1) does not really demonstrate the 1968-73 dry period and El Fasher has not shown the late 1970s recovery. Mazroub and Al Khowi, both situated in Kordofan, illustrate some of the differences that may be experienced over a relatively short distance (Ibrahim 1980). In the former the peak period is 1958-66, whilst in the latter there is a continuous decline from the 1948-57 period onwards (Fig.2). Local variations are also shown by Ed Dueim and Gesteina. At Ed Dueim it is plain that 1968-73 was the driest period on record this century, but at Gesteina the figures are less noticeably low (Fig.3). A comparison of the traces for Khartoum and Alexandria suggest that more than a simple equatorward or poleward movement in wind and rain belts is involved (Fig.4). It must be concluded that fluctuations of these kinds will
continue to occur and that the drought around 1910-14 was probably worse in many areas than 1968-73.

To return now to an earlier part of the discussion, it is clear that fears were expressed about desertification during the series of drier years and the reassuring reports that the desert was not really advancing were made during the rather wetter spells. It seems likely that the possibility of desert advance has been a recurrent theme for the Sudanese during the past 5,000 years or so and the advantage of a nomadic pastoralist way of life for the Saharan margins can be easily identified.

Rainfall is scanty in Egypt so that periodic fluctuations are of little account unless they are reflected in the height of the Nile flood. Nile floods have been maintained during the Sahel drought due to increased rainfall nearer to the Equator occurring at the same time as lower than average falls near the desert margins (Goudie 1977; Hare 1977). The Nile is the second theme of continuity and change to be examined. To the ancient world it was strange for the river to flow through the desert and to flood at the very end of the Mediterranean world's dry season, at the precise time when it would have been expected to be at its lowest, unless of course it had supernatural qualities. Both Aristotle and Eratosthenes were to put forward the correct solution (Tozer 1897), namely, that its flood was due to summer-rains in the tropics.

Other strange aspects of the Nile to have intrigued scholars include the Great Bend of northern Sudan, Sabaloka gorge, the clay plains of the Gezira and White Nile, the sudd, the river's strange course among the East African lakes and the Blue Nile gorge in Ethiopia. The origin of these features is not of concern here. Perhaps it is a river that overflowed from East African into a lake basin in the sudd which, in turn, overflowed into another lake basin in northern Sudan and finally into an ancient arm of the Mediterranean (the Nile Valley north of Aswan). If this is a reasonably old river geologically, then with uplift and other earth movements going on contemporaneously in East Africa and Ethiopia, perhaps a mechanism may be found here whereby the Blue Nile gorge could have become eroded out, the Gezira plain laid down as deltaic deposits thereof and the course through Sabaloka superimposed onto the ancient rocks of the gorge from a younger overlying Nubian Series. By 20,000 years ago the river was following a course similar to the present. It fluctuated widely from year to year with general periods of high and low flow reflecting rainfall patterns in Sudan, Ethiopia and East Africa. However, as the Sudan began to dry out 5,000 years ago, the river began to assume its present significance in the eyes of the people of Egypt and northern Sudan.
Egypt had become the "Gift of the Nile" as Heroditus had written, though he was not in fact referring to the river so much as the valley itself (Rawlinson 1886). He had suggested that the Nile Valley on the one hand and the Red Sea/Gulf of Suez on the other were similar, except that the Nile Valley had been silted up, whereas the Red Sea/Gulf of Suez had not, but he speculated that one day it would be. If the Nile were diverted he thought it might fill up the Red Sea in 20,000 years (Thomson 1965).

From the Ancient Egyptian period onwards it remained man's hope to tame and subdue the river. The desire to achieve this may have been a factor leading to the amalgamation of the White and Red Kingdoms to form dynastic Egypt. The earliest civilisations seem to have been based on using lands after the flood waters had receded, but included simple canalisation for basin irrigation from perhaps 3500 BC (Butzer 1976). By 1500 BC the shadouf was widely used. The Greek Ptolemies introduced the Archimedes screw and the sagia to Egypt. Both the shadouf and the sagia made perennial irrigation possible, not only from the river but also from wells. The degree to which a modern form of canal irrigation was developed in Ancient Egypt is difficult to estimate. Rameses II may have had some perennial canals dug in the delta, but the area where it is known for certain that modern perennial type canal irrigation with head regulators was used in the Faiyum. Amenemhat I's engineers appear to have used the Faiyum as a flood regulator and control reservoir. Serostiris II improved the system considerably and under the Ptolemies the area under irrigation in the Faiyum is said to have reached 1,300km² against 1,800km² today (Butzer 1976). It has been claimed that at its peak perhaps 24,000km² of irrigated land existed in Ancient Egypt against 30,000km² in the Nile Valley today, though the irrigated land was far less intensively used (Butzer 1976). In Roman times Egypt was an important exporter of agricultural products especially wheat and barley, and the Romans made great efforts to maintain and improve productivity.

