The Ife Project - Report 1989

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University of Kuopio, 1990
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26 October 1990

University of Kuopio Press, Kuopio 1990
2nd printing 1992
Front cover:
Slow take-over
Deep etching print, Segun Adeku 1986

Back cover:
Wrestling
Deep etching print, Segun Adeku 1986

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1. Introduction

This report represents the 'Ife Project' of the Computing Center of University of Kuopio, Finland. The essence of the project is to test the suitability of a computerized hospital information system in Africa.

The project started as Licentiate studies of this author in 1985, and was formalized in 1988 into a research undertaking of the Computing Center, the author's employer. Today there are two other participating institutions as well, i.e. the Computer Science Department of Obafemi Awolowo University (CSc OAU), and the Obafemi Awolowo University Teaching Hospitals Complex (AUTHC), both in Ile-Ife, Nigeria.

The report covers the backgrounds of the project, the author's stay in Nigeria during 1989, and the plans and prospects for 1990-91. Chapter 4 is a very detailed chronological record of the developments this far. Chapters 5 to 8 are also mainly concerned with my stay in Nigeria in 1989. A reader interested in getting just a general view of the project can concentrate in chapters 2, 9, and 10.

The aim of this report is to record, rather than to interpret, what happened during my stay, to avail the facts and feelings to other people so that they can critically judge my behaviour and decisions. I have tried to cover the intertwined personal, technical, administrative, and national events and information which contributed to the setting where I worked. The main focus is on the professional aspects of course but I have included selected other episodes which were either typical or exceptional and thus affected my understanding.

Theoretical analysis of the results, as well as references to literature, will be left to my prospective Licentiate Thesis.

It should be noticed that the report reflects the author's subjective understanding. Some information and events have certainly been misinterpreted by me. The reader is therefore requested to avoid judging the other persons and institutions involved. As far as this project is concerned, they were part of the given framework and my task was to try to avoid the risks and obstacles, and to benefit from the opportunities.

It is now the reader's task to assess what could have been done better in the circumstances given, and to which extent the experience might be applied elsewhere.

Prices are given in parallel in U.S. dollars, Nigerian naira, and Finnish marks. Converted prices are rounded. The exchange rates applied are USD 1 = FIM 4.0 = NGN 7.5, or one naira is roughly equal to 0.53 marks. This rate is fairly applicable to the whole year of 1989. In end of September 1990, the rates were USD 1 = FIM 3.7 = NGN 7.9, or NGN 1 = FIM 0.47.

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2. Research problem and goals

Sub-Saharan Africa, the vast area between Sahara desert and Limpopo river, is clearly the least computerized, least industrialized, and poorest major region of the World. The preconditions of computer systems development and use are thus more demanding than those in the industrialized countries. Only the most rugged and cost-effective methods and technologies are viable in Africa.

The overall hypothesis of the project was that the practical every-day experience of African systems developers (in a wide sense of the word) could point out fundamental problems, benefits, and contingency factors of information systems. Collecting and learning to understand that experience was the main objective of my stay in Nigeria in February-December 1989. In more detail, the objectives of the project can be specified on four levels, from a quite practical approach to small impacts to long-term processes.

1. A running Hospital Information System. The core of the study was a real systems development project which was to produce a Hospital Information System, if possible, for the OAUTHC. An existing set of public domain applications, developed by the U.S. Department of Veterans Affairs (V.A., formerly Veterans Administration), was to be evaluated against the requirements and resources of the hospital.

If the evaluation would prove the system useful and viable, it was hoped that in the best case a low-cost solution could be produced which would be available to other hospitals even in other countries. The technology in question was based on the MUMPS programming language, FileMan and Kernel 4th generation development tools, and powerful microcomputers used in a multiuser mode. I had prior experience in hospital informatics and in most of the technology, but not in Developing Countries.

It was understood that the long-term viability of the system could only be achieved if local systems support could be established, eg. at the Computer Science Department, OAU.

On a more general level, the case project was to introduce the problems and contents of systems development in Nigeria to me in practice.

2. Information on systems development in Nigeria. The vertical material of the case project was to be supplemented by a more horizontal view by visiting some major computer users and systems houses, especially on the health care sector. Semistructured interviews of systems developers were to be applied.

Not only production of software through Systems Analysis and Design was regarded as systems development, but any activities by computer professionals in producing and implementing computerized information systems for organizations (using ready-made packages also).

3. Analysis of European ideas of systems development. It was hoped that the results of the case project and the interviews, reflected against the "universal" theories of information systems and systems development, would provide some new light on the roots, prerequisites, and limits of the latter. More specifically, the internationally acknowledged Scandinavian and British traditions of human-centered systems development theory were to be discussed, from Socio-Technological Systems Development and Macroergonomics to different critical/emancipatory approaches.
4. More adequate methodologies. Finally, as an ultimate goal, it was hoped that the analysis of results would contribute in outlining methodological improvements in systems development in Developing Countries, especially in Africa. Of course, a single, limited study would only offer some tentative conclusions.

3. About Nigeria, Yorubaland, and Ile-Ife

Nigeria. I had two objective and three subjective reasons for selecting Nigeria as the object country of my research.

First, Nigeria with her some 100 million inhabitants represents one fifth part of the entire population of Sub-Saharan Africa, and about 20 per cent of the computer imports of the subcontinent as well. Computer education and use date back to mid-1960s. Thus there exist computer activities enough for a relevant study, and the experience is quite representative to Africa in general.

Second, Nigeria was considered relatively wealthy during the 1970s and early 1980s. Consequently foreign aid organizations have no major role in Nigerian development — the Nigerians are doing everything by themselves, so to say, in good as in bad. In many of the so-called programme countries of Finnish development cooperation in East and Southern Africa, for example, donor institutions are highly influential, especially in technology transfer. The Nigerian experience is more closely bound to endogenous processes of an African economy and society.

Third, Nigeria incorporates many of the most ancient high civilizations of Africa — it has been estimated that 90 per cent of African antiquities more than 100 years old originate in Nigeria. As the stay in Africa was a family undertaking, the country of choice had to provide research material for both my wife and myself. Nigeria was number one in both perspectives.

Fourth, as I don’t speak French, the selection was narrowed down to the Anglophone Africa. Fifth and last, I had already gathered some basic knowledge on Nigeria, more than on any other African country.

Geographically Nigeria lies on shore the Gulf of Guinea, a few degrees north of the Equator in West Africa. The northern parts of the country belong to the Sahel, while the southern parts are on the tropical rain forest region. Average daytime temperature is permanently around 30-35
degrees Centigrade in the whole country, except in Jos Plateau where the climate resembles the Mediterranean one. The rivers Niger and Benue run across the country in an Y-shape, reaching the ocean through a large and swampy Delta.

Historically, four major regions of traditional centralized states fall into present-day Nigeria. Kanem-Bornu reigned for more than a millennium around Lake Chad, the

North was the empire of the Hausa city kingdoms, the South-West that of the Yoruba city kingdoms, and the Mid-West was governed by Benin Kingdom. Smaller state formations were typical in the ethnically more diversified areas of the present-day Middle Belt, Delta, and Cameroon borderlands. The heartlands of the East were inhabited by the Igbo, who preferred a decentralized, village-level system of governance.

European sea powers established small commercial and military bases along the Atlantic shore since the 15th century. Trans-Atlantic slave trade reached even the inland states during the 18th and early 19th centuries, although the European slave traders themselves stayed on shore. Trade companies and missionaries started to enter the interior during the latter half of the 19th century, and in 1880-1900 British forces conquered the country.

Today there are 200-300 indigenous languages, of which Hausa, Yoruba, and Igbo are spoken by more than 15 million people each. Roughly half of the population are Moslems (mainly in the North and West) and the other half Christians (mainly in the East and West), although traditional religions have their followers as well.

Nigeria is a Federal Republic, divided into 21 States and the new Federal Capital Territory in Abuja. She gained her independence in 1960 under a British-style parliamentary system, divided into three Regions. Regional contradictions drove the country into military take-over in 1966 and into a bitter civil war between secessionist and federal forces in 1967-1970. The military tried to reconcile the contradictions by creating more States and a presidential constitution. In 1979 the civilian rule was returned, but the three regional major parties of the First Republic re-emerged.

The military took power again in 1983 after alleged election riggings and corruption by the ruling party. Since 1985 President of the Federal Republic is General Ibrahim Babangida, who has been characterized as one of the most talented African politicians, by his opponents as well as his supporters. According to his Transition to Civil Rule Programme, a new-breed presidential two-party system should take over in 1992. Party politics was unbanned in 1989 and local elections are due in 1990-1, followed by State and Federal Parliament elections. The two
official parties, i.e. the National Republican Convention and the Social Democratic Party, were launched by the Military Government in 1989.

Nigerian press is exceptional in Africa in quantity and in freedom of expression, in spite of some cases of oppression by the rulers. There are some two dozen universities on the Federal and State levels. The official language and the language of education is English. Radio and TV programmes are broadcast in about a dozen indigenous languages as well. Some three quarters of the adult population are illiterate. Nigerian writers, however, produce the bulk of black African literature.

In pre-colonial and colonial times Nigeria had a strong agriculture, producing yams, cassava, tropical fruits, maize, wheat, millet, sorghum, potatoes, peanuts, palm oil, cocoa, and cotton. The discovery of mineral oil lead to a distortion in the economy, whereby today some 90 per cent of the export income is due to oil. The government pays much attention to revitalizing agriculture and diversifying the economy, as well as in privatizing parastatal enterprises.

Nigeria has vast natural and human resources. The deep decline of oil income accompanied by huge debts, however, brought the country into very hard times during the 1980s. The naira has been devalued into a tenth part of its rate against the U.S. dollar in 1983, domestic prices have risen several hundreds of per cents, while the salaries and wages have stayed virtually unchanged especially in the public sector. Understandably, the Structural Adjustment Policy (SAP) of the government has raised wide-scale opposition. The World Bank, however, strongly advocates the policy in all African countries as a prerequisite for negotiations on loan rescheduling.

Regarding to the infrastructure of Nigerian economy, the road network is relatively good, while the railways were neglected for decades and the telecommunications networks are badly insufficient for the magnitudes of population and economy. Inadequate telecommunication leads to highly localized banking services. Foreign currency acquisition has been deregularized by the Government, but scarcity of hard currency is still a major obstacle to many economic activities. According to a Decree of the 1970s, the majority of corporate shares must be owned by Nigerians, and there is an Expatriate Quota for employees of private enterprises.

The first IBM computers were introduced in Nigeria in early 1960s, and by the same time first courses in Computer Science were held in the University College, Ibadan (later University of Ibadan). Currently something like a computer boom is being experienced in the private sector, as a consequence of the microcomputers. Based on the information I collected in 1989, I would estimate that there are at least 200 firms engaged in the computer business in Nigeria, most of them selling hardware.

During 19th April — 30th November 1989 I collected the computer-related advertisement in two of Nigeria's most respectful newspapers, namely the Daily Times and the Guardian. Altogether 249 different pieces of advertisement were published, or more than one daily. They can be classified into the following groups.
Vacancies for systems analysts/designers, programmers, operators, computer engineers: 87
Vacancies for computer-literate accountants, secretaries, etc.: 28
Sales of computer hardware: 30
Sales of accessories, stationery, UPSs, etc.: 31
Computer education and training, for programmers, secretaries, etc.: 57
Miscellaneous (bids for tenders, congratulations by computer firms, etc.): 16

Besides OAuthc, two other University Teaching Hospitals were installing new computer systems in 1989, namely LUTH of Lagos and UCH of Ibadan.

Yorubaland. Obafemi Awolowo University, the second biggest in the country, resides in the relatively small town of Ile-Ife (some 200,000 inhabitants) in Oyo State, Western Nigeria. Ile-Ife is the spiritual capital of the Yoruba people.

According to Yoruba legends, the Earth and its inhabitants were created in Ile-Ife. A divine hero called Oduduwa created the first Yoruba kingdom there, and his children founded the rest of the most highly-respected urban kingdoms. During the 10th to the 14th centuries Ife was the site of a high civilization which produced world-famous naturalistic bronze and terracotta sculpture. Later it declined in terms of real power, but it is still considered the cradle of the Yoruba, and the Ooni (King) of Ife is the most authoritative traditional ruler of Southern Nigeria.

The Yoruba are exceptional in tropical Africa due to their ancient urban culture. Although living in an agricultural economy, people preferred to live in towns and cities when not required on the fields, which could be quite far away. The Oyo, Ogun, Ondo, Lagos, and Kwara States of Nigeria, together with much of Republic of Benin (former Dahomey), constitute the Yorubaland. It was never governed as a single empire — as a matter fact, the umbrella term 'Yoruba' is rather late invention. Several subgroups have an enduring own identity — the Egbas, Ijesha, Ijebu, Ibe, etc.

During the 19th century Yorubaland was torn by fierce wars between coalitions of kingdoms. Entire cities, as Old Oyo, disappeared, and new ones as Ibadan and Abeokuta were founded by refugees and bands of soldiers. The wars were the source of the last major transportation of slaves across the Atlantic. Their descendants can still be identified in parts of Brazil and Cuba.

Yoruba kings were appointed amongst a royal lineage — the off-spring of

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The Daily Times, 24 October 1989

The Yoruba empires and their neighbours in 1800. From Webster & Beahan: West Africa since 1800.
Oduduwa. In theory they had vast powers, but in practice there was a number of other high office-holders, appointed from other aristocratic lineages, who had to be consulted. During the fraternal wars several modified systems of government were invented.

Women had considerable economic autonomy and could rise into influential positions. Today as well most of local trade is in the hands of market women, a few of which are very prosperous and engaged in trade all along the West African coast. There are numerous Christian churches, global and local, and a roughly equal number of Moslems. The religious tolerance of the Yoruba has been discussed by several researchers. Traditional religion is alive in folklore and customs, less so as a discrete communion.

The role of national and cultural factors. Nigerians today are rather reluctant to discuss things in terms of ethnic groups, due to the painful experience of the past. Nigeria is, however, a multinational country, comparable to the European Community rather than a homogenous country like Finland. Although the Europeans preserved the derogatory term ‘tribe’ for the Africans, the Yoruba, Igala, Efik, etc. have the same national attributes as the Germans, Estonians, Lithuanians, and so on. In a federal country it is a most crucial task that the aspirations of each and all of the national groups are satisfied, and the hegemonic tendencies avoided.

As a participant in a cross-cultural project, I am naturally interested in the effects of the specific social and material features of the cultural setting into experience gathered in the project. Is this or that finding attributable to something specific to Yoruba heritage, or Nigerian political system, or British colonial influence — or maybe to negritude in Senghor’s terms? Can the experience be generalized to a Teaching Hospital in Northern Nigeria, or to a manufactory in Lagos, or a Ministry in Angola — or is it universal?

It may turn out at the end of the day that cultural differences between groups of people have less effect on systems development than material preconditions have. This is at least my own view for the time being. Yet my personal experience is extremely narrow, and even the briefest Nigerian social history can convince one about major differences in the traditions of Nigerian peoples. Therefor I wish to record the specific setting of the project as richly as possible, without discarding any potential explanatory factors by default.

Hopefully this very brief introduction into the socio-political scene gives some cues to people who are versed with other societies, in order to collectively identify the contingency factors of my experience. Moreover, I regard it as extremely important to be able to collect practical experience of a much larger number of Nigerian systems developers before proceeding into any sweeping generalizations.
4. Course of events

4.1 Pre-history: 1966 to February 1989

One of the earliest international news I followed with interest was the end of the First Republic in Nigeria early 1966, when I was a schoolboy of fourteen years. I can’t remember if I was interested in African affairs before that, but I recall that I sounded the attractive rhythm of Prime Minister Sir Abubakar Tafawa Balewa’s name in my mind. Ever since I have been reading anything concerning Africa, from newspapers and academic monographs to novels by Ousmane, Ngugi, Achebe, and others. More and more my interest has centered around the long history and the present-day struggles of the West African peoples.

It turned out that the girl whom I married shared the same interest, and together we sometimes dreamt about once being able to work in Africa. As I became a Systems Analyst/Designer and she an Arts Teacher, we regarded ourselves quite useless people for the Africans, however, and time passed without any sign of the dream ever coming true.

Early 1985, soon after starting my work at the Computing Center of University of Kuopio, I suddenly realized that because of the triumph of the microcomputers, it might finally have become possible to combine my profession with my long-standing interest. A search into some reference data banks about ‘computers and developing countries’ confirmed my supposition. As a first step I decided to commence doctoral studies in ‘Information Systems in Developing Countries’.

In May 1985 I was accepted as a postgraduate student in Helsinki University of Technology (HUT), where I had made my M.Sc. in 1978. My Main Subject (30 study weeks, or credits, of formal studies) was approved to be Computer Science and the Secondary Subject (15 credits) Development Studies — a combination that raised some discussion amongst the professors, and required two meetings and additional explanations. The latter subject was from the Institute of Development Studies (IDS), University of Helsinki.

The supervisor of the studies is Prof. Reijo Sulonen of HUT, and the instructor is Prof. Pertti Järvinen of University of Tampere. The Secondary Subject was supervised by Ag. Prof. Marja-Liisa Swantz of IDS and Prof. Martti Kaila of HUT.

My first tentative idea was to collect and compare experiences of systems development from two different African countries, one relatively wealthy and capitalist, the other relatively poor and socialist-oriented, but both with a strong indigenous cultural tradition. I was interested in the experience of the Africans, not of the foreign aid organizations.

In September 1985 I wrote to the embassies of Ethiopia and Nigeria, asking for advice in applying for a teaching post for 1987-88 in a university, with Finnish grants. The Nigerian Universities Office in London replied in October, recommending that I should write directly to the universities. In March 1986 I wrote letters to the Computer Science Departments of the Universities of Ibadan and Ife, but never got a reply. By then I had already dropped the idea of comparison, not the least for practical reasons.
In the meantime I went on with the examinations of my Secondary Subject. While Kuopio is some 400 km away from Helsinki, lectures were substituted by extra literature. In the beginning of 1986 a National Doctoral Education Programme was established in Information Systems Science, and I was admitted in it. The programme funded three months of full-time studies for me in 1986, besides arranging workshops which I attended.

In August-September 1986 I discussed the lacking contacts with the then Finnish Ambassador to Nigeria, Mr. Vilho A. Koironen. He advised me to find the funding first and the contact in Nigeria after that.

The then Subsecretary of State for Development Cooperation in the Ministry of Foreign Affairs (FINNIDA), Mr. Martti Ahtisaari informed me that I could not be employed with Finnish development cooperation funds, while Nigeria was not one of the so-called Programme Countries of Finland. However, it might be possible to get a research grant from the Academy of Finland, the government institution for research funding.

The Chairman of the Section of Development Studies of the Academy, Prof. Kari Launiala told me that I should write a well-argued research plan, indicating why it was essential to conduct the study in the country suggested, and that it was possible to do the research work in practice there. An officially confirmed status in Nigeria was a precondition to a research grant.

The Secretary of the Section told me to first apply for an exploratory visit to the Nigerian University in question. The actual research phase could only be funded after I could show knowledge of the site and conditions of the research work.

In early December 1986 I left my application, accompanied by a heavily revised research plan, to the Academy. I applied for a two-week visit to Nigeria in spring 1987, and three months’ salary for preparing the study. I also sent the research plan and applications for postgraduate studentship to the Heads of the Computer Science Departments of the Universities of Ibadan, Ife, and Lagos.

On 27th January 1987 the funds were granted.

While having no reply from Nigeria, I sent new letters in January and February to the Universities and to the Nigerian Universities Office in London, asking for a Letter of Invitation. I was unable to get through to the University of Ibadan by telex or telephone. Mr. Lars Backström, Second Secretary of the Embassy of Finland in Lagos, had no success either.

In order to realize the visit during spring, I sent my Visa application to the Embassy of Nigeria in Stockholm on 25th February.

On 1st March I got a letter by courier from Professor S.B. Jaiyesimi, former Head of Computer Science Department of the University of Ife. He was quite affirmative, offering his help during my exploratory visit, but proposing Ogun State University, Ago Iwoye, where he was currently developing Computer Science programmes. He also informed about an International Conference of the Computer Association of Nigeria (CAN) from 29th April to 1st May.

I immediately sent a copy to the Embassy of Nigeria and replied to Prof. Jaiyesimi, indicating however that I would still like to discuss the choice of the research site. The flight tickets were rescheduled to enable me to attend the conference.

On 12th March I got another letter from Dr. A.D. Akinde, Head of Computer Science Department, University of Ife, also inviting me to the exploratory visit.

On 26th March, however, my travelling agent informed that Nigerian Embassy had rejected my Visa application, referring to their regulations to the effect that "schools and similar organizations arranging conducted tours for their students/members for any study courses or for research purposes must first obtain the
authority in writing from the Immigration Authority before Visas for such visits could be granted”.

I called Mr. Jackden, the Visa Officer, explaining that I was only going to discuss the terms, not to conduct any research work, but he insisted that I still had to get the authorization of the Director of Immigration, Lagos. He told me that the Embassy of Finland could obtain it for me within two-three days.

I called Mr. Backström in Lagos. He said the Embassy could not directly be in contact with the Immigration Department. According to him, it was the University’s task to get the authorization to me.

Several hectic efforts were made by me and Mr. Backström to get any of the Universities of Ife, Ago Iwoye, Ibadan, or Lagos to obtain the authorization, but with no reply. In June I had to postpone the visit indefinitely while concentrating in re-establishing the contacts in Nigeria. Meanwhile I finished by Secondary Subject (“Excellent”).

In September, with the help of Mr. Awofisayo of the Nigerian Universities Office and Mr. Backström, it was realized that the University had to address the Letter of Invitation to the Director of Immigration, taking responsibility of the stay, and indicating that the expenses would be paid by the Academy of Finland. However, the Ministry of Internal Affairs had been transferred to the future Federal Capital, Abuja, in the middle of the country, and there were currently no telecommunication links there. A University Officer would have to wait for the decision in Abuja and then travel to Lagos to cable the authorization to Stockholm.

In November 1987 I got one more month of full-time studies funded by the Doctoral Education Programme. I had lots of materials on computers in Developing Countries, on macroergonomics, and so on, but experienced difficulties in formalizing that to examinations. I wrote some essays but tended to focus on different support disciplines instead of Information Systems Development proper.

After dozens of telexes, letters, and phone calls and a visit to Stockholm, I got a message from Dr. O.A. Daini, the new Head of Computer Science Department of the Obafemi Awolowo University (former University of Ife), on 3rd December 1987. According to the University staff in charge of immigration matters, the University could not procure the authorization since it had no obligation for my visit. He offered the assistance of the Department in case something could still be done.

On my request Dr. Daini submitted the case to the Registrar for directives on further actions.

In February 1988 I attended the Informatica’88 Conference in Havana, Cuba, with a paper about my daily work with healthcare informatics. The papers and discussions gave some more insight into the practice in Developing Countries, but there were no Nigerian participants present. I established a contact with the Working Group on Developing Countries of the International Medical Informatics Association (IMIA) through the Chairman, Prof. Dr. med. Otto Rienhoff.

On 8th March 1988, I wrote a personal letter to Ambassador A.O. Ajose, the new Nigerian Ambassador to Stockholm, drawing her attention on a general level to the obstacles hindering Finnish-Nigerian scientific contacts. Quite unexpectedly I was requested to submit a new application, and a two-week Visiting Visa was granted on 15th April. Two weeks later I got a letter from Dr. Daini, informing that the Department was applying for a Visiting Research Fellowship for me so that the University could take official action on my visa requirements.
Mr. Backström, while congratulating me by telex, told that increases in fuel prices had sparked off strikes and student demonstrations. The universities were closed for the time being, but that should not prevent my trip.

The long patience was finally rewarded when I landed in Lagos on 7th May, and arrived at the Computer Science Department in Ile-Ife on 9th May 1988 (for details, cf. Travel Report). I found a beautiful campus, bigger than expected (more than 10,000 students). Computer Science Department was relatively small (10 academic staff members, 220 students) and its facilities (a Data General Eclipse C-150 and a single-user DEC PDP-11/34 with RSX-11M) badly inadequate. The Computer Center was running a punched-card IBM S/370. The staff, however, appeared professional and friendly.

The results of the trip can be summarized as follows. First, face-to-face personal contacts were established with the Departments of Computer Science and Fine Arts. This made later correspondence much easier. Second, I got a first-hand view of the physical environment of the would-be stay, from climate and accommodation to computing facilities and children’s schools. My orientation while preparing for the study phase was of course enormously facilitated. Third, a Letter of Appointment as a Visiting Research Fellow, without remuneration but with free housing on campus, was under consideration during my trip and sent to me a few weeks later. With the official status I thus gained, I would get the S.T.R. (Subject To Regularization) Visa automatically, the immigration officers of the University told me. The Letter was of course a prerequisite for applying for more funds as well.

The trip brought about a major change in my research plans. I had avoided making too detailed plans, but the main idea had been to conduct in-depth interviews on maybe half a dozen systems development projects in a classical field research manner. Now I saw that I would be left at least one leg up in the air if I wouldn’t participate in some project by myself. Furthermore, confidentiality issues had to be given much more attention.

In Ile-Ife I was told that introduction of computers at the OAU Teaching Hospitals Complex had been recommended by Prof. Jaiyesimi (who was still on leave). Hospital informatics was
my bread and butter, and I had already earlier thought that the technology University of Kuopio was using (see Chapter 5) was highly suitable to Developing Countries.

I discussed with Dr. Daini the idea of bringing a microcomputer and public-domain hospital software with me, and evaluating it with the Hospital. He supported, and promised to be in contact with the Hospital Management while I was already about to leave by that time.

The project was exceeding the limits of a personal undertaking. Back in Finland I wrote a proposal to the Board of the Computing Center on establishing a research project on "Health Care Informatics in the Context of a Developing Country". The objectives for University of Kuopio would be to contribute to the understanding of the prerequisites and gains of health care informatics by studying the application of the latter in an exceptionally demanding context. In the beginning my Lic.Tech. studies would be the core of the project.

The proposal was approved 12th June 1988. Later a Supervisory Board was established for the project, with members representing the Computer Science Department of University of Kuopio, the Computer Center of Kuopio University Central Hospital (KUCH), National Board of Health, and the Department of Development Cooperation (FINNIDA) of the Ministry of Foreign Affairs. Prof. Järvinen was a member as well, and the Chairman was Dr. Yrjö Jokinen, the Director of Computing Center.

I estimated that an ideal hardware configuration for the evaluation phase would consist of a powerful microcomputer (with Intel's 80386 processor and a big hard disk), maybe a small micro for administrative use, a serial port expansion board, a couple of terminals, a printer, a back-up tape drive, two Ethernet boards for connecting the micros, and an Uninterruptible Power Supply (UPS). The software would consist of MS-DOS, DataTree MUMPS, the U.S. Veterans Administration's public domain hospital applications, and some basic administrative packages (text processing, spreadsheet). The overall cost estimate was about FIM 133,000 (USD 33,000/NGN 250,000).

I discussed the equipment expenses with Dr. Elina Visuri, Director of Research in FINNIDA, in June. The response was discouraging, because Nigeria was not one of the Programme Countries for Finnish development cooperation. As a matter of fact, Nordic governments have quite little to do with any West African country, for historical reasons. FINNIDA was concentrating on large-scale projects in the Programme Countries, besides the cooperation with multilateral organizations.

It would still be possible to get FINNIDA funding if I could show that the project, besides being realizable, would produce more general results which could be applied to Finnish projects elsewhere. Academy of Finland funding for equipment was rather exceptional and on the condition that the things would be left over to the administering university after the end of the research project. I thought, however, that the equipment should be left to Nigeria — it would be rather offending to bring it to Nigeria, find it useful, and then take it away.

In July I informed Dr. Daini about the developments and asked him to suggest an appropriate sum of money as a compensation to the OAU for the accommodation, administrative facilities, etc., which I could include in my application to the Academy. I suggested a few thousands of naira.

I learnt that in November there would be an IFIP (International Federation of Information Processing) Working Conference in New Delhi, India, on the impact of information systems in Developing Countries — the first one in almost a decade and something I would have to be able to attend. As I had no practical results to report, I had to offer a theoretical paper on the role of macro-level ergonomics in DCs.

In August and early September 1988 I was busy preparing a completely rewritten Research Plan and the application to the Academy. I asked for funds for 12 months' salary during 1989, travelling expenses for my family and myself, and diverse minor expenses. The equipment expenses were directed to both the Academy and FINNIDA. The application was scheduled for
the Development Studies Section's monthly meeting on 4th October, but was postponed due to organizational changes in the Academy.

On 5th October 1988 I had a crucial meeting at FINNIDA. To my deep disappointment, the final outcome was that FINNIDA could not fund the equipment at this phase of my project. Finnish Government activities were focusing on the lowest levels of primary health care, although a Central Hospital project in Sri Lanka might benefit from my experience in future. Moreover, there was no evidence on the OAUTHC's own prioritizing and on the concrete every-day benefits of the information system. I pointed out that it was precisely the reason behind the project to find out if there were benefits.

I was advised to try the Academy. Any case, further communication and cooperation was agreed upon.

On 13th October I got preliminary information to the effect that the Section of Development Studies was proposing funds for my personal expenses but not for equipment. The final decision was due to the Central Board meeting on 1st November.

Meanwhile I had requested for instructions for applying for an S.T.R. Visa from the Embassy of Nigeria, through my travelling agency — due to the delay in the procedure in the Academy I could not leave my application before the Delhi Conference. On 8th October I got the application forms and was told that the procedure would take a couple of weeks. As the instructions were somewhat ambiguous, I asked for clarification by telex directly from the Embassy on 21st and 28th October, with no response.

We had to start making arrangements for our departure in spite of the uncertainties. While we should have changed to a bigger apartment anyhow, we sold the old one from 1st January and signed the deed for one that would be constructed during our absence.

On 1st November the Central Board of the Academy decided to grant me funds for a reduced salary for 12 months, travelling for myself and my family (wife and three children of 13, 12, and 9 years), miscellaneous expenses, and a personal stipend — altogether FIM 194,700 (USD 49,000/NGN 370,000). According to the new Academy regulations I would be able to allocate the funds, except the salary, according to the detailed needs of the project in a quite flexible manner.

On the same day I called Olivetti (Finland) Oy, one of the major microcomputer suppliers for University of Kuopio, asking about possibilities to get a donated micro for the project. They promised to find out.

I asked my travelling agent in Stockholm, Mrs. Eine Kahva, to visit the Embassy and ask for a reply to my telexes. On 9th November she replied that I was requested to call the Passport Officer, Mr. Dutsin-ma personally. The latter told that he had not been able to confirm the documents needed in my case because the Ambassador was abroad. I should call again next week Friday.

On 10th November Olivetti promised to donate a micro they had used for demonstrations. It was M280, about a year old, with a 80286 processor, 62 MB hard disk, and a small tape drive. The university list price of the configuration, when new, was FIM 24,364

Dr. Daini writing in his office.
(USD 6,100/NGN 46,000). I estimated with Dr. Jokinen that FIM 40,000 (USD 10,000/NGN 75,000) would still be required for UPS, memory, port expansion, printer, one terminal, and the V.A. software. He wrote an application to the University Administration and gave me a go-ahead to the purchases.

I got a letter from Dr. Daini on 21st November. He stated, obviously after discussing with the OAU Immigration Officer, that the Visa would be issued to me on submission of the Letter of Appointment and four copies of IMM Form 22. I should collect one copy of the processed form to be submitted at OAU for the Immigration Officer to obtain Resident Visa for me locally.

He also informed that the Management of OAUTHC was quite willing to collaborate. In response to my earlier request, he attached a list of textbooks for donation consideration to the Department.

When I called Mr. Dutsim-ma on the same day he told that the Ambassador had not decided yet, but I could send my Visa application already and enclose the passports after returning from India. I sent the IMM.22 forms together with copies of the Letter of Appointment, a certificate by the Academy, and Dr. Daini’s letter.

During 23rd-29th November I was off for the Conference (see Travel Report for details). The expenses were paid from what was left of the first Academy grant because of sharply devalued prices in Nigeria. The Conference was small but there were many highly interesting papers and people. I had long talks with Mr. Olu Okuwoga of Nigeria. Kenya, Ghana, and Zimbabwe were also represented. No less than 11 of the altogether 35 participants were either British nationals or conducting studies in United Kingdom.

Back in Finland I found two letters from Dr. Daini. He was worried by the news that I was getting less funds than applied for, and hoped that I would still bring with me a microcomputer-based, multiuser Hospital Information System. The other letter enclosed a reply by the Registrar to my request on the financial compensation to OAU, to the effect that the University preferred technical assistance in form of donation of computer hardware and software. IBM PS/2 Model 80, OS/2, three compilers, dBase III+, and Wordstar Professional were enlisted as priorities.

I sent a long telex to Dr. Daini through the Embassy of Finland in Lagos, giving details of the hardware and software I was bringing with me, and assuring that it was quite appropriate for the evaluation project. I explained that the financiers were willing to hand over the facilities to the OAUTHC at the end of the project, in case two conditions could be met: (1) The system would be found useful from the Hospital’s point of view. (2) Permanent Nigerian systems support would be organized before that.

I emphasized the latter condition, suggesting that a substantial part of the project be dedicated into an in-depth scrutiny of the software by a group of Nigerian Systems Analysts/Programmers and I.

As to the Registrar’s letter, I regretted that I had not received it in time for attaching it to the application for funds, but I promised to look at the software. About the PS/2 I expressed my
view that it was not in scale with the other expenses of the project, nor with the expenses I would cause to OAU.

On 1st December I took the risk and left an application for leave for 1989. On 5th December Mr. Dutsin-ma told me in phone that the Ambassador had studied my case, which she knew well from the first time. New guidelines for granting Visas for academics had arrived, to the effect that a Clearance from Lagos would be needed. The Embassy was about to send a letter by diplomatic mail next Friday. I sent a telegram to Dr. Daini about the new situation and the probable delay in our departure.

When I called Mr. Dutsin-ma next Tuesday, 13th December, the mail bag had not left because of troubles with the air line. The following day the microcomputer arrived, although without manuals and software for the tape drive. Assisted by the microcomputer support staff of the Computing Center I assembled the main unit, including the memory expansion and serial port expansion, without difficulty. Then I had to try and get my consultation tasks with Finnish hospitals finished.

The Supervisory Board of the project convened in Helsinki on Monday, 19th December. I briefed the members on the situation and plans. I guessed that the departure would be postponed by at least two weeks, till 13th January. The funding problems and the portability of the results were discussed. The members stressed that the persons who would carry on the project locally should be identified early on, and be brought along. Permanent system support was considered crucial and problematic. Finally, it was decided that I should give a report every four months.

Next day, 20th December, I called Mr. Dutsin-ma only to find out that the request for clearance could not have been sent yet. I stressed the urgency of the matter by telling that we were going to be homeless and jobless within two weeks, and he promised to inform me immediately when the diplomatic mail would start going again.

I asked my travelling agency to cancel the tickets of 31st December, and make new reservations to the next three weekly flights. Besides, I sent telexes to Mr. Okuwoga and a Finnish lady in Lagos, asking if they could follow up the processing of the request, whenever it would leave. Mr. Backström informed that Nigerian Airways was facing financial problems — 3,000 employees had been given notice to quit, and recently some flights to Europe had been cancelled due to unpaid fly-over fees for Algeria.

Meanwhile I started installing MUMPS. I had virtually no prior experience with the DataTree MUMPS implementation which I was to use, because I had been working with PDPs and VAXs. With the briefing of my colleagues it was however easy to create the environment needed. The V.A. software had arrived, and I downloaded them from 9-track tapes through our VAX. I was pleased to see that the software, developed on a mini computer running another vendor’s MUMPS, could be restored on the micro without any problem.

The missing manuals and software for the tape drive arrived, as well as the UPS and the terminal. University Administration approved officially the funds for the purchases. Mr. Kari Kuutti of University of Oulu had sent two volumes of scientific journals (Communications of the ACM, etc.), and Prof. Järvinen promised to send a C compiler, both for being donated to the CSC Department, OAU. Everything was ready on Friday, 23rd December 1988, besides the Visa. Nigerian Embassy informed that the request had left, and estimated that 4-6 weeks should be reserved for processing.

After Christmas we moved our household things to a storehouse, leaving only what could be carried along in car. Luckily, my parents-in-law were leaving for a 6-week trip and we could settle down to their place in Imatra, some 250 km from Kuopio. I borrowed a portable micro with modem for easy communication with the Computing Center.

Children started to do their homework, embarrassed for not going to school, and I tried to concentrate in updating my Research Plan, and in reading literature on Developmental Work Research and Activity Theory. On 12th January 1989 Mr. Okuwoga replied that he had returned from vacation and would do his best to help us. On Thursday 26th January I sent a lengthy telex
through Embassy of Finland to OAU Liaison Office in Lagos, copied to Mr. Dutsin-ma, Dr. Daini, Mr. Okuwoga, and Mr. Backström. I urged them to find out the state of affairs with the request while we had been living for almost a month on a salary not intended for the Finnish price level.

On Wednesday 1st February six weeks had elapsed since the request had left, without any sign of progress. We decided to start preparations for aborting the project by end of February if nothing would happen — where to find temporary jobs and accommodation for the rest of the year, and so on. We were not in the mood of seeing any friends or relatives for some time.

Meanwhile I finished with my list of reading and started writing examination essays on the books. While we were getting broke, I agreed on some short consultation contracts. As the first of them, I attended a system specification meeting in Kuopio on 8th February. There I got a telex from Mr. Backström, informing about a letter by Dr. Daini being forwarded to me, with a quote: "The Embassy of Nigeria in Stockholm should be informed that you are not applying for a Resident Visa. They should give you a Visitor’s Visa for a period of three months."

I forwarded the quote to Stockholm by telex and returned to Imatra. On Friday 10th February I called Mr. Dutsin-ma and, to my surprise, was told that new Visa application forms IMM.22A had been sent to us. Visitors’ Visas would be granted for us within 24 hours after receiving them completed. I immediately reserved tickets for the flight on 24th February, and sent the message to Mr. Backström and Dr. Daini. We decided to move to Helsinki on Tuesday 14th February when my parents-in-law would return.

By Tuesday the forms had not come, and we realized that they had probably been sent to our old house address. I called my travelling agency, Mrs. Kahva got another copy of the form from the Embassy in Stockholm, and sent it to us by Post Office telefax. We drove to Helsinki airport where we filled the forms (both IMM.22 and IMM.22A for sure) and gave them to Mrs. Kahva’s husband who was luckily just returning to Stockholm.

During Wednesday and Thursday 15th-16th February I worked in Turku, some 100 km from Helsinki, while the rest of the family stayed with my mother in Helsinki. On Thursday I called the Kahvas and was told that Mr. Dutsin-ma had been travelling but had promised the Visas the following day. On Friday I called again several times. By the end of the office hours I was told that the Visas were "just being signed" and they would be sent to us by courier on Monday.

On Tuesday 21st February the passports arrived with the Visitors’ Visas on them, but there were no processed copies of the forms for the OAU Immigration Officer. I called Mr. Dutsin-ma who said, a little fed up for the first time, that the Embassy had now done everything in its powers, and every Nigerian officer should understand that the Embassy would not process S.T.R. applications if Visitors’ Visas had been applied for.

I travelled by night train to Kuopio. On Wednesday 22nd February I packed the things and informed the forwarding agency that everything was finally ready for transportation. The printer had arrived, as well as most of the software for the Department: dBase IV, Harvard Graphics, PC Tools, and Windows, together with a collection of public-domain software. I was alarmed by the Olivetti not starting up (hard disk not found), but switching the power off and on again helped.