Amongst the agrarian difficulties still with us in Egypt and noted at the time are fractionation of holdings, the existence of inefficient large farms, and the problem of supplying cheap food for the towns: Alexandria, for example, may have reached 400,000 under the Ptolemies. As today, serious difficulties were reported from the delta with loss of land for cultivation due to waterlogging and salinisation caused by poor drainage and overwatering (Stamp 1961). In Graeco-Roman times the population of Egypt was estimated at 4 1/2 million. By AD 1000 it was reduced to 1 1/2 million and the irrigated area appears to have decreased dramatically to perhaps 6,000km² (or 1/2 of the
earlier period) due to a general neglect of the irrigation network, though to the peasant the river was just as important as before. In theory, from the Arab conquest in AD 641 onwards there was a well designed system of irrigation control with specific roles to be played by central and local government (Lane-Poole 1901). Strong rulers such as the Fatamids followed by Saladin and the Aiyubids ensured that irrigation works were well maintained. To quote Hrbek (1977) this was a period of "political stability and material prosperity rarely achieved in earlier or later times". Again some of the early Mameluke rulers of the 14th century took a great interest in irrigation works and during this period improvements to the Alexandria canal added 40,000 hectares of new land under irrigation in the delta. But a more common situation for long periods was probably that described by a British Government report on trade in the Levant issued in October 1790 (Marlowe 1971):

Many canals are now either wholly dried up or so decayed that they now no longer answer the wise purposes for which they were made. It is computed that more than one third of the land of Egypt that was formerly cultivated is now changed into a sandy desert.

Substantial progress in improving the use of the Nile waters for irrigation had to wait until the 19th century. Mohammed Ali's adventures in Palestine, Arabia and Greece cost a great deal of money as did his various attempts to modernise Egyptian life. The great source of wealth available to him was land, but to make the most of it a drastic overhaul of the irrigation and agricultural systems in Egypt was necessary (Rivlin 1961). By 1840 he had revitalised the whole system. Some 1,150 of nearly 2,000 km of main canal in existence were dug for the first time during his reign and the remainder had been cleaned, deepened, straightened and had new regulators. Perhaps a quarter of the irrigated lands were by then producing more than one crop a year. He planned the delta barrage which was completed by Ismail. 19th century technology made a substantial control of the Nile possible and various barrages were constructed culminating in the Aswan Dam completed in 1902 and subsequently raised several times.

One of the results of changes in the 19th century and later was an increase in population pressure on the land. In 1900 there was 0.2 ha of irrigable land per head of population. By the 1952 revolution this had been reduced to 0.1. In 1904 Wilcocks produced his plan for a fully rational use of the Nile waters. The concept of 'century storage' was evolved which envisaged the storage of Nile waters in such a way that the supply to Egypt for irrigation could be made constant if the peaks and lows of the previous century were to be repeated. The dream was to be
made a reality by the computer, for now the possibility of making the millions of necessary calculations in a short space of time was conceivable. Two strategies emerged: the first supported by many international scientists involved storage of water behind various dams scattered throughout the Nile basin; the alternative, popular in Egypt and made possible by modern concrete technology, envisaged one large dam sited in Upper Egypt (Hurst 1952). This was eventually decided upon and the sudd-al-aali (High Dam) was built. The effect of the High Dam on the river is to reduce its function in Egypt to that of an irrigation ditch. The Nile now almost literally ends at Aswan (Waterbury 1977).

In an attempt to control the river so as to avoid floods and droughts man has merely removed one set of problems and replaced them by another. Silt no longer renews delta lands, problems of water-logging and salination are enhanced by the interference with natural drainage, and the use of water for irrigation several times over has increased the salinity of water reaching the delta. Lack of flow through the delta has also allowed Mediterranean sea water to infiltrate underground aquifers in the delta, whilst long-shore drift is eroding what is, in effect now, a "dead" delta and the coastal fisheries have been seriously damaged. Many other human factors such as the prevalence of bilharzia and other waterborne diseases must also balance the benefits of perennial irrigation (Farver and Milton 1973; Benedick 1979; Stanley and Alpers 1975; Allan 1981).