None of the textbooks had arrived yet, nor MS-Word for the CSc Department. Neither was the subscription of the PC Magazine to the Department confirmed, and nothing had been heard of the MUMPS word-processing and spreadsheet packages by Data Methods Inc. The deficiencies were not crucial however. I calculated that the list prices for the materials and software to be donated would add up to at least FIM 10,000 (USD 2,500/NGN 19,000).

Back in Helsinki on Thursday we made the final arrangements. Next morning I called on Enroth Oy, my forwarding agency. They had received instructions from their counterpart in Lagos, Elder Dempster Agencies, to the effect that I would need to bring my passport and an Unaccompanied Baggage Declaration to the latter, they would take care of the rest. The baggage would arrive in Lagos on 6th March by air.
Our plane left Helsinki on Friday 24th February 1989 at 7:15 PM for Moscow. Next afternoon we arrived in Lagos. On Monday morning we called on Elder Dempster, and half past one in the afternoon we arrived in Ile-Ife.

4.2 March to May: The study phase

Within two days we were accommodated in one of the chalets reserved for temporary staff. There were just two small rooms for the five of us, but after storing some of the furniture and buying a double-decker children's bed from a carpenter we were able to settle down. The conveniences included tap water, indoor toilet, gas cooker, electricity, refrigerator, two fans, and an air conditioner that unfortunately broke down immediately.

The campus was almost a self-sufficient town itself, several square kilometres wide. The Leventis grocery store for manufactured items, the Staff School, and the Computer Science Department were within a ten-minute walk. The Administration, Health Center, Post Office, banks, and the bus stop were within 20-30 minutes. The Maintenance was near to the Main Gate, maybe 5 km from us. The town itself — with the Market and all kinds of specialized shops — was some 10 km away and could be reached by mini buses (Japanese vans accommodating twelve passangers).

One of the luckiest things during our stay was to find our best friends at the very next door. Mrs. Lucy Ali and Dr. Joseph Ali with their four children had returned from the U.S.A. a year

Map by Planning and Survey Section, OAU. One square is 400 meters.

Center: Faculties and Administration (Computer Science in square F7). Left center: Students quarters, Health Center. Top left: Hills 1 and 2, village road. Beyond top: Hill 3. Top right: Staff quarters (our house in F6, Staff School in G7). Right center: Road to town. Bottom: Ibadan-Ife Road, Main Gate, Maintenance.
earlier, after a twelve-year stay. They helped us in all kinds of practical problems, and Lucy took us to the markets and shops, advising us about bargaining, and frying breadfruit, and so on. Even more valuable was their support when children were ill or lost, or during times when the future of the country appeared too depressing to bear.

Dr. Daini introduced me to the Registrar and to the Immigration Officer of the University. The latter was surprised by the Visa I had, but told me that it could be extended every three months.

Dr. Daini also took me to the OAUTHC, at the other end of the town. I was introduced to Prof. G.O.A. Ladipo, the Chief Medical Director, and Dr. (Chief) E.A. Bamgbuye, the Chairman of the Medical Advisory Committee.

Our new home (from the pillar on left to the window on right).

The next week or two were filled with purchasing things, learning places and procedures, registering the children to the school, sweating during blackouts, wandering around the huge campus. I was surprised to meet the dry brown landscape while my exploratory trip had taken place well into the rainy season. The first rain was on 10th March.

On 9th March Dr. Daini and I had the first meeting with the OAUTHC Management. An agenda prepared by me was distributed, and on the 14th it was discussed at the inaugural meeting of the Project Committee appointed by the Management. The chairman of the Committee was Dr. Bamgbuye. Members were Mr. M.A. Abiodun, Assistant Director of Administration, Mr. D.O. Akanji, Chief Medical Records Officer, Mr. N.A.M. Dosumu, Chief Accountant, Prof. O. Morakinyo, Chairman of Medical Records Subcommittee (representing the clinicians), Dr. Daini, and myself.

I was told that the OAUTHC had already planned for setting up a computer system which would incorporate both medical and accounting records. Some funds had also been earmarked for the plan. When Dr. Daini had introduced my project, the Management had decided to wait and see if the two undertakings could be merged. I assured that the goal of my project was to fulfil the goals of the Hospital. I was not very experienced in Accounts and I did not have that kind of software with me, but one way or another could be found to implement the accounting records as well.

Other concerns expressed were the availability of maintenance and support after my departure, and the confidentiality of the patient information. I said these were high priority issues for me also, and I was confident that arrangements could be made to take care of them.

The administrative framework of the project raised some confusion. I had thought that there would be a management-level Supervisory Board meeting quite infrequently, maybe every one or two months, and a design-oriented Project Team incorporating operative-level staff from OAUTHC and the CSc Department. It was decided, however, that the Project Committee would meet weekly, at least initially, and the ordinary Top Management Meetings would be briefed monthly.

After the meeting Prof. Morakinyo had a discussion with Dr. Daini and me. He described the experiments he had conducted on computerized admission statistics, using the punched-card
system of the OAU Computer Center. We decided to suggest a Technical Group consisting of me, three representatives of the OAUTHC, and three representatives of the CSc Department.

I was satisfied and surprised by the preparedness of the OAUTHC. What worried me was the lack of contacts with the user level, but I thought time would take care of that.

The following day there was an Academic Staff Meeting at the CSc Department, where Dr. Daini introduced me and my project. Some discussion was raised on the existence of computer facilities after the project would be ended. The Department was trying to purchase an IBM PS/2, but the price seemed to go up faster than the funds could be increased. The members agreed that in the long run there ought to be one computer for the OAUTHC and another for the system development, but this issue did not need to be considered for the time being, to avoid complicating the project. Dr. Daini and two other senior lecturers, Dr. S.O. Aladesulu and Dr. V.J.U. Ekong, volunteered to become members of the Technical Group.

On 17th March, after two and a half weeks, the National Bank had cleared all its concerns and we were able to draw part of my salary from Finland for the first time. On the next day our baggage arrived. The computer was installed in the Digital Electronics Laboratory and found to be alright, except that I had forgotten the terminal cable. I relinquished to Dr. Daini the software and journals that were for the Department.

The second Project Committee meeting on 22nd March discussed my working plans. I was to first study the work procedures and information needs of the OAUTHC, and the existing Veterans Administration software on the other hand while I had not seen it before. These two aspects would be merged in a prototyping workshop, producing the requirements of the system to be implemented. In the same time, the staff and advanced students of the CSc Department would be trained in the MUMPS/FileMan technology.

In June, decisions were to be made by the Top Management about the hardware configuration, the applications set, and the work procedures to be installed. Then the hardware expansions would be purchased, software modifications made, maintenance procedures checked, and the users and the support staff trained in full scale. November and December would be reserved for fine-tuning.

The Technical Group was approved and, after some discussion about the level of the members, Mr. Akanji and Mr. Dosumu were appointed. Mrs. A.O. Songonuga, Chief Pharmacist, was co-opted to the Project Committee.

I suggested that a Main Operator should be appointed quite early. The nature of this post was not clear — a computer expert, a data entry clerk, or an administrator — and the issue was suspended. I realized that I may need to heavily modify my original view of an end-user driven multiterminal system with a 'Site Manager' as the Main Operator.

On the 23rd I finalized my first report to Finland. Dr. Daini commented on it advising me to pay more attention to the Department’s needs. What the Department should gain was academic merit — publications, conference trips — and not just being a resource. I replied that the project with the OAUTHC was just a case, needing mainly hard work, and the academic
gains would come through methodological studies and creative application of the practical technology used in it.

I started to initialize the Veterans Administration applications and found out that there was some fault in the printer.

After the Easter holidays I spent some days in familiarizing with the different wards and departments of the hospital, guided by Mr. Bello, Public Relations Officer.

The Complex consists of the Ife State Hospital (ISH) and the Eleyele Urban Comprehensive Health Center in Ile-Ife, the Wesley Guild Hospital (WGH) in Ilesha (a bigger town some 45 km away), and the Imesi-Ile Rural Comprehensive Health Center still further away, together with Schools of Nursing, Medical Records, and Laboratory Technology. Each unit keeps its own Medical Records and has some local administration, but accounting, purchases, and the like are centralized.

The Teaching Hospitals are under the Federal Ministry of Health. Formally the OAUTHC is autonomous of the University. In practice, of course, the lecturers of the Faculties of Health Sciences and Pharmacy are also consultants at the OAUTHC.

The ISH had been established as a State Hospital. The premises were still not adequate for the present use as a Federal Teaching Hospital with about 400 beds. Many of the wards lacked even fans. Water had to be distributed with a tanker while the existing borehole did not supply enough, but a pipeline was under construction from the Local Government reservoir. Scarcity of liquid funds, combined with a number of other obstacles, hindered the maintenance of existing facilities and equipment. Transportation was one of the major problems as well.

I visited the General Administration, Establishment, Planning, Accounts, Medical Records, Civil and Electrical/Mechanical Engineering, and Stores Departments, Chief Matron’s Office, Pharmacy, the Haematology, Chemistry, and Microbiology Laboratories, Radiology Department, Dietary Kitchen, Mothers’ Inn, and most of the wards. I interviewed senior staff members and collected samples of the forms in use. Mr. Bello acquired for me annual reports, statistics, and latest numbers of the internal Newsletter.

The staff members made a very positive impression to me. In spite of the trying conditions, most of them were interested and apparently well trained. Especially I noted the continuing education efforts of the nursing staff. Primary health care seemed to be well integrated into the
Complex, contrary to Finnish University Hospitals. I had few opportunities to speak with the doctors, but hoped to continue my tour amongst them later.

Of special interest to me were the Intensive Care Ward, Radiology Department, and the Laboratories, which had experience in operating and maintaining delicate equipment. I understood that the daily operating — ie., the capabilities of the operators — was no major source of concern. Unstable electricity, combined with lack of protective equipment, was the main source of faults. When something happened, it was difficult to get things repaired. A microscope could lay unused for three years due to lack of bulb.

Scarcity of funds was an obvious reason for the maintenance problem, but not the only one. The engineering and purchasing staff of the OAUTHC itself could not be experts in the more complicated equipment, but these activities were yet centralized. Vendors of the equipment, almost all based in Lagos, sometimes lacked trained maintenance staff, and communication with foreign manufacturers was troublesome. The exchange, customs, and visa procedures caused problems and delays. An extreme case was a vendor which, during the hectic years of the early 1980s, had left an intensive care system uninstalled, with manuals in German.

I concluded that although systems design and user training were important, the most crucial task would be to develop a frictionless maintenance and support arrangement. Trained people, funds, contacts, spare parts, and agreements would be needed as elements of the support activity. Even after finding all the elements it would still take some efforts to get all the needed organizations to work smoothly together.

In the mean time I continued installing and studying the V.A. applications, when not going to the bank, air conditioner maintenance, and so on. The University staff was busy with the Haraattan Semester examinations, but I was able to briefly demonstrate the system to Prof. Morakinyo, Dr. Daini, and Dr. Aladesulu. The former gave me an experimental data collection form on Mental Health Inpatient Admissions, so that I could demonstrate the properties of the FileMan database. Later on I introduced the system to the Project Committee as well.

With Dr. Daini and Dr. Aladesulu I discussed the systems development and research aspects of the project. They were naturally more interested in the latter. I explained that to convince the financiers that the facilities could be left behind, I had to show that there would be sufficient support after my departure. Therefor I had concentrated in the practical side. We agreed that I would give a departmental seminar about the whole project as soon as the Rain Semester would begin, and then go on with a MUMPS/FileMan/Kermel workshop.

On 4th April we purchased a second-hand air conditioner, after finding out that the University had no funds for repairing the original one, and it would cost us almost the same to fix the University’s machine as to buy one of our own. Nights became cold, afternoons remained hot while the chalets were not indeed designed according to the age-old, sheltering Yoruba architecture.
Our younger daughter got high temperature on Sunday 2nd April. It went down with aspirin, only to return with strong headache and nausea two days later. The next morning we went to the OAU Health Center for the first time. After some administrative problems she was examined and given a chloroquine injection. The blood test exposed no parasites but a probable bacterial infection. She was given antibiotics, and the symptoms disappeared rapidly. After four days of uncertainty it was relieving to see that the ordinary children’s diseases were the same in Africa as in Finland.

On 6th April I was able to take a tape backup of the hard disk for the first time. It took three cartridges and almost one hour. I agreed with Dr. Daini that the staff and selected students could use the Olivetti for their projects when I would not need it. Mr. Ogwu, the hardware expert of the Department, and I had the keys to the laboratory and to the computer.

The first school term ended, and children got their first reports. During the three-week break they didn’t have vacation — the textbooks of the Finnish school were studied every weekday. My wife and I acted as part-time teachers. The University was on leave as well, but my wife studied at home and started the registration procedure as an Occasional Student in the Fine Arts Department for the next semester.

I defined the database and a few menus for Prof. Morakinyo’s experimental Mental Health system. The whole thing took no more than two full days, and I did not need to do any programming.

The minibus transportation from the Campus to the town and OAUTHC was blocked for some days by the students as a protest against an unsuccessful attempt to increase the fares by 100 per cent. I spent the days in writing letters to some 30 addresses around the world, introducing my research plan and the first impressions in Nigeria. The recipients were researchers in the fields of Information Systems Development, Information Systems of Developing Countries, Medical Informatics of Developing Countries, and Ergonomics of Developing Countries, together with the computer experts of some United Nations organizations.

Mr. Akanji, Chief Medical Records Officer, showed me some documents from 1977-78, when there had been a plan already about computerizing the admission statistics. The OAU Computer Center’s IBM mainframe was supposed to be used, with a remote terminal in three of the OAUTHC’s units, but the plan was never accepted in the end. Actually the IBM was never equipped with the terminal operating system. Mr. Akanji told that currently the University College Hospital in Ibadan was also implementing a computer system. We could travel there some day to learn more.

During the familiarization tour I had learnt that there was a separate department and specialized staff for Medical Records — something lacking in Finnish hospitals. It was this department’s staff that was in charge of patient registration at the General Out-Patient Department (GOPD), Consultant Out-Patient Department (COPD), and Radiology Department as well. The Laboratories and Pharmacy kept their own records by themselves.
Now I went on through the details of the records-keeping, mainly with Mr. Ibimilua, the number two man of the Department. There were several separate recording schemes — a comprehensive one for the in-patients and the COPD, and much less detailed ones for the GOPD, Accidents and Emergency, and each of the Health Centers. The Ilesha unit operated with an identical arrangement. Each scheme had its own patient numbers.

In the same way as in Finland, information about the patients’ hospitalization periods and consultant appointments were collected into Case Note Folders (the Continuous Health Record principle), which were stored at the Case Note Library in the patient-number order. There were more than 100,000 folders at the ISH for the time being. At the COPD there was a Master Name Index (a card index) in the alphabetical order. The Radiology Department had a similar library and index for the X-ray picture folders.

The Case Note Library had a desperate shortage of space — something not too unfamiliar in Finland either. A new space had been included in the plans for the third construction phase of the OAUTHC, together with 350 more beds, but the funds were not available.

We compiled lists of the information recorded: demographic data, admission, discharge, diagnoses and operations (for in-patients only, using the International Coding for Diseases), and appointments. I was pleased because now I already had sufficient specifications for developing a prototype of the basic functions.
On Tuesday 18th April I learnt that the fuse of the UPS had burnt up the evening before. Mr. Ogwu had not found that type of a fuse in the town, but promised to try in Lagos next weekend. Dr. Daini said in a Departmental Staff Meeting that the quotation for an IBM PS/2 had risen beyond the reach of the Department. He would check the possibilities to cooperate with the Bursary which was also seeking for computing facilities.

The OAUTHC Project Committee discussed my plans for a prototyping workshop for the hospital staff. The need for starting with the very basics was emphasized. A space for the computer at the Medical Records Department was accepted, and decisions about the necessary renovations were made. It was agreed that the main operator would be recruited from the Medical Records staff.

On Thursday 20th April I got some mail from Finland for the first time, eight weeks after my departure. Amongst other things I got the terminal cable that was missing. Courier mail was used for testing purposes, but it appeared to be very costly (FIM 978/USD 240/NGN 1,800).

Mr. Ogwu returned from Lagos with fuses that were nearly enough equivalent to the original one. The UPS was reassembled but the fuse blew up again. Mr. Ogwu found a faulty diode and a completely blown-up 250 V varistor. The latter had been the only overvoltage protection of the device! I was quite disappointed, while I had been told in Finland that overvoltages would not harm the UPS.

Mr. Ogwu promised to travel to Lagos again next weekend to search for the spare parts and a voltage stabilizer. Meanwhile I could share the Department’s stabilizer. The computer was intact, and the terminal started working as well.

The Rain Semester lectures started gradually towards the end of April and I was worried because there were no timetables for the MUMPS lectures and the OAUTHC workshops yet. The CSc Dept. staff was busy again, however, and it was difficult to call a meeting. Finally Dr. Daini approved that I could start on Tuesday 9th May with a Departmental Seminar and go on with weekly MUMPS lectures. The OAUTHC workshops would be on Thursdays.

My wife started to attend to lectures and workshops at the Fine Arts Dept., although the registration procedure was still unfinished.

Meanwhile Prof. Morakinyo invited my family and me to a party where I met some other high-level staff also of the Faculty of Health Sciences. I learnt that quite many researchers had micros of their own. Perhaps the biggest microcomputer installation in the country was in the International Institute of Tropical Agriculture (IITA) in Ibadan — some 200 Macintoshes in a network, besides a few VAXs — "but that is not Nigeria".

Mr. Bello took me to the Wesley Guild Hospital on Friday 28th April. It had been established in the 1920s by missionaries, and specialized into paediatrics. Since 1975 it had been part of the OAUTHC. The number of patients since then was less than 100,000. I visited the Medical Records offices. Arguments for and against the inclusion of the WGH data into the computerized system was discussed, without a definite stand.

In Ife, Mr. Ibimilua introduced me to the Statistics Section of his department. They produced the daily bed status report, and the comprehensive monthly and annual reports to the Federal Ministry of Health. The latter comprised of several dozens of pages, but a great deal of the information was departmental — i.e. collected and reported by the departments concerned and only drawn together by the Statistics staff. I collected samples of all the forms again.

The Statistics staff also kept up the indexes on diagnoses and operations (on card files), and had a lot of responsibility on proper coding. The indexes were utilized in the reports to the Ministry, and for finding research material for the resident doctors. The latter task was sometimes quite labourious with the numerous cards and folders.

After Monday 1st May, the Workers’ Day holiday, children returned to school. President Babangida announced the lifting of the ban on party politics. Mr. Ogwu had found a stabilizer but no varistor. He knew a small company were an equivalent circuit could be constructed. We agreed that he would take the UPS to Lagos next weekend.
Due to space problems the lectures and workshops were postponed for another week. After two months' inquiries it was confirmed that neither the OAU nor the OAUTHC could appoint a grounded car for my use in exchange for paying reasonable repairs.

During the Eid-el-Fitr holidays on 5-8th May Dr. Mike Dibiasi, an American archaeologist and our only white neighbour, guided us to the highest of the nearby hills and showed us remains of an ancient pavement a few hundreds of meters from our house. The rainy season was gradually commencing.

I had been thinking about the achievements this far and what should be done next. On 10th May the Project Committee discussed a memorandum I had written about the scope (information contents) of the system, the hardware configuration, the permanent support arrangements, and the goals and constraints. The aim of the paper was to represent the alternatives at hand and get the Committee's feedback for preparing a more detailed proposal along the selected direction. The Top Management Meeting would then make the final decisions towards end of June.

It was decided that the inpatient and consultant outpatient information only should be incorporated in the database, while the general outpatient units produced hardly any diagnostic information and without reliable patient identification. Furthermore, the Wesley Guild Hospital would be left out for the time being due to too big procedural problems in collecting and utilizing the information.
The first phase was to incorporate basic subsystems only — registration, admission-discharge (including diagnoses and statistics), and consultants’ appointments. The inclusion of laboratory results, for instance, would have been quite beneficial, but had to be considered only after getting something functional first. I estimated that the storage capacity of the Olivetti would accommodate the basic subsystems, but not the expansions.