The Nile has never presented such a keen problem to the Sudan until recent years due to the large area south of latitude 14°N receiving reasonable summer rains and the country's much less dense population. Basin irrigation, the sagia and the shadouf were all introduced at an early date, certainly by Roman times into northern Sudan, but if some of the observations of Petherick (1861) and others are correct, then the first sagia did not appear on the White Nile until the 19th century. During the Egyptian occupation in the 19th century attempts were made to grow cotton in the Gash and Tokar deltas. However, it was not until the 20th century with the building of the Sennar dam and the Gezira scheme in 1925 that the question of Nile waters became an important issue in the Sudan. The first Nile Waters Agreement between Sudan and Egypt was reached in 1929 and was revised in Sudan's favour in 1959. The building of Manaqil, Khashm el Girba, Rahad and Kenana schemes and the introduction of a large number of water pumps on the rivers of the Nile Basin have heightened the question of Nile waters in Sudan.

The waters needed for present production methods are almost all spoken for. To increase supplies the Jonglei diversion canal, planned for completion by 1985, is being
excavated. This will have a profound effect upon riverain lands in the Sudan, and its full price cannot yet be calculated in either financial, human or other terms. Nevertheless, the creation of a whole new set of ecological problems for the Sudan is certain. Sudan will then truly have joined Egypt in her experience that with the Nile you can never win, the problems merely change: 'High Dam and Jonglei canal can only buy time for Egypt and for the northern Sudan'. (Wright 1978).

The penetration of the Red Sea between Africa and Arabia to leave only a narrow isthmus at Suez has meant two things. Firstly, all land contacts between Africa and the rest of the world in historic times has had to pass through it, and secondly in the days before the intervention of modern land transport, sea transport for trade was of prime importance and this narrow isthmus concentrated to itself traffic between the Mediterranean and the East. Control of the isthmus therefore was vital to Egypt and to all powers concerned with the region and aspiring to maritime greatness. Perhaps this interaction of peoples also helps to explain the emergence here of three of the world's great monotheistic religions: Judaism, Christianity and Islam, to add a further dimension to Great Power involvement with this narrow neck of land. Throughout history if one power gained supreme control the envy and opposition of the others was soon apparent. This is the third theme to be investigated.

In ancient times the civilisations of Egypt, Mesopotamia, Persia, Greece, and later Rome, during their periods of prominence, successively occupied the Isthmus and included Egypt within their dominions. Thus, strong Pharaohs for self defence as much as for reasons of aggrandisement set out eastwards towards Palestine. Only in this way, by the creation of a buffer zone could Egypt be defended. This policy is seen in the exploits of Sesostris III (c. 1960 BC) or Thutmose III (c. 1530 BC). Weak Pharaohs found themselves being invaded as demonstrated by the famous, if short-lived, Assyrian invasion under Esarhaddon in 670 BC. The first Persian invasion under Cambyses was in 525 BC, and it is probable that Egypt from then onwards until General Neguib became President in 1952, was either directly under foreign rule - Rome, Byzantine Empire, the Caliphate, Ottoman Empire, Britain or under an alien ruling class - Mamelukes, Fatamids, House of Mohammed Ali.

Ancient Egypt's position on two seas encouraged her sailors to trade in the eastern Mediterranean as witnessed by the famous voyages organised by Snefru (c. 3200 BC) to bring cedarwood from the Lebanon, and in the Red Sea probably as far as the Kuria Muria Islands off the coast of the Arabian peninsula and to Somalia during the reign
of Queen Hatshepsut (c. 1500 BC) (Cary and Warmington 1963). And yet Egypt's heart was not really in sea-going navigation and frequently foreign sailors were employed as when Necho used Phoenicians for the possible circumnavigation of Africa about 600 BC. Perhaps the average Egyptian from Ancient Egypt down to our own times has been basically much more interested in the Nile and agriculture rather than with trade and external activities; and that it was the incomers and alien rulers who were the ones really interested in the strategic position of Egypt.