The selected scope would necessitate the purchasing of two more terminals, besides the one brought from Finland (at COPD, Radiology Dept., and Statistics). I learnt that although funds had been appointed to computerization, purchases of this magnitude had to be decided by the Board of the OAUTHC, meeting quarterly. The next meeting would take place during the following week already. I promised to try and make an estimate of the expenses for the Board.

In my paper I had listed the different support services needed, from hardware maintenance to systems design. It appeared that the OAUTHC wished to rely on in-house maintenance in the long run, and had not intended to make any contract with the CSC Department. I tried to clarify the difference between hardware maintenance and software support, and stressed that it would take a long time to train even a qualified computer scientist in all the software involved. It was decided that Dr. Daini would make a proposal on the maintenance requirements.

The next day I met with Dr. Daini and Dr. Aladesulu. Again I strongly emphasized that it would take time and effort to learn all the software levels — MS-DOS, MUMPS language, DataTree implementation, FileMan, Kernel, V.A. applications, local modifications. I wished to have something like an apprentice watching when I would work with the system. The others seemed to approve my concern. They would look after proper candidates. I would have preferred paying the salary through the Department, but I was told that the appointment procedure could then take some half a year.

When preparing the cost estimate I realized that the distances of the terminals from the computer were too long for the ordinary RS232 signalling, but current loop would fit. If the terminals would be equipped with the current loop mode, a single multiline converter at the computer end would be sufficient. My VT230 appeared to lack the current loop mode, however, and thus altogether three terminals would be required. The terminals ought to be powered centrally from the computer room to avoid buying extra stabilizers.

On Tuesday 16th May I had the first workshop — it was for the last-year students of the Medical Records School. As advised, I spoke on a very general level about computers, information systems, and health care applications. After some two and a half hours’ lectures I presented my hardware configuration and demonstrated the V.A. applications.

In the meantime I had been busy searching for a car, assisted by Mr. Ogwu. The candidates were not in a very healthy shape but the prices were still extremely high. On 17th May, nearly three months since our arrival, we finally bought a 10-year old Peugeot 504 at 30,000 naira (USD 4,000/FIM 16,000). It had been interesting and useful to trek along the campus and the town, and to use the crowded minibuses, but now we were happy to be able to widen our horizons to other towns as well.

On Thursday 18th May I had my Departmental Seminar. I spoke about the history of my project, systems development methodologies, different levels of ergonomics, MUMPS, and the Veterans Administration tools. There were some 40 people present, mainly students. I got an impression that my message was understood and raised some interest.

The next day I drove, for the third time, to the Immigration Office at Ilesha to get our visas extended for another three months. The extension was granted, but in the same time I was told that the Visitor’s Visa could not be extended beyond six months altogether. If I wished to stay after August, the University should obtain an S.T.R. Visa for me from Stockholm, and the Immigration Department Clearance from Abuja before that.

At the OAUTHC Mr. Abiodun reassured me that they would help me and send somebody to Abuja. Dr. Daini went with me to see the OAU Immigration Officer. The latter told us what
kind of letters were needed to get the Registrar officially involved, and estimated that the trip would cost at least 600 naira (USD 80/FIM 320).

Next week I took the car several times to Mr. Moses Ogumola, an excellent road-side mechanic. Meanwhile I mailed letters introducing the project on behalf of Prof. Morakinyo, Dr. Daini, and myself to the Veterans Administration, the World Health Organization (Information Systems Support), and the International Medical Informatics Association (IMIA) Working Group on Developing Countries.

The second workshop was on 23rd May for the Medical Records Department staff with the same contents as before. I learnt, however, that the higher Medical Records education incorporated some computer subjects, and most of my lecture was already known to most of the audience! Yet they were quite interested while they had hardly any practical experience.

The Computer Association of Nigeria (CAN) arranged an annual conference in Benin City, some 250 km away, on 24-26 May. The topics were not very useful for me, but I decided to participate in order to see the vendor exhibition and some high level professionals — and to have a little holiday to the children also. It was to be our first trip outside Ife by our new car.

Mr. Sola Iginla, the National President of the Computer Science Students Union, guided us to Benin and told a lot of interesting things about Computer Science education in Nigeria. He thought the Department at OAU had the highest level but was poorly equipped, compared to Ibadan or Benin for instance. In Benin City we met Mr. Olu Okuwoga, our friend from New Delhi. I attended a session on the computer education plans for secondary schools.

Next day I studied the exhibition. There were half a dozen exhibitors only, mainly hardware vendors representing IBM, Digital Equipment Corp., ICL, and some less well-known microcomputer manufacturers.

We were about to leave for town to visit the Museum when we were told that the disciplined student demonstrations of yesterday against the Government's Structural Adjustment Policy (SAP) had given way to full scale riots in the town. The unemployed and other desperate people had blocked the streets, burnt some government buildings, and forced car drivers to express solidarity by waving palm fronds.

In the evening the Military Governor of Bendel State, Col. Tunde Ogbeh, announced in the TV a dusk-to-dawn curfew and immediate closure of all schools, and warned that the Army had orders to shoot at sight.

The conference was of course badly affected while many of the speakers could not arrive. The venue was a luxury motel some 5 km from the hottest spot, surrounded by high walls, and seemingly safe. The situation reminded us of Decamerone, especially during the evening party. From the Chairman's toast I noticed his regrets that there had been no strong software house in Nigeria for 15 years — either they died soon or the vendors swallowed them.

On Friday 26th we were told that the situation was supposed to be cooler. We tried to leave, wondering the burnt cars and buildings. At a major roundabout a policeman made way for an armoured van by firing in the air, forcing us to a side road. We tried to go further through the town along small roads amidst hesitantly wandering people, until a man told us that the Lagos Road was too dangerous, several people had been killed there by the soldiers that morning. We returned to the motel.
Early next morning we drove back home without any problems. In the evening we had a long and concerned discussion with the Alis on the hard times this bountiful country and its hard-working people were facing.

On Monday 29th May I met Mrs. H.A. (Bimbo) Sor-Yan whom had been recommended to me for the "apprenticeship". She had a BSc in Computer Science (Econ.) from OAU, and a few years’ experience with microcomputers. Recently she had been caring her baby. She was interested in practical systems development, and making her Master’s also.

I got an impression of an independent and interested person. Later I was told that she had been a good student, and had the most of experience of the people considered. If I wished, I could pay a stipend during the training period, and Dr. Daini would check the possibilities for permanent employment on a technical vacancy towards the end of the year. In that case the Department could commercialize the MUMPS services. All consultancy agreements had to be made through UNIFECS, a specialized agency of the University. I wrote a memorandum to Dr. Daini on the personnel, types of services, and hardware needed to support the OAUTHC.

The anti-SAP demonstrations had shifted to Ibadan, this time without cases of death. OAU was closed (to students) as a preventive measure on Tuesday 30th May and the students were to leave the Campus within the same day. Most of the Staff School children stayed at home. My third workshop, intended for the Accounting and Administration staff of the OAUTHC, was very sparsely attended.

As a positive event, Mr. Ogwu had got the printer repaired in Lagos for 500 naira (USD 70/FIM 270). No progress had been made with the UPS because the components could not be found in Lagos.

The Project Committee met on 31st May. Mr. D.O. Adewuni, Senior Technical Officer (Biomedical), was present for the first time. I learnt that my paper on the necessary hardware expansions had not reached the Board due to a misunderstanding. It was approved by the Committee as a recommendation to the Management.

Dr. Daini distributed a brief proposal on the support arrangements, along the lines I had suggested. The atmosphere became alert. The OAUTHC side suggested training their own staff
for maintenance. I said it might be possible on the hardware in the long run, but the software support staff ought to have undergraduate education in Computer Science.

When the members still shunned Dr. Daini's proposal for a reason I could not understand, I got a little annoyed and told them that somebody would have to be around to take over the system support at the end of the year, no such person was readily available, and it took a lot of time to train somebody in all the technicalities involved. I needed green light very soon for employing somebody for training.

The Committee however decided to postpone the issue and requested Dr. Daini to look into the possibility of appointing a programmer from the OAU Computer Center on part-time basis. I warned that the person in question had to have experience with microcomputers and databases, and as far as I knew the Computer Center only had a punched-card system.

4.3 June to August: Hardware break-downs, lectures, tenders

On Thursday 1st June the newspapers reported about the Dark Wednesday in Lagos: The State Government had announced the closure of the higher education institutions in Lagos, students replied by setting bonfires on major highways, and soon rioting crowds started burning government vehicles and buildings all around the city. The Army and Police suppressed the uprising within the same day. The number of dead was later estimated to be about twenty.

The disturbances flashed in most of the major towns, one after the other, before settling down. Almost all universities and schools were closed in the Southern parts of the country. The OAU Staff School was closed as well for a few days, and our children studied their Finnish textbooks in our tiny sitting room, while my wife tried to learn batik design. The uncertainty of life was stressing for everybody.

Troubled by the OAUTHC Management's apparent lack of confidence in the CSc Department in the software support issue, I wrote a lengthy memorandum. I tried to clarify the differences between
operating the system, maintaining the hardware, debugging existing software, and developing new functions or applications, emphasizing the importance of the last aspect.

I analyzed that there were four alternative ways of securing the software support: 1) by employing computer scientists to the OAUTHC, 2) by an arrangement with a MUMPS Team in the OAU, 3) by a contract with a commercial software house, 4) by involving the Federal Ministry of Health. Only the second one appeared realistic to me at this early stage of developments.

The most important issue would be "to guarantee the widest possible interest in MUMPS/FileMan based systems development in Nigeria for at least five years", otherwise there would be nobody besides the OAUTHC to share the costs of training and employing programmers and designers. I gave the memorandum to Dr. Bamgbaye and Dr. Daini. I was not sure if the latter was still interested in creating a MUMPS Team at the Department.

Many mornings and afternoons had to be spent before the mechanic got our car into a satisfactory condition. Yet its usefulness became evident when I had to travel to the Customs Mail Office in Ibadan to get the duties for a parcel from Finland cancelled.

One of the Computer Science students, Mr. A.A. Adetunji, was very keen to get involved with my research. For a small fee I let him collect a list of diverse computer-related companies for my would-be interviews.

On 7th June I had a meeting with Prof. Morakinyo, Mr. Akanji, and Mr. Ibimilua about the in-patient records and functions. Some details were adjusted, but basically the specifications remained as sketched earlier during my talks with Mr. Ibimilua. I felt that the discussion was focusing too much on designing new forms, instead of the end-user functions and the information flows, so I proposed to design a prototype according to the specifications within a week and a half.

I went to the computer, only to find out that it did not start up properly. The students told me that nowadays it usually did not find the hard disk before afternoon, when it was hot enough. Mr. Ogwu and I tested the computer systematically during many days but did not find the reason for the fault.

Meanwhile Mr. Dosumu, Chief Accountant, discussed the plans for the Accounting systems with me. Payroll had the first priority, followed by Accounts, General Ledger, Stores, and even Personnel Records. Six tenders had been received. I was requested to participate in the awarding process, and Mr. Dosumu gave me the tenders.

Vendor no. 1 was the sole representative of a medium size American minicomputer manufacturer. Thus, they proposed a mini. The expenses were poorly expressed and some of them were missing, but I estimated that the hardware only would cost more than NGN 400,000 (USD 53,000/ FIM 210,000). Vendor no. 2 was the subsidiary of a European computer manufacturer. They proposed an expensive Unix-based micro with workstations, but MS-DOS-based Accounts software!

Vendor no. 3 offered consultation only. Vendor no. 4, a well-known Nigerian company, offered just a single-user micro without software. No. 5, a small Nigerian
company unknown to me earlier, proposed a PC/AT with Unix and terminals, but only the Payroll software for the time being.

Tender no. 6, by a small Nigerian company unknown to me earlier, gave a professional impression. They proposed a selection of American PC/AT micros, but stand-alone only for the time being. They quoted the full range of Accounting applications.

The Management of OAUTHC invited Dr. Daini and me on Wednesday 14th June for consultations. They had two concerns. First, how to avoid having different computers for Accounts and Medical Records, with duplicate maintenance arrangements. Second, how to ensure the permanence of the software support staff — ie. that the staff would not move to greener pastures after being trained.

I expressed my disappointment with the tenders, and brought up that the possibilities of obtaining the Accounts software in MUMPS should be looked into, while that would enable using the same or similar, relatively cheap hardware for both Accounts and Medical Records. That would even create a second source for MUMPS support. I promised to write an analysis about the alternatives at hand.

My memorandum about the software support issue was briefly discussed at the Project Committee meeting on the same day. Dr. Daini had discovered that there was one programmer with some microcomputer experience at the Computer Center, but he did not know the latter’s willingness for training. The Committee decided only to check that and to return to the issue later.

I felt that time for training the software support staff was running out, took the risk, and employed Mrs. Soriyan on 15th June as a part-time Trainee Research Assistant. I made it clear to her that there were no guarantees on her employment with the Department after December, and besides it was not clear yet whether the rest of the MUMPS Team would be at the Department or at the Computer Center. She began to study the FileMan and Kernel manuals.

The next day there was a CSc Departmental Staff Meeting. Dr. Daini was quite disappointed and tired with the OAUTHC’s distrust, and stressed that originally this was supposed to be a joint project. I agreed, and explained that a single programmer at the Computer Center on a part-time basis could not be considered as sufficient support. I suggested that the Department should not just wait until the relationship with the OAUTHC would be cleared.

A MUMPS Group was indeed established, with Mrs. Adefemi, Mr. Adigun, Mr. Adagunodo, and Mrs. Soriyan as members, and Dr. Aladesulu and Dr. Daini as supervisors. It was the meeting’s firm opinion that the Group needed the Olivetti in the long run for program development, otherwise further development work and cooperation with me after my departure would be impossible. Dr. Daini told that he had given up the hope of purchasing a 386 computer for the Department, but there were good opportunities for an AST 286 with a 70 MB hard disk.

The Departmental Tenders Committee of OAUTHC met on 21st June. I concluded that the tenders were non-uniform, all of them rather costly, most of them poorly prepared, and none of
them acceptable as such. The Medical Records and Accounting needs should be considered together to find the best total solution.

Two of the vendors had come for an interview. Number 1 was represented by a boastful salesman. They had proposed a mini because it was easy to expand, "you can lay a cable to Ilesha for example". Medical Records was to him "merely straightforward data entry" — they had some private hospitals as clients. I got some estimates for the missing expenses.

Number 6 was represented by its Managing Director. He explained that for the time being there was not experience enough on microcomputer networks in Nigeria, but within some years that would certainly be the way of implementing multiuser systems. He analyzed the advantages and disadvantages of minicomputers quite convincingly.

The Tenders Committee decided that a new request for tenders would be compiled, based on the requirements already identified, to obtain proposals that could be directly compared with each other.

Meanwhile it had become clear that the OAUTHC did not have a car available that would be sound enough to take the OAU Immigration Officer, Mr. Akinola, all the way to Abuja. I was almost ready to give up — if people needed me here, they would do something to keep me here — but after some frustrated days Mr. Ogwu found a vehicle. An international project at the Faculty of Health Sciences had a car of its own that was hired out when not needed elsewhere.

I took Mr. Akinola first to the Immigration Department at Ilesha for consulting the Assistant Comptroller of the office there. He was told that according to the new regulations, the University should have acquired the Immigration Department Clearance for me after granting the Letter of Appointment, before my visa application. Anyhow, he was given some advice on the procedures in Abuja in this case.

I prepared a lengthy memorandum about the numerous events in the visa affair this far, and he travelled to Abuja on Tuesday, 20th June. Three days later he returned with a duplicated letter by the Director of Immigration Services, to the effect that a request for S.T.R. Visa "should be made direct by the Company's Expatriate staff to the Nigeria Embassies/High Commission in their places of domicile or nearest to them, attaching the following documents: (i) Photocopy of Approved Expatriate quota, (ii) Letter of Employment, (iii) Acceptance of Immigration responsibilities by the company."

So finally after three years' uncertainty I had the official directives at hand, and they stated that the damn Clearance (or Regularization) was indeed to be acquired after, not before, the visa. However, I still had the wrong type of visa. Universities do not have Expatriate Quota, and Mr. Akinola promised to get a Letter of Acceptance of Immigration Responsibilities to me for a new application.

There were no signs of a rapid reopening of the University, so I finally started the MUMPS lectures on 22nd June for about half a dozen staff members. Nobody came from the Computer Center. The programme had to be squeezed to six weekly lectures of one hour each, three for the MUMPS language and three for FileMan and Kernel. It was obviously not enough for an
entire language, more so because there was no textbook. I duplicated a handout about the syntax and major features.

Mr. Ogwu and I had to draw the conclusion that either the disk or the controller of the Olivetti was faulty, and the computer hardly ever found the disk any more, be it cool or hot, morning or evening. It was to be taken to a maintenance engineer with better equipment. On Midsummer Eve, Friday 23th June, I drove to Lagos for the first time with my family, and Mr. Ogwu followed with the Olivetti.

The next day we checked the computer in a small computer maintenance company. The computer worked with a spare disk and controller, but not with the original ones. The disk, made by NEC Japan, was not common in Nigeria. The owner of the company promised to see if it could be repaired, and gave me price estimates for the repairs and for spare disks.

During the weekend we visited the Embassy of Finland where we had the opportunity to have a Midsummer Day bath in a Finnish sauna — only the palm trees behind the windows were not Finnish. Our children were overwhelmed by the opportunity to speak Finnish to somebody besides family members, after four months.

On my way back on Monday 1 visited Leventis Technical Ltd., former representatives of Olivetti in Nigeria. They had never sold the M280 but had the technical manuals and promised to cooperate in troubleshooting the disk.

The rest of the week passed in preparing and sending (by courier) the new visa applications to Stockholm, taking my elder daughter to the Health Center for tonsillitis, lecturing, repairing the car. In the Project Committee meeting on 28th June I learnt that the next OAUTHC Board meeting was after three weeks already. New tenders had to be requested and analyzed before that, in order to enable any major purchases. Dr. Daini was absent.

I prepared a memorandum about the different hardware/software alternatives for the Management meeting on 3rd July. I identified two groups of applications needed — the Medical Records and the Financial/Administrative Applications — both of which would quite soon have to accommodate a few simultaneous users. Besides the micro+MUMPS technology used in the Medical Records system, the tenderers had proposed three different principles:

1) A traditional minicomputer with Unix, 2) a high-end micro with Unix/Xenix, 3) a few stand-alone micros which could later be connected to a network. For a four-user system, choices no. 1 and 2 were more than twice as expensive as the MUMPS system (estimated by me to cost about NGN 145,000/USD 19,000/FIM 77,000 without the applications software), and even the third one would be some 50 per cent more expensive. For an eight-user configuration, all the three alternatives would cost roughly twice the corresponding MUMPS system (NGN 185,000/USD 25,000/FIM 99,000).

I concluded that none of the tenderers had a reliable and non-expensive multiuser solution to offer, but one or two of them seemed to have existing single-user applications for the Financial/Administrative domain. I recommended that it were checked whether the tenderers were interested in converting their applications into MUMPS, after getting free training from me. In that case the hardware cost would be minimal (even a single micro could take care of all the applications, although two identical ones would give extra hardware reliability), and two sources for software support would be ensured.

If the MUMPS alternative would prove unrealistic, only single-user Accounts applications should be considered for the time being. Even then two identical micros should be purchased, while "I am not recommending the Olivetti computer for the OAUTHC. I have just been informed that it cannot be repaired to its original 60 MB disk capacity in Nigeria, and the best choice for getting it running again is to buy a new 40 MB disk. That disk is too small for the OAUTHC, and the maintenance in Nigeria seems not to be good enough for a computer in a critical application." ... "I would still suggest that the Olivetti is used during the testing and training period, to speed up the process. After that it can be dedicated to systems development."


I introduced the paper in the Management meeting. No definite decisions were made, but I prepared a list of requirements for new tenders along the lines of my recommendations. I got the impression that the members had difficulties in distinguishing the Olivetti hardware from the MUMPS software.

As indicated in the memorandum, Mr. Ogwu had again been to Lagos and informed me that the controller could be repaired but the disk would have to be replaced, and the new one would take only 42 MB. It had been found out that the manuals with Leventis Technical were not for this brand of disk.

Mr. Ogwu took my Bank Draft to Lagos and returned with the Olivetti on Friday, 7th July. The computer started up nicely and I was able to restore the contents of the C drive from the backup copy of 10th May.

Meanwhile the University had been reopened on 3rd July. During the first week the atmosphere was very tense. The students tried to find a non-violent way of demonstrating against the one-year closure of six other universities, and against the detention without trial of Chief Gani Fawehinmi, a radical lawyer, for trying to arrange an 'Alternatives to SAP' conference. They were blocked into the campus, however, by anti-riot troops at the University gates.

It was strange to drive with one's children through the gate barely one meter from the gunpoint of the assault rifle of a samurai-looking anti-riot policeman, while the others watched on top of their armoured van. Our younger children created an entire phantasy world for their toy frogs into their room. After a noisy campaign, the frog called Gani was elected president.

After a week of student meetings the situation was calmed down by a plea to President Babangida by prominent traditional rulers headed by the Ooni of Ife. The Government promised to reconsider the closure of the universities.
The original disk of the Olivetti had been partitioned into a 32 MB logical drive C (the maximum size under MS-DOS 3.30) and a 30 MB logical drive D, with some 12 MB and 20 MB in use, respectively. Now I had to try and get everything back into 42 MB, partitioned into something like 16+26 MB.

The problem was that the tape backups were image (one-to-one) copies and could only be restored on a logical disk of the same properties as the original.

The new disk was initially partitioned into 32+10 MB, so it had been easy to restore the C drive contents. I copied the whole thing on another tape as a file-by-file copy and partitioned the disk into 12+30 MB, thus erasing the disk again. The D drive backup did not come down, however.

I had never needed to configure disks before, so I was not sure if I was doing it incorrectly or whether the image backup simply ought to be restored to the same cylinders and tracks as the original. In the latter case I should start installing everything from the diskettes again, as in Finland, loosing the modifications made since.

I studied the Olivetti manuals, used various utility programs for formatting and partitioning, and tried several partition sizes, but the restoration did not succeed. It was very slow a process while each formatting took quite some time. The DiskManager utilities and the Olivetti configuration program seemed to treat the disk in a wrong way, but the basic MS-DOS commands appeared more promising.

In the meantime I had an extra three-hour lecture for the Computer Science students, repeating the whole MUMPS language. The Student Union had announced a lecture boycott in the same morning to express their solidarity to the closed universities and to Chief Fawehinmi. Strike guards came to the lecture room but after a discussion gave us permission to go on. I explained that this was an extracurricular event and no taking of a stand on SAP or Decree No. 2 (the one empowering the Chief of General Staff to take anybody into detention without trial and without right to appeal, to guard national security).

In a Departmental Staff Meeting Dr. Daini told that his term as the Acting Head of Department was expiring at the end of July, and he was going to a sabbatical leave starting from October. The new Acting Head was not appointed yet.

I had discovered that there was a private telex service in the town. On 12th July I was able to get a message through to University of Kuopio, requesting for the troublesome spare parts for the UPS. It was an extraordinary feeling, after all these years of communication problems, to see the telex machine sending the message and to imagine how the machine at the other end was printing the same letters simultaneously in the familiar library of my university, amidst the Finnish summer.

In the same day I got a telegram from my travel agency in Stockholm, to the effect that the Embassy was helpful but insisted on the Letter of Appointment in four copies notarially legalized.
There was a holiday from 13th to 16th July due to the *Eid-el-Kabir*. We travelled some 400 km to the East to see a Finnish-Nigerian family. The modern towns as well as the traditional villages of the Igboland were strikingly different in architecture compared to the Yorubaland we were used to. Back to Ife there was a blackout that would last a week, a record time during our stay. The rainy season was finally starting in earnest. My wife had learnt the batik technique and began to try her own designs.

After going to four wrong places I got the legalized copies of the Letter of Appointment and sent them by courier on Monday 17th July. The next day I got the passports and S.T.R. visas from Stockholm by courier — the Letter of Appointment had yet been already in the Embassy! A certificate on my professional status had also been needed. The travelling agency had obtained it from University of Kuopio and got it officially translated, with considerable expenses.

By the deadline of 19th July, thirteen political associations left their applications for being registered as one of the two parties to contest for power in the Third Republic, come 1992. While the applications had to be in 50 copies, and personal data on all members and functionaries was needed, several lorryloads were brought by each contestant.

I spent a lot of time in preparing my lectures on FileMan and Kernel and writing the hand-outs, in order to get that out of way. Then I went on trying new ways of formatting and partitioning the disk with Bimbo.
On Thursday 20th July the Olivetti had abruptly gone out when a student had been working with it. Mr. Oguwu examined it and discovered that the power supply was faulty. He travelled to Lagos only to find out that the technical manuals at Leventis Technical were not for this brand of power supplies. Later on he localized a faulty transistor that could not be identified in the components catalogues available at the OAU. Neither was it found in the electronics shops in the town.

The Managing Director of vendor no. 6 visited me to get more information about MUMPS and FileMan. He was interested in converting their dBase III applications into MUMPS/FileMan while that would result in quite cheap multiuser systems. The OAITHC Management had obviously requested for new tenders, although I had been too busy to follow up.

The Project Committee met on 26th July, after a four-week pause. I told about the hardware breakdowns, the visa, and Dr. Daini's end of term. The members said that his successor would automatically be a member of the Committee.

We received a telegram from two colleagues of my wife's who were going to visit us, arriving on 1st August. While the telex line to Ife was faulty for some days, we drove to Ibadan to send a telex to University of Kuopio, asking them to send the missing components along with the visitors.

The second school term ended on Friday 28th July. I had spent a forenoon every 2-4 weeks at the OAU Health Center to get Paludrine pills (malaria prophylactic) for my family, but now I learnt that the Health Center had run out of it. We found a chemist's shop in the town and realized that we could have been buying the pills there all the time without prescriptions. We had the first contacts about selling the car in December.
On 31st July, after one unsuccessful trip, I was able to hand out the new applications for regularizing our stay at the Immigration Office in Ilesha. I was requested to produce a Marriage Certificate, but I insisted that two passports with the same family names and children had to be enough to prove that I was married to the mother of my children.

Dr. Akinde was announced as the new Ag. Head of Department. We travelled to Lagos to collect the two ladies, and returned on 2nd August after reconfirming their return flight, all the seven of us in our five-person car according to the common style.

The spare components came as well, with the information that what was supposed to be a transistor was actually a thyristor. Mr. Ogwu realized that in that case it was not faulty and the problem had to be elsewhere.

A faulty capacitor was indeed discovered and a roughly similar replacement found in the town. The computer came up, but not permanently. Mr. Iginla, "the President", who assisted Mr. Ogwu, removed all the three filtering capacitors and got the computer working. They explained to me that it would be alright temporarily while we had the stabilizer. As a security measure the stabilizer was plugged to another power line which was considered more stable.

The last of my lectures took place on 3rd August. About a dozen students and Mrs. Soriyan were present, no staff members. The Rain Semester examinations were about to start.

In the evenings and during the weekend we took our visitors to the markets, textile shops, palm wine tappers, artists, sight-seeings, hill trekkings, Fine Arts Department, Botanical Garden, Zoo, Antiquities Museum, Pottery Museum, and so on. They stayed at the OAU Conference Center’s Guest House.

Mr. Adetunji brought me the list of computer companies he had compiled, with more than a hundred names.

On Monday 7th August I partitioned and formatted the disk again with MS-DOS utilities, and this time the D drive contents could be restored from the tapes. Supposedly I had previously formatted the second logical drive before, not after partitioning. Any case, Bimbo and I took a file-by-file copy of drive D, partitioned the disk still one more time into 16+26 MB, formatted
the two logical drives, and copied all the files back. The last three files produced errors and were not properly restored.

Next day I started MUMPS and ran the integrity check. Three of the six applications data sets were corrupt. I tried to re-restore the problematic files, but the tape was apparently bad. I had to start from the beginning with the D drive — partitioning, restoring the image copy, taking a file-by-file copy of the problematic files, partitioning again, restoring the files. I had eleven tape cartridges altogether, and all of them were in use now. One of them could not even be formatted.

On 9th August there was a Project Committee meeting with only three members present besides me. I had not seen Dr. Akinde for inviting him. I learnt that the new tenders had arrived and were waiting for formal opening.

I had noticed that some MS-DOS commands on the hard disk were corrupted. Some Part 5 students told me that they had found a virus in the computer after another student had used his text processing software in it. So once more I formatted everything using the original MS-DOS diskettes, and restored all the files. The same three MUMPS data sets were still corrupted.

I advised Mrs. Soriyan and Mrs. Adefemi through some elementary operations — how to log in to MUMPS, how to use the editor, how to work with FileMan. While the applications data sets were corrupted, I created a new name space for experimenting, with only a duplicate copy of FileMan and Kernel included.
On the village road.

On Wednesday 16th August children returned to the Finnish school and I to restoring the V.A. applications, besides helping Bimbo and Fola (Mrs. Adefemi) in their MUMPS and FileMan exercises. I took a new tape backup of what had been restored this far. I tried to fix the corrupted data sets with the DataTree backup/restore in repair mode, but they were in too bad a shape. So I had to restore them from the original diskettes which I had made in December. The restoration succeeded.

The virus seemed to be still around, while the sizes of some MS-DOS command files increased spontaneously and I had to copy them from the system diskettes several times. I had forgotten to shut down the computer after erasing the disk when trying to get rid of the virus, and it had kept alive in the memory. I decided to try and live along with the virus, hoping that it would not make more harm than this far. There was merely four months left before going back to Finland.

The new tenders were made available to me. There were only two of them — by vendors no. 1 and 6. Number 1 quoted only stand-alone microcomputers, no MUMPS conversion, no terminals, not to speak about current loop converters. Number 6 proposed a full set of

The Olivetti had to be protected from more viruses by locking it out of reach of the students, leaving them almost without any computing facilities. I had no choice if I ever wished to have the project back on track at all.

On Thursday and Friday 10-11 August I wrote my second report to the Supervisory Board in Finland, besides taking our visitors to see Alhadja Seliatu, an old indigo dyer some 45 km away in Oshogbo.

The next day we drove via Ibadan to Lagos. The Alis had recommended to us the OAU Guest House near to the airport, and luckily we were able to get two rooms. On Sunday we took the ladies to the airport and drove to Abeokuta to have a two-day vacation in the home town of the eloquent Wole Soyinka and the articulate adire dyers.

The writer Wole Soyinka. From Olaniyan: op. cit.
administrative/accounting applications converted into MUMPS/FileMan, different choices of micros, and all the other hardware except the current loop converter. I was pleased to see one good tender but worried for the lack of competition.

I discussed the situation with Mr. Dosumu. He was strongly of the opinion that a multiuser system would be required. They would gradually need all the applications needed, with Payroll as the first step. Even if only one of the tenders was acceptable, there was no need to carry an unacceptable tender along.

In my memorandum on the tenders I proposed further negotiations with vendor no. 6. I represented a diagram of the proposed system in its full extent, with two identical 286 micros (150 MB hard disk each), seven terminals, two printers, two tape drives, two UPSs and stabilizers, and the full range of applications.

In the first phase, three terminals would be purchased and connected by cables to the Olivetti for testing and training. In the second phase, before my departure, the two micros, one more terminal, and the Payroll software would be purchased, and the Olivetti returned to development use. The rest of the system would be installed gradually later, according to the needs and preparedness.

I calculated that the Board meeting required for awarding the contract would take place in mid-October. MUMPS training for interested tenderers was to be arranged as early as possible so that at least prototype applications in MUMPS/FileMan would have been developed by that time, and the computers installed immediately after. There would still be some two months then to see that everything would take off smoothly.

I learnt that Prof. Ladipo’s term as the Chief Medical Director had ended, and a new man was to act for that position. Dr. Akinde had had to travel abroad for an indefinite time due to unavoidable personal reasons. Dr. Ekong acted for him. The rains had paused for a while, and the academic year came to an end. My wife took her examinations.

I asked Dr. Aladeselu to attend the Project Committee meeting on 23rd August, but eventually he could not come. The meeting was as sparsely attended as the previous one, and my memorandum had not been distributed yet. I learnt however that the modifications to the Computer Room had finally been completed, and estimated that I could bring the Olivetti and the Medical Records programs to the OAUTHC for testing during the latter half of September.

The estimates for the cables to be laid had never been made. I contacted the OAUTHC Electrical/Mechanical Department again, this time accompanied by Mr. Adewumi. The terminal sites were inspected again, the specifications of the data and power cables discussed, and the methods of laying considered with the electrical and telephone experts. They gave 15,000 naira (USD 2,000/FIM 8,000) as a very rough first estimate for the total expenses for three cables.

The printer was found faulty again on 24th August. I went on initializing the V.A. applications, as in March and April already. It was a little burdensome because the disk was so small now, and I had to temporarily remove some parts of the system to diskettes when installing the 12,000-entry International Classification of Diseases for instance.

On Friday 25th August there was the traditional Oshun, or River Goddess, festival in Oshogbo, made internationally known by the Austrian artist and Oshun priest Suzanne Wenger who had been instrumental in the emerging of the Oshogbo group of artists. We drove close to the shrine area and went on trekking along the crowded road. The atmosphere did not appear cheerful to us — on the contrary, aggressive young men with sticks and older men beating drums seemed to be interested only in forcing money of the passers-by, rather than in a spiritual event.

Nearer to the river it became ever harder to move. There was a narrow opening in one of Wenger’s sculptured fences. When we tried to make our way through it, there suddenly arose an enormous rush, and while we were fighting to save our children’s lives, the little money we had in our bags and purses was stolen. Being used to the friendly people of a small countryside town like Ife, we had fallen to the most classical pickpocket trap.
There was no use any more in telling the policemen around, and no interest either after we saw a half-conscious suspect being kicked in the face on a police lorry. Luckily the car keys were left, and we returned shocked to Ife.

This was to be our only major negative event among the ordinary people, in spite of the painful economic hardship and all the news and true stories about armed robbers. Of course there were numerous cases when somebody wanted to gain this or that from the rich white people, but our dominant impression was that of openness, friendly curiosity, and self-evident equality. People in the streets and markets were neither aggressive nor subservient. The bitter unemployed young men selling petty things amidst traffic jams in Lagos were a natural exception.

The third school term commenced on Monday 28th August. The heavy rains were returning, sometimes it was merely 25 degrees centigrade in the morning and the children looked after sweaters, shivering. The first MUMPS Group meeting could finally be held. Dr. Aladesulu was elected as coordinator. Only Mrs. Adefemi and Mrs. Soriyan were present of the others. I described the current state of affairs in the project and what had been planned.

Dr. Aladesulu pointed out that the OAUTHC was a test case to the Department, needing full support. The OAU Consultancy Services (UNIFECS) had been thoroughly reorganized, giving the Departmental staff free hands in making arrangements with potential clients. This should remove all fears of unreasonable costs
of the support services. He advised that the procedure for employing Mrs. Soriyin in the department should be started soonest.

The MUMPS and FileMan training was discussed. I was delighted to learn that Fola was interested in practical programming of the OAUTHC applications as well, while I had supposed that she, as the only Systems Analyst in the Department, would be too busy for that. Related research subjects were listed also. Fola, Bimbo, and I proceeded with the exercises using the computer and the terminal.

I decided to take only file-by-file backups of the disk from now on, in spite of the slightly longer time needed, to avoid the problems experienced with the image copies. New bad blocks were discovered from the tapes every time they were used, so I decided that they had to be reverified before each backup.

While the printer was still faulty, Mr. Ogwu borrowed the one belonging to his own project. I was finally able to print the most important data base definitions and registration programs of the V.A. applications.

4.4 September: System construction

I started to design a modified Medical Records application for the OAUTHC in the evening of Tuesday, 29th August. During the next two days I created the menus, added some extra fields to the Patient file, and developed the first version of the Patient Registration function.

I decided to keep the V.A. programs intact and to retain the definitions of the superfluous fields like 'Is the Patient a Veteran'. Instead, I copied the Registration programs to a different name and modified them so that data for the unnecessary fields were not inquired to. The task was fairly straightforward.

Bimbo and Fola exercised with FileMan. They had a lot of things to clarify with me, only two of us could work with the system at the same time, and I was eager to get something done for the OAUTHC, but we tried to share our times.

The representative of vendor no. 1 appeared and explained that the defects of the tender were due to his absence at the time of writing it. They would be interested in supplementing the tender and learning MUMPS/FileMan as well. I advised him to have a formal contact with the OAUTHC authorities for that.

Before advancing to the rest of the functions I had to change the American date format of the FileMan to the Nigerian one. It appeared to result in tiny corrections to quite many programs, in addition to a major modification to the main date conversion program. Because of these modifications I changed FileMan's version into '17.32 WAN 1'.
On Monday 4th September I was introduced to Prof. R.O.A. Makanjuola, the new Ag. Chief Medical Director, at a meeting with some OAUTC Management members. My memorandum on the tenders and proposed actions was discussed. A new request for tenders was needed for the first phase purchases, but the CMD could approve the laying of the cables. I learnt that the Board would not meet until mid-November.

The prices, advantages, and disadvantages of the single and double-computer options were discussed. I was inclining to propose obtaining a single computer for both Accounts and Medical Records in the first place, due to the high costs of a duplicated system, but no definitive stands were taken yet. I got a straightforward and open impression of the new CMD.

I went on modifying the V.A. Admission function according to the requirements of the OAUTC, and spent two more days with the date formats. Fola and Bimbo began to study the Diagnosis Statistics and the Bed Status Report, respectively, as their first large real-life MUMPS programming tasks. Both functions were quite complicated and I tried to sketch stepwise approaches for them.

The Project Committee meeting on 6th September was poorly attended and the CSC Department was still not represented. I distributed a schedule I had drafted for the remaining time. The Board meeting in November was the critical point of time. Before that, the modified Medical Records system had to be developed, cables laid and terminals installed, end users and main operators trained, software support staff trained, potential vendors for Accounts applications trained, and terms for agreements negotiated.

I proposed that there would be a four-day MUMPS/FileMan course for the vendors in the beginning of October, after which the Olivetti would be transferred to the OAUTC for training. The members wished that the transfer should be earlier, and I explained that the problem was that we only had one computer for programming and training. Prof. Morakinyo, who was present for the first time since June, wondered why the transfer of the computer had been postponed all the time "because of different excuses", and suggested that the vendors’ course could be started within a week.

I felt bad while I really had thought that I had worked hard to get the things working. However I said that it was hardly possible to arrange the course that abruptly, but I would do my best to transfer the computer as soon as reasonable.

The specifications for the cable work had been detailed. The Committee discussed my hardware diagram and favoured the double computer alternative for increased reliability. There was no information about any supplementary proposals by vendor no. 1.

Next day I went on with the date conversion and with assisting Fola and Bimbo. On 8th September a Part 5 student checked the computer with a program called FINDVIRU, and found out that the disk and all the system diskettes were infected with viruses called 1813 and 1168. He inoculated the disks with an INOC program, which would stop the virus from spreading, but he did not have a cleaning program. I swore for not write-protecting the diskettes in time.

On Saturday 9th September we drove to Lagos. I had been worried for not being able to start the interview part of my research, and now I had prepared introductory letters for some half a
dozen companies which offered systems development services and were located not far from the OAU Guest House in Ikeja (northern side of mainland Lagos).