Inevitably therefore Egypt's political strength and weakness has always been her position in the eastern Mediterranean covering this slender land connection between Asia and Africa. Strength, because she cannot be for long out of the mainstream of world political activities; and weakness, because of the cupidity of other powers. Western European powers first saw fit to be involved with Egypt with the Crusades between 1090 and 1290, but did not really become a political force of great significance until the end of the 18th century. This new interest arose from British paramountcy in India secured from the Treaty of Paris in 1763 and the increasing French resentment of British worldwide expansion. The revival of British interest in Egypt sprang from the need to improve connections between England and India. At this time the British East India Company was able to send letters from Bombay to London via the Goseir-Qena-Cairo-Alexandria route in 40 days against 4 months via the Cape of Good Hope. As the British Government report of 1790 already quoted states:

Egypt from its fortunate position between the Mediterranean and Red Sea, is able to trade either with the rich countries of the south coast of Asia or with Europe. It was for many centuries the entrepot and only channel by means of which any commercial intercourse between the distant parts of the world could be carried on. The wealth it derived from foreign trade is immense. (Marlowe 1971).

The French response was Napoleon's occupation of Egypt in 1798, only to be dislodged by an Anglo-Turkish force in 1801. Increasing European interest during the 19th century culminated in the British occupation of 1881. Egypt's strategic position was to get her involved in both world wars and still today she stands in the cockpit between the competing superpowers, USA and USSR, and their struggle for supremacy.

The most important single factor to involve Egypt in the rivalries of world powers in recent times is the Suez Canal. The first canal started by Necho II (610-565 BC) and finally completed by Darius I connected the Nile to the Red Sea at the head of the Gulf of Suez. It was
periodically cleaned out and allowed to silt up, but from Roman times onwards it remained silted up until after the Arab invasions in the 7th century when it was dug out to facilitate grain exports from the Nile Delta to Arabia. It was subsequently abandoned, and in spite of periodic suggestions for its revitalisation, especially by the French from the 17th century onwards, nothing significant was done until the 19th century. Napoleon, during the short French occupation, had a survey made by Le Père but concluded in error that the difference in height between the Mediterranean Sea and the Red Sea would make locks necessary (Kinross 1968).

Growing Anglo-French rivalry, increasing international trade and the invention of the steamship facilitating navigation at the northern end of the Red Sea made the Suez Canal possible and inevitable. Britain favoured a railway connection between the Mediterranean and the Red Sea and one was built between Alexandria and Suez via Cairo during the 1850s. The French, led by de Lesseps, favoured a canal as they had continuously done since the days of Colbert in 1665. Eventually in 1858 an international commission completed a favourable feasibility study, and work began. The canal was opened by the Empress Eugenie in 1869 with a glittering and expensive opening ceremony sponsored by the Khedive Ismail. Britain, fearful for her sea route to India under a French controlled Suez Canal, bought out Egypt's 40% share in the Suez Canal Company in 1875.

Anglo-French progressive involvement in Egyptian affairs, culminating in British occupation in 1881 was carried out ostensibly on behalf of the Ottoman Sultan whose influence in Egypt was supposedly paramount as Egypt was part of the Ottoman Empire. This fiction was maintained until Turkey sided with Germany against Britain and France during the First World War (1914-1918). Egypt was to resume her independence in 1922, but it was not until after the Second World War (1939-1945) that the declining importance of Britain as a world power with loss of Empire, the rise of the super-powers and an increasing Egyptian desire for untrammelled independence coincided, and led to the end of a British physical presence in Egypt. Britain's fears over the Suez Canal caused this area to be the last to be garrisoned by British troops and it is significant that the last important event in this chapter should be the abortive Anglo-French landing at Port Said in 1956.

The words of Ernest Renon when he made his speech of welcome on de Lesseps' election to the Académie française after the opening of the Suez Canal have turned out to be tragically prophetic:

The isthmus now cut will become a battlefield... a single Bosporous has sufficed for the troubles of the world; you
remained at least nominally Christian until AD 1505. Even after Islamisation, its successor, the Fung Kingdom of Sennar, maintained its identity with most of its systems of government and social institutions reminiscent more of Black Africa than Islamic Egypt. Bruce's account of his visit to Sennar in the 18th century clearly demonstrates this.