On Monday we reserved our return flight to 9th December so that we would have time for moving before Christmas. Then I visited a company which had advertised a conference on "Why Computer Projects Fail". The programme and the speaker list were not ready, two weeks before the event, so I decided to cancel it. In the afternoon and the next morning I visited four more companies and made appointments for interviews four weeks later. The fifth company was not at the address given. Meanwhile the children made their homework for Finland, of course.

Tuesday afternoon we drove to vendor no. 6, at another end of the huge Lagos city. The MD was not there but I left a proposal on the MUMPS/FileMan training.

Back in Ife I created modified versions of the rest of the in-patient programs — Inquiry (basic information display), Transfer (from ward to ward), Discharge, and Discharge Summary (including the diagnoses and operations). These were easier than the first two programs. On Wednesday afternoon 13 September I demonstrated the system to Prof. Morakinyo and Mr. Ibimilua, nearly three months after the date originally planned. They were satisfied and only some small modifications were needed. I learnt that the operations codes were not from ICD-9, but from a British classification. We agreed that I would demonstrate the system to the OAUTHC Medical Records Subcommittee in October.

I specified a small FileMan database for the interview questionnaire and formulated the questions. Bimbo and I experimented with the V.A. Out-Patient Appointment Scheduling application. Very few needs for modification arose. The MD of vendor no. 6 appeared and the training course was scheduled for 3rd October. They would bring along their own AT or XT and I would instal MUMPS on it, so the Olivetti could be released. I told him the technical requirements.

The OAUTHC Departmental Tenders Committee met on Friday 15th September, but there was no new information, so it was decided that tenders for the terminals and converters would be requested within a week. I wrote down short specifications.

I received a brand new introductory textbook on MUMPS from my university, together with a new MUMPS diskette for resales. The former was found very good and highly needed, but the latter was accidentally a single-user version only. I tried to send a telex to Finland on Monday, requesting two multiuser diskettes for the potential vendors, but the line was not working.

Bimbo found a dBase III manual for me while I had no detailed technical knowledge on it. There seemed to be no fundamental problems in converting systems from it to FileMan, although the terminology and mode of operation were quite dissimilar.

On Tuesday 19th September we had the second meeting of the MUMPS Group. I was told that the MUMPS course could be held at the Department, but a formal approval by UNIFECS would be needed. Alternatively I suggested hiring a room at the Conference Center.

The members strongly doubted that the OAUTHC would never return the Olivetti after its transferring there, reiterating that without a computer the MUMPS Group could not do anything. I wondered and explained that the computer belonged to University of Kuopio, nobody could just take it like that, and I had written in my papers that the computer was not suitable to production use any more. I was advised to obtain a signed paper on the returning of the computer. Dr. Aladesesulu was appointed to attend the Project Committee meeting, although he said he would not be able to arrive in time.
On Mrs. Soriyan's appointment Dr. Daini told that there were no free technical vacancies right now, she should apply for a Graduate Assistantship.

The next day there was a Project Committee meeting. I briefed the members, saying that I wished to transfer the computer next Monday. I stressed that we had to make progress in three directions simultaneously, namely the user training, programming, and the vendor training. Nothing had been heard about vendor no. 1.

A week before I had written a thirteen-item list of scheduled tasks to be accomplished before the Board meeting. Accidently it had not been distributed, but I went through the items one by one, trying to find the persons who would be in charge of each of them besides me.

The items were: Laying of the cables. Purchasing of the first phase terminals and converters. Preparing the Accounts Computer Room. Main operators (selecting and training). Programming of the Medical Records functions. Training of the Medical Records end users. Preparing the Medical Records support agreement. Preparing the hardware sales and maintenance agreement. Training of the supplier of the Administrative subsystems. Programming of the Payroll functions (by the potential vendors). Preparing a Development Plan. Preparing of administrative guidelines (for permanent operation). Preparing of emergency plans.

Dr. Aladesulu did not appear. After the meeting I asked Mr. Abiodun to sign a document itemizing the pieces of equipment and specifying the dates of moving them to OAUTHC and back to OAU. He began to wonder the returning date, and told that according to his understanding the computer was supposed to be left to the OAUTHC although not in production use, and this was what the Board had been told also. After a brief conversation I said that I would discuss the issue with the CMD after he would have returned from Lagos.

I was deeply depressed because I saw no reasonable alternatives to using the Olivetti in program development by the MUMPS Group, and now its permanent site seemed to be raising an authority conflict, in spite of all the memoranda I had written on it. This was certainly not something needed at this critical point of time.

Dr. Aladesulu had missed the meeting due to being in Ibadan. He tried to see the Director of UNIFECS several times with me in order to discuss the site of the MUMPS course, but without success. The telex line had been repaired but now the light was off in the town. The Department's generator was working and I could modify the Patient Inquiry Display to look like the corresponding basic information form in the case note folder.

I checked the Computer Room furniture with Mr. Akanji. He showed me a paper about the role of computers in the management of Medical Records, represented at the National Workshop of the Health Records Association some weeks ago. It was written by the Assistant Director of a Lagos-based company currently installing a computer system in the Lagos University Teaching Hospital. I said that I wished to visit both LUTH and the UCH of Ibadan with him, whenever I would have a little more time.

Mr. Adewuni told me that the quotations for the cables and accessories had come, and the Tenders Committee would award the contract next week Friday. After that there would be two weeks only before the target date I had specified for the installation of the terminals. I asked him to make a realistic estimate about the time needed for laying the cables, and he assured me that five days ought to be enough.

I decided to try and bring to daylight the underground distrust between the CSc Department and the OAUTHC so that the issues would be discussed openly and solved in time. I wrote a very straightforward letter to Prof. Makanjuola but tried to make it less official with some ironic humour. I discussed it with him Friday afternoon 22nd September, and stressed that
both of the two institutions would gain if this project would succeed, and both of them needed each other to succeed.

I proposed that OAUTHC, CSc OAU, and University of Kuopio would make an agreement on mutual support for a period of about one and a half years, during which time the facilities would formally stay property of University of Kuopio. The Olivetti would reside at the CSc Department for MUMPS/FileMan/Kermel systems development and training, and the Department would guarantee the availability of software support to the OAUTHC.

Prof. Makanjuola said that to him the situation seemed clear — the OAUTHC could not use the Olivetti in the long run, the Department could, the OAUTHC would still benefit from that kind of use, and after all only University of Kuopio could decide on what to do with its property. If I could make the computer temporarily available to them for testing and training, fine. He signed the paper on the movements of the equipment.

I asked his opinion on whether it would be good or bad to copy the letter to the Project Committee and to the MUMPS Group, as I had thought. He said that it was OK, the two institutions could start discussing things on that ground. This project ought to be made more formal at this stage, problems could arise in the long run without a formal framework.

The discussion relieved me a lot and I felt rejoiced. On my way back home I bought a carton of the excellent Star lager. Even the telex to Finland had finally left.

On Monday 25th September I asked Dr. Ekong to sign the document as the Ag. Head of the CSc Department. Bimbo made a backup copy of the system, I distributed my letter. We parked the disk heads, disassembled the equipment, and carried everything into my car. However, at the University gate the guards told me that the paper needed to be stamped at the Security Office as well. At about 3 PM the papers were in order and we could bring the computer to the OAUTHC Computer Room. It was put together and started up without problems.

Next morning there was the first brief tutorial for the four potential main operators. I was formally introduced to Mrs. J.O. Ojo (Lola), Mr. M.A. Adekunle (Moshood), Mr. O.A. Ogunniran (Bayo), and Mr. S. Olatok (Samson). They were all Medical Records officers with responsible posts. Some of them I had already met during my familiarizing tours. We went through starting up and shutting down the computer.

I had to rush back to the Campus for a MUMPS Group meeting scheduled at 10 AM. Nobody was there and the secretary told me to ask Dr. Ekong. He was irritated by my letter and wondered what was going on. Anyhow, Dr. Akinde had returned, I should see him.

While this was the first time I could discuss project matters in earnest with Dr. Akinde, I summarized what had been planned before my arrival, the breaking-down of the Olivetti, the Department’s inability to acquire an MS-DOS computer, the mutual signs of distrust, my talks with Prof. Makanjuola. He asked me about what should be done, and I said the relationships between the two institutions should be cleared both on the top level and on the day-to-day level. He promised to see Prof. Makanjuola soon.

The discussion was open-minded and sympathizing, but I felt that my letter had been misinterpreted as a kind of blame at the Department. Any case, I had to rush back to the hospital. I entered access codes for the four users and they practiced how to log in and how to enter patient data, until the lights went off.

Dr. Aladesulu informed me that he had seen the UNIFECs Director, and it was alright to have the MUMPS course at the Department for a nominal fee.

Next morning I streamlined the start-up procedure and taught the operators the special keys of the FileMan user interface — question mark, up-arrow, at-sign, space bar, and erase. They began to practice in shifts using the terminal, assisted by Mrs. Soriyan, and I made the final modifications to the Medical Records functions using the main keyboard. Samson turned out to be the only one to have typewriting experience.

On Thursday we went through the Medical Records functions, in the same time identifying the sources for different pieces of information. The concepts and functions were familiar to the
operators and raised no problems. I fastened on the wall concise operations instructions for starting up and shutting down the computer, while I had noticed that the trainees had not made notes for themselves.

Mr. Akanji confirmed that we could use real patient data for practicing, and gave us a list of the consultants and a catalogue of the operations codes (nearly 200 pages). A few wards were selected, lists of the patients currently on them compiled, and the Master Name Index cards of the patients picked up. The first few patients were admitted, and Samson shut the computer down following the instructions.

Friday morning Moshood and Samson were already working with the computer when I came. The consultants data were entered. We discussed the logical structure of the operations classification, and I made corresponding modifications to the new operations file I had created earlier.

In the afternoon I took a back-up copy with Bimbo — one of the three tapes produced a lot of new bad blocks again. She told me that a permanent job had been offered her at a research unit of the OAU, and she should make up her mind in two weeks. I advised her to speak to Dr. Akinde about the possibilities for her to be employed at the Computer Science Department, while I would consider it very important that she stayed.

At the end of the day there was a meeting of the OAUTHC Departmental Tenders Committee. Vendor no. 6 had quoted both terminals and converters, vendor no. 1 only the terminals and on a higher price. The contract for three terminals and three converters was awarded to no. 6. The total price for the cables and accessories turned out to be less than 7,500 naira (USD 1,000/FIM 4,000).

After only four days of training the operators were coping very well with the system. I was happy to see that my original positive impression of the quality of the Medical Records staff was proved correct, even more than I had dared to hope. They needed practice with using the keyboard, of course, but they did not shrink from the computer, and adopted the principles of operation without big problems.

In the beginning Moshood had kept on asking for Bimbo’s advice for the same things time and again, until Bimbo refused to answer and told him to use the question mark and to recollect what had been told him before. After that he decided that he had to rely on himself and made quick progress. Soon he was the first one to search for and experiment with new things by himself.

4.5 October to December: Training, tensions, agreements

Monday 2nd October was a national holiday due to the Independence Day on Sunday. Our Finnish Nature Calendar informed that the first snow would come in the whole country during this month. In Nigeria the rains continued. We found a new hamlet when trekking around the hills, and celebrated independent Nigeria with fried breadfruit.

Tuesday morning I checked that there were no problems at the OAUTHC — Lola was entering admissions and Moshood operation codes. Mr. Akanji remarked that he would refuse admittance to the computer during my absence, but I disagreed, stressing that it was very important that the users felt that the system was theirs, that they were in charge of it. I referred to Moshood’s experience with the importance of a daring attitude. Mr. Akanji changed his mind with delight.

The cables had already arrived and appeared to be alright. I hurried to the Department for a MUMPS Group meeting, but Dr. Aladesulu told that it was cancelled due to a Faculty Meeting
on Examinations. The MUMPS course for vendor no. 6 was to start by noon. Bimbo and I waited but nobody came.

I went home to type a memorandum for the OAUTHC about the estimated costs of the single and double computer options, in this phase and if expanded to the full scope. Depending on the scope, the cost range was from about 180,000 naira (USD 24,000/FIM 96,000) to about 500,000 naira (USD 67,000/FIM 270,000).

Late in the evening the Managing Director and two other men of vendor no. 6 turned up at my apartment and told that they had had some emergency things to do before leaving Lagos.

Next morning we met at the CSc Department, only to find out that the two PC/XTs they had brought were equipped with 320 KB diskette drives, and the MUMPS I had got from Finland was on 1.2 MB diskettes. We went through some general issues, then I drove to the hospital to take a backup of the MUMPS and Kernel files on 320 KB diskettes. Back at the Department we realized that they had MS-DOS version 3.20 — I had mentioned that 3.30 would be needed but without emphasizing that. Version 3.20 refused to restore backups taken under 3.30.

They found a 3.30 system diskette but the computer did not boot with it. The Olivetti manual indicated that the whole hard disk ought to be formatted when upgrading to 3.30. I went to the hospital again to take the files with the COPY command — that should work with 3.20 — but one of the files was too big. Back to the Department to inform the others, and
then I had to drive to the hospital for a Project Committee meeting, badly late and sweating all over.

Almost all of the members were present. The Computer Science Department was represented by Dr. Adigun while Dr. Akinde had had to travel. I briefed the Committee about recent developments. Then my letter to the CMD was taken under discussion. All the members representing OAUTHC expressed their astonishment about the "more than 180 degrees U-turn" I had made concerning the use of the Olivetti, and explained that they had supposed that it would stay at the hospital.

I stressed that it was the circumstances that had changed with the break-down of the disk, and I had written about that many times since July. I could see no use for the Olivetti at the hospital. Moreover, there were conditions for leaving the computer in Nigeria, namely permanent support would have to be established. I could not see how I would be able to convince the financiers of the viability of the system if the Olivetti would be used as the production computer, and there would be no computer for the software support.

The conversation was heated but intimate. No common standpoint was reached and the issue was referred to the Management. I said that I saw they felt that I had betrayed them. Being gentlemen they objected but I had the feeling anyhow. I drove deeply depressed back to the Department. — Later on this turned out to be the last time I saw Prof. Morakinyo.

The MD had not lost his spirit. Bimbo borrowed MS-DOS 3.30 from some friend at the Social Sciences, and that worked. The MD decided to transfer all valuable files from one XT to the other so that the former could be formatted with version 3.30. While it was late already, they took some manuals to read and we left.

Early next morning I went to the hospital to back up the missing MUMPS files. That went alright but the Kernel backup took much more space than it should have had to, and I ran out of diskettes. I was informed that the terminal had broken down suddenly. Back at the Department one of the XT's was vacated, partitioned, and formatted, MS-DOS was installed, and I restored MUMPS. Still one file was missing. I fetched that from the hospital, and finally MUMPS started up a little past noon.

I installed FileMan and demonstrated how to define a database, how to enter data and how to produce reports. While the trainees practiced I called at the hospital. Bimbo backed up the Kernel file with a clean MS-DOS and now the backup size was correct — obviously the virus had been causing trouble in the first case. I opened the terminal and found a burnt-out fuse.

Next morning it was Friday already. I installed Kernel and converted the programs from MUMPS version 3 (the one we had in the Olivetti) to 4 (the single-user one I had received from Finland). One of the data sets appeared to be corrupted by the virus. As a last attempt I used the MUMPS data set backup and restore in repair mode to it, for the first time ever, and it worked! I was pleased to demonstrate the high quality of the DataTree software in a real case.

We went through the Kernel subsystems. I created very quickly a tiny demonstration application with a few menus, an input template, and an output template. Then I coded a sample program which accessed information from a FileMan file using a cross-reference, called utility routines, and printed on a selected device. By 4 PM all
the main topics had been briefly looked at.

I apologized that the course had shrunk up into one and a half days only from the three and a half originally intended. The trainees seemed a little confused but satisfied, and promised to see me in Lagos next week to clarify whatever problems might arise. I was pleased with the professionalism they had shown during the troubles and the intense training.

President Babangida, also called the Maradona of Nigerian politics, again surprised everybody by rejecting all the thirteen would-be parties, while all of them were dominated by oldbreed politicians and money-bags. Instead, the Armed Forces Ruling Council decided to establish two parties by itself, "one a little to the left, one a little to the right". The parties were called the Social Democratic Party and the National Republican Convention.

I had spent some sleepless hours in the nights pondering over the situation in the project. On Saturday 7th October I wrote a short memo to Dr. Bamgboye, listing the actions needed in order to prepare for the Board meeting, proposing a meeting with the CSC Department, and asking for the Management's stand on the project's future so that I could get instructions from Finland in time. I also suggested that a microcomputer would be leased for the training activities for the time from the Olivetti's return until the installation of the permanent computer.

On Sunday afternoon we drove to Lagos for my interviews. Close to the city it began to rain very heavily. Our wipers gradually stopped working and we had to crawl to the Guest House.

On Monday morning I visited Data Sciences Nigeria Ltd., the representatives of Digital Equipment Corporation. The questionnaire I had mailed some three weeks ago had not arrived, and the person to answer my questions had to leave for Port Harcourt soonest, but I agreed on a new appointment one month later. Exactly the same thing happened in the afternoon at Senil Computers (Nigeria) Ltd., so I had time to get the wipers and a tyre repaired. We learnt that Wednesday would be a national holiday due to the Prophet Mohammed's birthday.

Tuesday morning 10th October I had a very informative interview at Debis (Nigeria) Ltd. (cf. Appendix C). Originally I had intended to discuss two sample projects in more details with the respondents, a "nice" one and a "troublesome" one, but in practice this proved to be impossible without risking the confidentiality of the clients. Instead, we discussed on a general level the factors hindering and promoting systems development.

Before leaving I had a courtesy call to Dr. I.A. Odeyemi, Managing Director, who had been instrumental in founding the Computer Science Department in Ile-Ife before moving on to the
private sector. According to him most of the computer firms had been founded by Ife graduates, although today the curriculum was probably equally good in Lagos also.

We drove to the Apapa Wharf area, were fined for driving on a road prohibited for cars with odd numbers on even days (you have to know the roads, there are no signs), but reached the forwarding agency and agreed that they would collect our baggage on 4th December.

In the evening the MD of vendor no. 6 came. They had not used MUMPS meanwhile and had no questions. I asked about leasing a computer of the type he had proposed to the OAUTHC. He calculated that, taking into account the 25 per cent interest rate and an 18 month amortising period, it would cost 8,300 naira (USD 1,100/FIM 4,400) a month. I decided to order it and he promised to try and deliver it within two weeks. I also ordered connectors that would fit to the terminals and converters, and a carton of printer paper.

On Thursday 12th October I had our visas extended in Ilesha pending to the regularization, but for five weeks only. At the OAUTHC I realized that the users had ceased entering data, frightened by the terminal's breaking down. Mr. Adewuni had found a new fuse but that one had burnt out as well, and now he wanted to have my authorization before further investigations. The laying of the cables was started that morning.

Mrs. Soriyan had spoken to Dr. Akinde and Dr. Ekong and been assured about her eventual appointment, but nobody could say how much time it would take. The other institution had shown great interest in employing her immediately. I said that for a few months I could pay her the same salary as they had proposed, and she should now collect all the relevant information on both of the alternatives before making up her mind.

Friday morning 13th October I was suspecting something spectacular from the virus because of the special day, but the computer was alright. I had designed a graphic model of the database using stacked sheets of coloured-paper forms to represent the most important files and subfiles (Patient, Admission, Diagnosis, ICD Code). Now I fastened it on the wall of the Computer Room and explained it to the operators, trying to clarify the concepts of files, entries, selecting, cross-reference fields, name fields, computed fields, multiple-valued fields, and pointers.

Then I demonstrated the general-purpose functions of FileMan (inquiring to, entering/editing, and listing file entries) referring to the model and the concepts. I assured that the breaking-down of the terminal was not something they had influenced on, and they should now proceed to experimenting with FileMan, after getting familiar with the preprogrammed Medical Records functions.