Communications between the 'heartland' of the Sudan, centered on the confluence of the White and Blue Niles and environs, and Egypt were always tenuous. The main formal contacts took place through the desert caravan routes of which the most important was the Sennar caravan. But there were sometimes gaps of several years when no caravan of any size got through due to unstable conditions in northern Sudan or southern Egypt. The 'heartland's' other external contact, mainly with Ethiopia and the Sultanate of Darfur, were often uneasy. It was an Ethiopian invasion of the Sudan (c. AD 320) which had brought a final close to the glory of Meroe. The Sudan 'heartland' also had some contact with the Red Sea and beyond through Suakin. The old mosque at Sennar as described by officers in Mohammed Ali's army undoubtedly had Indian work in its structure, but Suakin never seems to have come under the control of either Alwa or the Fung. The Red Sea coast of modern Sudan usually consisted of a series of small political entities more or less under the control of Egypt or Ethiopia depending on local circumstances.

European powers, as well as others outside Africa, were little concerned with the Nile Valley within Sudan. It was remote from their main area of interest and appeared to offer relatively little in the way of trade. Besides, the desired commodities could always be obtained through Egypt or at Suakin. What European activity there was in Sudan before the 19th century was usually concerned with Ethiopia. Thus the expeditions of Poncet and Brevedent of 1699 and of Du Roule a few years later were concerned with French hopes of developing relations with Ethiopia; the visit to Sennar was merely incidental (Foster 1949). Similarly, before them, the Portugese in the 15th and 16th centuries were interested in Ethiopia and though they attacked Suakin and contemplated making it a Portugese base this was in pursuit of their commercial policy in the Red Sea and had little to do with its African hinterland in the Sudan.

Non-African powers became more interested in the Sudan during the 19th century. Scientific curiosity about the Nile and its sources led to exploits by some of Mohammed Ali's expatriate officers in the southern Sudan and the famous journeys of Speke, Grant and Baker. Humanitarian interests were represented by the arrival of the first Christian missionaries and of pressure to curtail slave
trading in the Sudan. Commercial interest was represented by ivory traders like Petherick. Political interest led first to consulates in Khartoum and later to the "Scramble for Africa". In the process the Sudanese Mahdist State which had managed to end Egyptian occupation in 1885 was to succumb. The 'Fashoda Incident' of 1898 was to ensure British rather than French colonial rule.

The Anglo-Egyptian Condominium policy was to illustrate very clearly once again the Sudan/Egyptian relationship. The need for close cooperation through the Nile ran parallel with a realisation that in spite of many close relationships the Sudan was culturally distinct from Egypt. The title implied the close relationship and occupation came in from the north. At the same time the British administrators saw the Sudan as a separate entity and sought to curtail Egyptian influence in the country. The Sudanese themselves were to emphasise this. Sudanese nationalism received much of its inspiration from Egypt, but in the run up to Independence this rather than Union with Egypt was opted for.

However, within the Nile valley the Sudan/Egyptian relationship was not the only one of importance. The southern Sudan was always separate from the north. Northern influences rarely penetrated to this part. Mohammed Ali's officers reported that south of Aba Island they entered a different world. How far south the Fung King's rule held sway is difficult to determine but it does not appear to have been very far. The Turkiya brought the southern Sudan under rule from Khartoum. The experience seems to have broadened differences rather than narrowed them. The Condominium recognised this and for a considerable period ruled the south and north almost as if they were separate colonies. Troubles developed after independence culminating in the Addis Ababa Accord of 1972 and the agreement for southern autonomy.

Another longstanding difference within Sudan has been Darfur. For most of history Darfur seems to have been a separate entity. It was controlled neither by Meroe nor by any of the successor states. Kordofan became the conflict zone between the Fung and Darfur. Darfur had much to do with the success of the Mahdiya and during the Condominium remained outside Khartoum's control until 1916. Since then this region, centred on Jebel Marra with its contrasted environmental conditions to the Sudan plains, has seemed to be set apart from the rest of the northern Sudan.

Thus, though the Nile Valley has seen great changes during the past forty years in environmental, economic, social and political conditions, many of the difficulties and the problems in their present guise are in fact old
ones expressed in a new way. Periodic drought has affected Sudan down the ages, but today the new dimension is a much larger rural population on the desert margins than ever before; use of the Nile waters to their capacity merely caused the river to present new challenges to the riverain peoples; the struggle for control of Egypt and the isthmus begun by the Pharaohs and the Assyrians continues between the superpowers and their client states; and the close but not always easy relationship between Sudan and Egypt and within the Sudan itself still produce, as in the past, period strains within the Nile Valley. There may be "change" but there is also "continuity".

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