Lola suggested that the experimental data would be erased from the computer and they would start entering the entire daily in-patients data from 1st November, to get enough real-life material for studying the data retrieval features. I agreed and asked her to check the auxiliary files like Wards etc. before that. Bimbo and I studied the database definitions in more detail and she decided to draw a map of the pointer relations for herself.

During weekend we bought a big stack of Nigerian literature in Ibadan and got to know with Mama Kofo, a charming lady selling on University of Ibadan Campus the best traditional textiles we had seen this far. She gave us credit till our next visit. In the evenings our elder daughter had long discussions on the front yard with her friends about religions and philosophy.

The operators experimented with FileMan. Mr. Adewuni had found two faulty components from the terminal's power supply, and I promised to look after them at the University. I learnt
that some types of power supplies were sensitive to an improper frequency of the current, even if the voltage was stabilized.

I met Dr. Akinde. He told that appointing Mrs. Soriyan might take two-three months. I explained that I could pay her salary during that period. I briefed him about the leasing and asked him to see Prof. Makanjuola or Dr. Bamgbuye.

Mr. Ogwu had studied the UPS together with power electronics experts from the Department of Electrical Engineering, but there was still something wrong. The blowing up of the varistor had even broken part of the circuit board. We decided that if they could not fix it until next week, I would test the maintenance capabilities of vendor no. 6 by ordering the repairs from the latter.

I started to upgrade the MUMPS version from 3 to 4 on Tuesday afternoon 17th October. Converting the programs was slower than I expected and took the next morning as well. There was a message from Bimbo that she would be on sick leave that week.

Mr. Akanji introduced to me two representatives of another computer firm. They offered cheap but unknown Taiwanese microcomputers, networking, and a Medical Records application. Bimbo had seen their demonstration earlier and told that the application had been rather for printing invoices at a private hospital, and the networking software had seemed to occupy most of the memory. I had not been impressed by their leaflets, either — the words were big but the quality of the products appeared to be low. I told them that as far as the purchasing procedure was concerned, they should turn to the authorities of the OAUTHC, although the deadline for tenders had passed already.

The minutes of the previous Project Committee meeting did not reflect the argumentations correctly according to my mind, and I thought that the written documentation of this crucial meeting would be very important. I typed and photocopied an expanded version of the minute in question, together with a collection of citations on the Olivetti issue from my memoranda starting from the Research Plan. To the latter I attached an emotional preface where I explained that my honesty and professionalism was in question, and I did not know how to report to
Finland about this kind of an inglorious dispute.

I also prepared my proposal on the purchases. I concluded that after the non-appearance of vendor no. 1, there were two choices I could see: either to postpone the decision in hope of getting more tenders, or awarding the contract to vendor no. 6. The latter was proposing hardware which was popular in Nigeria and of high quality. I had put them under test in learning MUMPS, and I was going to test them in delivering and maintaining the hardware. The OAUTHC had arranged for visiting their reference sites, and could try to assess their financial viability.

This far no negative aspects had come forth, and thus for the time being I recommended awarding the contract to vendor no. 6 according to the single-computer option.

I went somewhat excited to the Project Committee meeting on 18th October. I learnt that the Board meeting had been postponed by another week, but the Management had taken decisions on its preparations and intended to invite me for discussions at a suitable time. They had discussed my proposal but needed some more time. The atmosphere was conciliating and I decided not to distribute the citations. My corrections to the minutes were approved after grammatical editing.

I briefed the members about the leasing. I was asked if the patient information could be removed from the Olivetti on the instance of its return, and whether the information could be transferred to another computer. I explained that it was easy to transfer the data, and to erase it as well, and the erasure should be verified by OAUTHC staff to guarantee confidentiality.

The single and double-computer options were discussed again. Dr. Bamgboye analyzed the pros and cons in a very fine way, showing understanding of the issue. He came to the conclusion that a single computer was the realistic outcome for the time being, but the need for increased reliability should be explained to the Board so that it would not come as a surprise later.

A well-slept night since a long time. Mr. Ogwu had not found the components for the terminal on Campus. The men laying the cables told that they would be ready by next week.

When being started up MUMPS informed that it had been shut down improperly last time. I realized that the operators had probably forgotten some steps of the shut-down instructions for some time already, but the previous MUMPS version had not noticed that. The database verification procedure found some inconsistencies but I was able to fix them with the data set backup-restore utility.

I explained to Moshood and Bayo that switching the power off while MUMPS was running was equal to a black-out, both could leave inconsistencies into the database. Later on I saw them stressing the point to the others.

I discussed the purchases with Mr. Dosumu from the Accounting Department’s point of view. The only thing he was a little hesitant concerning the single-computer option was the distance to the Computer Room. I explained that only starting the computer in the morning and stopping it in the evening had to be done in the Computer Room, otherwise a terminal would do the same job. The Accounting functions would be visible and accessible only to authorized staff, regardless of the configuration.

Dr. Aladesu asked for my opinion on the configuration needed for the OAU Bursary — he was a member of the awarding committee. We discussed the pros and cons of different microcomputer operating systems in Nigeria. I asked if he would be interested in a survey of the
state of the art of Nigerian systems development, modified from the questionnaire I was using during my interviews. He was, but right now he was collecting materials for a survey of Computer Science education in Nigeria.

A film dealer told that his businessman brother in Onitsha would be interested in buying our car, and we could trust in him because "the Igbo do not talk nonsense like the Yorubas in here".

The rains were coming to an end — the last one was on 24th October. Some mornings the Harmattan dust from the Sahara filled the air like mist, earlier than usual. One Sunday we tried to make a trip to the highest hill again, but the rainy season had raised a three meters high grass mixed with all kinds of twinning plants, and we couldn’t make our way through the last one hundred meters in spite of all the Finnish guts.

On Monday 23rd October I showed the operators how to change one’s password and demonstrated the electronic mail, although I explained that the latter would not be very useful in this kind of a small and centralized configuration. We went through the V.A. Out-Patient Scheduling application. The booking of the appointments was alright, but it was difficult to get an idea about the usefulness of different reports without a printer. The operators promised to collect the basic information needed on different Consultant Clinics.

The laying of the cables had hardly started. I asked Mr. Adewuni to try and push the matter. A MUMPS Group meeting was appointed on 24th October but the notice had not been distributed and it was cancelled. Instead, Bimbo and I discussed the employment issue. She had decided to leave the other opportunity and to see if the procedure would start in practice at the Department. I gave her draft terms of a full-time appointment as a Research Assistant with my project, from 1st November till her appointment by the Department, up to a maximum of a few months.

The TaskMan subsystem of Kernel had not started up, and now I had some time to look at it. The problems were due to the new MUMPS version’s improved handling of password-protected name spaces and extended memory parameters. I improvised corrections using techniques I had seen used in the big hospitals in Finland. The background tasks began to work.

The meeting of the Medical Records Subcommittee where I had "invited myself" took place on 25th October. Prof. Morakinyo was absent and I did not know the other members very well. I had expected to demonstrate the system and discuss the priorities of its expansion with the Committee, but to my surprise the acting chairman went straight on into the issue of the ownership of the Olivetti.

I understood that the Committee had discussed the issue already at least twice in their monthly meetings. The arguments and even some phrases were the same as I had heard before. I was frustrated but repeated that the Olivetti was not something the hospital could use in real life. The members tried to find different reasons for keeping it. Before leaving I emphasized that I sincerely tried to safeguard the hospital’s interests, there should be no reason for any disappointment with the outcome of this project, and I thought it would be more fruitful to discuss how to make use of the system to the maximum.

The power cables were ready by Thursday 26th October. The laying of the data cables had not been started. I lamented to Bimbo that I didn’t know how widely and with what kind of information the Olivetti issue had been discussed at the OAUTHC. She advised me to tell Dr. Bamgboye my concerns.

In the evening I wrote my third report to Finland, concentrating on the apparent progress having been made and just briefly referring to the discussion about the future role of the Olivetti. While there had been no feedback from the OAUTHC Management, I repeated the proposal I had made to Prof. Makanjua and asked for a permission to act accordingly.

The Vanguard newspaper published an interview with my wife about art in Nigeria and in Finland. A cultural correspondent had met her at the opening of an art exhibition at the OAU Campus.
The terminal and the leased computer should have been delivered earlier during the week, but nothing was heard of them. Friday morning 27th October, the day the Olivetti was to be returned, I left a message to Dr. Akinde while he was not around, explaining that the returning had to be postponed until the replacement would arrive.

I erased the Patient file and took a backup copy. I gave to Bimbo a message for the MD of the vendor and instructions about the next week. We tried to see Dr. Bamgboye but he was busy.

During the week 29th October - 4th November I had my vacation, and we made a 2,500 km trip to the North. The first night we spent in Lokoja at the confluence of the rivers Niger and Benue — in the early colonial times considered as the future capital but today a God-forsaken small town. We stopped for a whole day in Jos at the Plateau highlands, and for another in the ancient city of Kano in the heart of Hausaland.

From there we drove eleven hours to Jebba on the river Niger. After a tough trip it was nice to meet the rusty corrugated-iron roofs of "our own" familiar Yorubaland.

To our surprise there were no problems at all with the car, and most of the roads were reasonably good. We never lost our way too badly, thanks to some good advice by our friends. The variety of the landscape and the urban and village architecture was impressive, even while this speedy sight-seeing gave us no opportunities for a more profound comparison.
The "Onitsha brother" never came to see our car, but we put an advertisement to the Conference Center notice board.

On Monday morning 6th November Bimbo briefed me about the events during my vacation. On Tuesday and Wednesday she had been at the hospital when they had began to enter the full daily in-patient information into the computer. The Managing Director of vendor no. 6 had come on Wednesday with the terminals and converters but without the computer. He had not been too precise about the latter.

Both the OAUTC Management and Mr. Ogwu had refused to hand over the broken-down equipment (terminal, UPS, printer) for repairs because I had not addressed a letter to them on the issue. I had not thought about that while I had informed them verbally about my plans and, after all, it was I who was in charge of the equipment.

I inspected the terminals and converters formally with Mr. Adewuni. The laying of the data cables had not been started because the telephone men had no ladder, as the foreman said. With the help of Mr. Adewuni the Electricity Department lent their ladder, and the telephone men promised to start next day.

I discussed previous week’s bureaucracy with Mr. Akanji. He said that it was better to be even over-careful than to get troubles because of exceeding one’s powers. We agreed that it would be very important to get a high level approval in beforehand for the emergency
procedures like hardware repairs for the prospective computer, so that straightforward actions would not be delayed by a need to obtain a permission from somebody difficult to access.

I tested the terminals with Mr. Adewuni using the RS232 cable of my own terminal. All of them worked fine, and one was left installed locally for the operators. The converter appeared to fit directly between the computer’s port expansion adapter and the data cable, so that just one current loop connector for each of the terminals would be needed at the other ends of the cables. No connectors were provided however.

Then I realized, by studying the technical specifications, that the terminal’s current loop interface had two passive loops and the converter had only one passive and one active loop. One of the two loops would have no active end at all. I had taken it for granted that the activity configurations of the interfaces would be selectable.

The vendor did not show up and I was about to leave for Lagos, so I decided to take the faulty equipment there by myself. Dr. Bamgboyie signed for me a permit to take the terminal out from the OAUTHC, but I couldn’t find anybody to sign on the CSc Department’s behalf. Frustrated I decided to just leave without a proper permit — any case the guards at the gates seldom checked the boots of the cars outside of the rush hours.
Before my departure on Wednesday afternoon 8th November there was a Project Committee meeting. Professor Makanjuola came in and asked if the Olivetti could be used in production if a new disk would be obtained for it. I explained that the problem with maintaining the rest of the computer would still be there. He then asked me to consider ways of minimizing the costs of obtaining a system which would still be efficient and reliable enough. Finance was tight but the institution had already expended a considerable amount of money and time and was interested in proceeding with the computer system.

Mr. Adewuni informed that the laying of the data cables had just been completed. After the meeting we drove to Lagos without being checked.

On Thursday 9th November I was able to conduct two informative interviews, with Data Sciences and Senil (cf. Appendix C). Friday morning we drove to vendor no. 6 through the frustrating "go-slow" of Lagos. I was told that the MD had left for Ile-Ife the day before! I left the equipment any case, explained the faults, and handed over the new multiuser MUMPS and manuals I had received from Finland. They promised to see me in the evening.

We visited some Lagos markets and the Craft Village at the National Museum for the third time. A representative of the forwarding agency came to the Guest House to confirm the transportation of our baggage as agreed.

In the evening the Managing Director came. He told that he had travelled to U.K. for the computer but had been asked to pay 500 naira (USD 67/FIM 270) a day for it, and had not dared to take it. We agreed that he would bring a less expensive PC/AT next Wednesday without a printer, tape drive, or UPS. I explained the converter problem and he promised to check in his catalogue if there were corresponding models with two active loops.

They promised to check the faulty equipment. I told that if it would cost more than 1,500 naira (USD 200/FIM 800) I would have to consider it. They were pleased with MUMPS that far — FileMan had proved out much faster than dBase III in some tasks.

On Monday 13th November Bimbo and I went through the complicated V.A. programs for calculating daily bed statistics. We located the place where the data needed at OAUTC was produced. Bimbo was happy while she had stuck in it when I had been in Lagos. Fola had returned from vacation and I tried to encourage her to restart working with the statistics when a computer would be available again.

In the evening I wrote a memorandum on the alternatives in reducing the expenses. I analyzed three options. If the Olivetti would be used in production, it ought to be expanded with two disks and a controller. The problems with this option would be the very unreliable maintenance, the lack of software support for the Medical Records while the Computer Science Dept. would have no facilities, and the difficulty of convincing the financiers about the viability of this arrangement.

The second option would be to strip the original proposal by reducing the disk capacity, tape drive speed, etc. The third choice would be to postpone the decision and try to find cheaper tenders. This would take 6-12 months because the new vendors should be given the MUMPS/
FileMan training. If the standard of the hardware would not be reduced, more than a 10 per cent reduction in prices could not be anticipated, and a falling rate of naira could even increase the prices.

I concluded that the first and last choice appeared too insecure to be applied. The cost of the original proposal was already "sensationally low" for a full five-user system with Medical Records and Payroll. If the price was still prohibitive, it could be reduced to about 55 per cent by stripping off everything possible. If not even that amount would be available, then it would be better to abandon the whole project for the time being.

I attached the citations about the Olivetti's usage I had compiled earlier, without the preface.

The paper was discussed in the extra Project Committee meeting on Tuesday morning 14th November. Dr. Adigun was absent. The amount of funds earmarked for the computer project a year earlier was disclosed to me. It was exactly enough to cover what had been purchased already and what I had proposed as the single-computer option. I was assured that there certainly were funds to obtain something. Gradually I understood that the idea was to purchase one new computer and use the Olivetti as a backup and in the program development.

I explained that even in that case, the Olivetti's disk capacity ought to be expanded and its tape drive ought to be replaced by another compatible with that of the new computer. Only then it could replace the first-line computer in case of the
latter's break-down. That was an interesting idea which would ensure the software support as well, although the maintenance would be a problem anyhow.

I understood that all the members wanted to make the software support arrangements with both the Computer Science Department and vendor no. 6.

At the end Dr. Bamgboye concluded that it was realistic to propose to the Board only the purchase of the first-line computer, and to leave the Olivetti. I saw that this was a difficult decision for him. I proposed a top-level meeting between the OAUTHC and the CSc Department, but he said there was no suitable time for it before the Board meeting.

After the meeting I considered with Mr. Akanji the idea of using the Olivetti as a back-up. The most delicate issue would be to find a place where it could be easily used for programming and MUMPS training but quickly transferred to the Computer Room as well in case of need.

The MD of vendor no. 6 came on Wednesday evening 15th November with a Korean Samsung PC/AT with 40 MB of disk space. I had three weeks left before my departure but I hired it for four weeks at 5,000 naira (USD 670/FIM 2,700). He had not found a more suitable model of the converters in the catalogue. He was in a hurry back to Lagos, but they would come again next week with more time to discuss MUMPS issues, possibly together with the repaired equipment. I asked them to buy some RS232 connectors for me.

In the night I woke up in a nightmare where the leased computer was about to explode because it was not suitable for MUMPS. For a long time I thought over what to do with the computers. In the morning I was happy to find Dr. Akinde at the Department. I suggested that the Samsung, not the Olivetti, would be installed at the Department, while that would save me a lot of work. He approved it.

He asked me to arrange for a meeting with the OAUTHC Management, either during their regular meeting on Monday or after the Board meeting. The first step for employing Mrs. Soriyan, an interview by a large number of high-level office-holders, was pending while the Dean was busy with resit examinations. About the Olivetti’s maintenance in the future he said the Department had funds for that, and there was a computer maintenance company in Lagos which would take care of it in practice.

I drove to the hospital with the Samsung and assembled it next to the Olivetti. Bimbo and I transferred the MUMPS directories using MS-DOS backup/restore and two diskettes alternately. It didn’t even take much time and MUMPS started in the Samsung like an angel. We erased the Patient file and Bayo confirmed that it was empty. I took the Samsung to the CSc Department and was relieved that there was finally a program development computer again, although three weeks later than I had promised.
On Friday 17th November Bimbo went on studying and modifying the Bed Status Report with my assistance. I called on Dr. Bamgoye to give him a memorandum where I detailed the costs of using the Olivetti as a back-up, and informed that due to my mistake one more converter would be needed for each terminal line. He told that everything was ready for the Board already and the Management would not meet before that.

During the weekend we drove to Oshogbo for the last time to see Alhadja Seliatu. We packed the fiction in English and for the first time it felt like leaving soon. The film dealer appeared and told that there was another brother in Ife who was interested in the car. The "brother" came but his last price was 22,000 naira (USD 2,900/FIM 12,000) and we didn't make a deal.

The man who had made our car insurance in June had disappeared without turning over the last part of the payment to his employer. I needed to obtain a new Engineer’s Certificate to the latter for the car. The engineer at the OAU Maintenance estimated the car’s market value at 42,000 naira (USD 5,600/FIM 22,000).

On Tuesday 21st November I had to extend our visas in Ilesha once more. No news about the regularization. Back at the Department I demonstrated the Site Manager functions of the Kernel to Bimbo. Late in the afternoon I was invited to the OAUTHC Board’s Finance and General Purposes/Tenders Committee.

The questions focused on the role of the Olivetti. I was asked if it could reside at the OAUTHC if it were used as a back-up. I replied that I didn’t want to argue about that, they would need to discuss that with the Computer Science Department. The Management had prepared a brief summary about the alternatives, referring to the cost estimates I had compiled.

Next morning Bimbo worked with the Samsung and I went to the Olivetti. When I switched it on, the Extended Memory Management complained about hardware faults, but MUMPS started yet. I wished to test the cables finally, using the terminals in the RS232 mode and a converter at both ends of the cable. I explained to Mr. Adewunmi what I was going to do and how the devices worked, while he had no prior experience in data communications. Then I found out that both the converter and the terminal had male connectors.

I decided to wait until I would get the connectors I had ordered. Later it occurred to me that probably there would be converters with female connectors as well. Bimbo’s Bed Status Report produced nice-looking output already. I explained to Dr. Ubaru and Dr. Adigun how to start and stop MUMPS, and described different manuals.

A carpenter who attended the same Church with Bimbo came to see the car. He told that his brother was interested in it and would come to see it later. Almost everybody was interested in buying the few household things we had. I tried to make inquiries through our bank about how to remit the sales income back to Finland, but they didn’t know and promised to travel to Lagos for instructions. It would be difficult, any case.

Bimbo was confused with the relationships between applications packages, menus, menu options, programs (routines), the menu driver, and the menu management options. I tried to explain and advised her to design an application with two dummy programs and a menu as a
home work. She was worried for the shortage of time for her training. We discussed the arrangements for mutual cooperation after my departure.

While waiting for the Board’s outcome I modified the Medical Records menus at the OAUTHC so that each terminal site would have its own choice of functions. I made TaskMan (the background task monitor) to start automatically whenever MUMPS was started, and designed a program that automatically stopped it at shut-down.

Vendor no. 6 did not appear, neither was I informed about the Board’s decision. On Friday afternoon 24th November I went to the OAUTHC Administration to ask for the news. I was referred to the CMD who called Dr. Ige as well. The latter turned out to be the new Chairman of the Medical Advisory Committee.

Prof. Makanjuola told that the Board meeting had ended two days ago. They had not found the money for purchasing a computer, and thus they had come to a stepwise solution. The money for expanding the Olivetti was approved now according to my estimates, and the Board would consider purchasing another computer in its next meeting in February.

I was surprised. I explained that it would be unreasonable to spend the scarce funds in expanding the Olivetti for a few months, very little would be needed to carry it on till February. Prof. Makanjuola asked me to specify by Monday what would be needed. I said that one must try, and stressed that a face-to-face meeting with the Computer Science Department was very important now.

On my way home I got a telex from Finland authorizing me to leave the computer to the Department. I told sadly to my wife that the project seemed to fail. The toilet was blocked and I couldn’t get it working. During the weekend we toured around the side roads of the town buying cloths and pots and a talking drum as presents and souvenirs to Finland. We went to the Staff Club for toilet and met an elderly white man who turned out to be the art historian Frank Willet himself.

Early Monday morning 27th November I called on the OAU Maintenance for plumbers, and returned to write my proposal to the OAUTHC Management. I emphasized that rapid action was needed to keep the project alive and to convince OAU and University of Kuopio on OAUTHC’s intention and ability to continue in it. A written agreement between the three parties would be needed. Besides, another 42 MB disk drive, three converters with female connectors, and the Payroll software ought to be purchased.

I dropped the memorandum at the OAUTHC and called on the man who had sold the car to me. He offered 28,000 naira (USD 3,700/FIM 15,000) for it. I hurried to the CSC Department’s Academic Staff Meeting starting at 10 AM.

There was a bitter discussion about the Department’s resources. How could a self-esteem Computer Scientist run a 1,000-student introductory course with FORTRAN exercises when there were virtually no facilities for it?

The last topic on the agenda was the MUMPS Project. I briefed the members on the last few months’ developments, and asked for advice. They thought it was self-evident that the OAUTHC was bluffing and would never return the computer after my departure. It was supposed to stay there for five weeks, it ought to be taken back immediately. One of the members described how a representative of OAUTHC had abused him because the Department was fooling me to take the Olivetti away from them.
The Department would be willing to proceed with MUMPS even without the OAUTHC — if the latter would ever buy a computer of its own, the Department would be glad to install the system on it then. I commented that I was not sure if the project could exist at all in case the OAUTHC would not purchase a computer for itself.

The meeting had to be finished but Dr. Akinde asked me to call on him later. The third MUMPS Group meeting was appointed to next Monday. I found Bimbo and Fola at the Samsung (as Technical Staff Mrs. Adefemi had not been present in the meeting). I briefed them and told that I was not sure if anything could be done to save the project. They consoled me and planned to do something for that end.

Later on Dr. Akinde assured me that if the OAUTHC Management would come to him openly with their problems, he would be ready to let them use the Olivetti for three months, or for six months if needed, but nobody had come to discuss. I asked for his opinion on the reason for all this distrust, but he could not say.

I felt better. A plumber had appeared to see our toilet but been forced to leave for the Health Center due to Guinea worm. A friend of one of our neighbours told that a friend of hers who was abroad might pay for the car in dollars. We calculated that taking into account the repairs and the time we used the car, a fair price would be USD 4,400 (NGN 33,000/FIM 18,000). We had read articles by the would-be payer in the newspapers and considered him very trustworthy.
Tuesday morning 28th November I met Mr. Akanji. He was very pessimistic. We decided to cancel the training of two more operators (for COPD and Radiology Dept.) and a visit to the Ministry of Health, which events we had scheduled for this week. The computer had not been used after the Board Meeting. The CMD was not around, and the next possible time for a meeting seemed to be Friday morning.

Back at the Department Bimbo and I went through her "homework" with the menus. The idea appeared to get clear to her. Then Fola and I studied the file and the draft program I had specified in September for the Diagnoses Statistics. There seemed to be too many things in too short a time to be digested.

The carpenter's "brother" offered 30,000 naira (USD 4,000/FIM 16,000) for the car. On Wednesday morning the bank still had no instructions about remitting funds.

I wrote to the CMD a message that I was going to collect the Olivetti on Friday, and I saw 90 per cent chances for the project to fail. Unexpectedly he had not left for Lagos yet, and I called on him. I said that pessimism seemed to reign everywhere. Vendor no. 6 had not appeared at all. The CMD had given orders for purchasing the disk and converters, but I told him that my proposal was an entirety and something had to be done to restore confidence.

I stressed that the Board just could not do that kind of a decision by itself, without discussing with anybody. It would be the same if I would come and say that I didn't have the money for buying a car but no problem, I decided to take yours and expand it to suit my needs.

Prof. Makanjuola assured that they sincerely intended to obtain a computer of their own. They had really run out of funds at the end of the year and only tried to keep the thing going till the next meeting. If I wished to take the Olivetti now, they would not prevent it, and if it would stay for a longer time they would not prevent its removal at the end of that time either.

I told that I had been authorized to leave the computer at the Department — if the OAUTHC could agree with the Department about the computer's temporary retention, that would be something I would be able to sign. Bigger changes would be impossible during these few days. Prof. Makanjuola thought the Department would not accept. I said I was not going to speak on its behalf, but I regarded the people on both sides as reasonable and well-meaning.

The CMD was travelling but we agreed on a tripartite meeting late on Friday afternoon to get things cleared before the MUMPS Group meeting on Monday morning. I proposed that Mrs. Soriyan would be present also as she would represent me after my departure.

I demonstrated the system to Mr. Akanji as he had wished to learn more about it any case.

At the Department I found Dr. Akinde. He would be travelling on Friday afternoon. We decided to keep hold of the meeting anyhow. He would ask Dr. Ekong to represent him, and we could discuss the Department's stand on Friday morning. If needed, Dr. Akinde would be around for discussions on Sunday afternoon.

Bimbo told about her talks with the Department's staff. Most people thought that the OAUTHC Management was making use of my gullibility as an expatriate and just trying to get me out of way, but the Department would cope without the hospital. I commented that the very next prospective client would ask why the Department could not reach an agreement with its closest potential ally, and would take them as non-cooperative regardless to what they would explain.

The admissions and discharges seemed to accumulate correctly into Bimbo's bed statistics. We observed that the V.A. Gains and Losses Initialization would have to be executed in the hospital to feed in the number of patients on each of the wards at the time of starting, i.e. on 1st November.

The lady who was interested in the car informed that her friend would not pay more than USD 3,500 (NGN 26,000/FIM 14,000) and thus she had withdrawn. We asked her to consider the same price we had paid for the car.

Thursday morning 30th November we complained for the third time at the plumbers' office and travelled to Ibadan to reconfirm our flight tickets by phone. At Nitel we were told that they
had no domestic services, but at Premier Hotel we were able to get through to the airline office. I tried to call vendor no. 6 but without success. For the last time to Mama Kofo and the University Bookshop.

Back home there was the Staff School’s closing party with hundreds of lively brown children and three strangely pale ones. The toilet worked, hurrah!

Friday morning 1st December Bimbo and I met with Dr. Akinde. He drafted a proposed text for a tripartite agreement as the Department’s stand, according to the lines of my proposal of September. The duties and prospective benefits of the partaking institutions were formulated on a general level, emphasizing the need for mutual trust and assistance but without an explicit reference to the Olivetti’s temporary retention at the OAUTHC.

There was a black-out so Bimbo and I just discussed the lists of tasks still to be done. I sent a letter by courier to vendor no. 6, urging them to show up to return the faulty equipment and to check the balance of payments.

Nobody turned up to represent the Computer Science Department at the OAUTHC in the afternoon, but the meeting was held still. Mrs. Soriyan distributed the draft agreement. Dr. Ige and Mr. Adeyeye, Director of Administration, were present as well as the CMD.

Prof. Makanjuola again illustrated the scarcity of funds at hand by telling which other investments the Board would have been forced to cancel if the computer would have been obtained now. There would be realistic chances for the purchase in
February while they were expecting the release of some new funds soon.

I agreed that investments in the ward facilities had higher priority than a computer. If the mutual trust emphasized in the draft agreement would be reached, there would be no problems in using the facilities in the best possible way.

The CMD assured that he was ready to sign an agreement that the Olivetti would be returned by 15th March, regardless to the Board’s decision. I suggested that it would be better to fix a date — say, 15th April — that wouldn’t needed to be extended due to the delivery and installation period.

I proposed that I would remove some currently unused programs from the computer to make room for the in-patient data. The OAUTHC would then need to purchase just the converters, not a disk for the period in question. I expressed my worry about the potential vendor’s disappearance — if they had quit now, there would be no Accounting software available in MUMPS in February. Mr. Adeyeye informed that the vendor had called on immediately after the Board meeting.

Prof. Makanjuola brought up the issue of financial implications to the OAUTHC due to the software support. I replied that this had not been discussed, but I understood that there had to be some kind of a formal agreement according to the University Regulations. He hoped that money would not be involved while the OAUTHC would be a test case and a reference site.
As we tried to proceed to the potentialities of the system, an idea about a National Workshop in May or so was discussed. The CMD expressed the OAUTHC’s willingness and deliberated on different potential sponsors.

The atmosphere was pointedly frank and towards the end even optimistic. Prof. Makanjuola would not be around on Sunday but promised to call on Dr. Akinde at 8 AM on Monday morning.

In the evening the lady’s spokesman, a top-level OAU official, agreed with us that the car would be inspected on Monday and the price confirmed with the payer by telex. On Saturday Mr. Segun Adeku, a profound and impressive young artist, gave us a Nigerian dinner, and on Sunday it was Lucy’s and Joseph’s turn. In the meantime we packed from early morning to late night.

Monday morning 4th December Dr. Akinde, Prof. Makanjuola, Dr. Ekong, Mrs. Soriyan, and I had the meeting at the CSc Department. Finally these people whom I trusted and had become fond of, had come together. In the beginning the atmosphere was a little reserved.

Prof. Makanjuola repeated that he would guarantee the computer’s returning from the OAUTHC, and Dr. Akinde responded that he was ready to let it stay there for the time needed. Simple. Dr. Akinde promised to consider the financial arrangements with his staff, and Prof. Makanjuola promised to look at the National Workshop. The agreement would be signed later during the week.

I called on the bank and obtained the instructions on the remittance of funds. It appeared to be too burdensome for the time available, as anticipated.

The MUMPS Group meeting approved the outcome of the talks as reported by Dr. Akinde. The members were willing to work with the OAUTHC without financial implications, but I referred to my experience in Finland and advised that while the initial system development could be free of charge, it would be better to have at least a nominal price for routine maintenance tasks after, say, one year. Otherwise delicate situations might arise later.

Other topics discussed were the arrangements for MUMPS training, the Medical Records System’s potential expansions, the hardware requirements of MUMPS, and potential research objects. The issue of the Group’s coordinator was brought forth but postponed as Dr. Aladesulu had had to travel.

I spent the afternoon waiting for the Elder Dempster men and the car inspector, typing Letters of Authorization for Mrs. Soriyan to several institutions. Nobody came. Tuesday morning I told the carpenter that I would possibly come to see his brother next morning, and dropped a telex for being sent to the forwarding agency and another to Finland.

At OAUTHC Bimbo and I met with Mr. Akanji and the operators. I said that now it was time to start looking forwards and searching for the benefits of the system. I promised to continue supporting them from Finland. Bimbo and I took an extra copy of the older Scheduling and FileMan versions, deleted them from the disk, and modified the Database Definition file accordingly. Some megabytes of free space was obtained.

The telex to Finland had left but it was impossible to get through to Lagos. In the afternoon the MD of vendor no. 6 came to my house with the faulty equipment. They had identified some of the faults but the delivery times of the spare parts would have been too long and the expenses too high, so the things were in the original conditions. He didn’t want any payment for the work, and the prices for the leasing and for the MUMPS licence were found to balance each other precisely.

He asked about my arrangements and promised to bring a letter from me to Elder Dempster, to the effect that they ought to show up by Thursday afternoon at the latest. He reminded us that the currency movements had been deregulated, and advised us about where and how to change the car payment to dollars or blank traveller’s cheques, and promised to help us in Lagos on Friday. He had some questions about MUMPS which we discussed.
Farewell party at the Computer Science Department. Dr. Akinde standing fourth from right.

In the evening there was a touching farewell dinner party at the Computer Science Department, with many prayers which was strange to somebody from the secular Finland. Dr. Akinde recollected the twisty history of my undertaking ever since the first letter. In responding I said we had wished to come here in order to learn something. I thought I had learnt a lot about my profession, my wife had learnt how to make *adire*, and I supposed my children had gained a second mothercountry for the rest of their lives.

Wednesday morning 6th December I found the carpenter's "brother", but now the money wasn’t ready any more, and in passing he said that the price would be reduced anyhow. In anger I told that I would rather let the car stay than sell it to somebody who advertises himself as a born-again and then cheats. This was not the way the market women bargained.

I lamented to Bimbo that I had to take care of myself now in spite of all the things we would have needed to go through. Dr. Akinde promised to manage the formal check-out from the OAU on my behalf, and offered his help in arranging the transportation in case Elder Dempster wouldn’t show up.

The last Project Committee meeting has been closed.

In the afternoon there was the last Project Committee meeting with my attendance, chaired by Dr. Ige. The state of affairs was summarized. I enumerated the faulty devices, commenting that the concern about the Olivetti’s maintenance was not just loose words. Mr. Adewuni was worried about how to instal the converters and terminals. I could only refer to the diagram I had produced with him earlier, and wish him all the best.
Earlier during the day the lady had called on because of the car. In the evening she came together with her spokesman. We agreed to sell the car at the price originally approved by the payer. The payment would take place as a bank transfer in dollars, and the Certificate on the Change of Ownership would be given to Dr. Akinde for safekeeping until the payment would have reached us.

Early Thursday morning 7th December I transferred the last modifications to the Samsung. Bimbo began to take a backup of the system on diskettes for me to bring to Finland.

I went to the OAU Maintenance with the lady to get the car inspected. Then I introduced her to Mr. Ogunmola, my mechanic. He gave a much smaller estimate of the necessary repairs than the OAU Engineer. We went to the Vehicle Licence Office but learnt that due to the increased number of cars stolen, the change of ownership now had to be done in the car’s original place of registration, in this case Owo in Ondo State. The procedure could however be performed by proxy.

Alright, we obtained a list of the particulars needed in Owo, and I wrote the proxy. There was no need to hurry any more, the rest could be done after our departure.

Dr. Akinde and I drove to the OAUTHC for signing the agreement. Prof. Makanjuola gave a short speech, revealing that he had been rather cynical about a computer’s usefulness when starting as the CMD, but had become convinced about it gradually. According to him I had proved out to be dynamic, contrary to my appearance. I bid farewell to him, Dr. Ige, and Mr. Akanji. Unfortunately Dr. Bamgboye was on leave.

Back at home I met Elder Dempster’s van. The man in charge of our case had left for vacation without referring it to
others. The three boxes and one basket were loaded and we promised to call on them the day after.

Bimbo had had to get a virus-free backup program from the Olivetti but succeeded to take the copy to me finally.

Last tours around the backyards of Ile-Ife, climbing on top of our hill to watch the last sunset, handing over of the car, packing until midnight. Early Friday morning 8th December the last things were distributed. Unhappy farewell to the Alis, to Bimbo, to Dr. Akinde. A silent drive to Lagos by the Loma Linda project’s hired vehicle.

After dropping our bags to the OAU Guest House we visited Elder Dempster to agree on the details. In the evening the MD of vendor no. 6 came together with his software expert. While there was no need to change money, I answered the last MUMPS questions and we thanked them for the care. As usual, we had rice, fried plantain, and goat meat in pepper soup as dinner.

Saturday morning 9th December a shaky yellow cab took us to the Murtala Muhammed Airport. The passport inspectors complained about the two visas without an exit stamp in between, but let us go. The airplane took us from the 35 degrees of Lagos to the minus twenty degrees of Moscow. On Sunday evening we returned amongst the Christmas-shopping rush of Helsinki, Finland.

![Transportation to the transit hotel at Sheremetyevo Airport, Moscow, does not operate during the night.](image)

### 4.6 Post-history

We had a week’s rest in the countryside before moving to our new apartment, and I started working only after New Year 1990, but yet I felt somewhat burnt-out for a long time. In January I established the contact with Bimbo by telex and mail. Our baggage arrived without problems, and the car payment was sent to us promptly. Fortunately so, as the balance of the year showed that African studies is an expensive hobby.

Bimbo experienced some software problems which I couldn’t repeat on the copy of the system I had brought with me. Moreover, the fault with the expanded memory was getting worse, and consistent black-outs made it difficult to use the computer. Mrs. Ojo and her colleagues kept on entering patient information into the computer however. The Project Committee decided to meet bimonthly. The relationships between the participating institutions were now relaxed and cooperative.

A 'Jerusalem B' virus was discovered in my micro. I got virus detection and erasure programs from my colleagues and sent them to Bimbo. The Olivetti was also found badly infected but all programs except the tape drivers could be replaced with clean copies. I agreed with Bimbo on measures to prevent further infections. I sent her spare parts for the UPS,
terminal, and printer, but Mr. Ogwu couldn't get the equipment repaired.

Bimbo and I exchanged long letters on diverse conceptual and operational issues which had remained unclear by the time I left.

On 2nd February 1990 I got a letter from the MD of vendor no. 6. He had got the converters with female connectors, but the terminal had not worked with them. I tried to imagine all possible reasons for the failure, and asked for more details from Bimbo by telex. Bimbo asked me to call by phone to one of her neighbours, and to my surprise I could get through on 22nd February, after about one hundred unsuccessful attempts. The problem with converters remained, however.

OAUTHC Board in February approved purchasing a computer for the Hospital. A bid for tenders was published. No applications software was included for the time being. I sent some recommendations on the technical specifications, and Bimbo did a lot of work in specifying the requirements and analyzing the tenders. The first round of tenders was again quite heterogenous. OAUTHC Management decided on Bimbo's advice to rely on original IBM hardware only, for reliability of maintenance, and the four tenderers were requested to give new quotations for two specific models.

The contract was finally awarded in June to CHAMS Nigeria Ltd., on the basis of price and maintenance terms. The computer was an IBM PS/2 Model 70-A21 (80386 25 MHz processor, 120 MB hard disk, 1.44 MB 3.5" diskette drive, 2 MB RAM) with an external 5.25" diskette drive for transporting programs from Olivetti, an external Archive ST600 60 MB tape drive for backups, Epson FX-1050 printer, American
Monarch 500 VA on-line UPS, and a stabilizer. An Arnet SmartPort/2 8-line serial port expansion board had to be purchased as well, while the SmartPort-8 I had brought was not for PS/2 Microchannel.

Meanwhile Computer Science Department had finally been able to purchase an IBM PS/2 Model 30 with 20 MB disk along with a Novell network and two diskless clones as work stations. There are some 50 micros on the campus but this was the first one specifically for Computer Science students’ use. University of Tampere donated Pascal and C compilers to it, and University of Kuopio Computing Center donated COBOL later.

The CSc computer was also supplied by CHAMS. The hardware engineers of the latter studied Olivetti’s memory problems and found out that the power supply was working irregularly, and later the disk controller stopped working altogether.

The Olivetti and the UPS were transported to CHAMS at Lagos. Leventis Technical and Olivetti Nigeria Ltd. were consulted also, but despite the combined efforts the equipment could not be completely repaired.

By April I completed the first, partial draft of this report, and sent it to Dr. Akinde and Prof. Makanjuola for feedback. Both of them gave me a go-ahead. In May I attended the 2nd International Conference on Activity Theory in Lahti, Finland, where I represented a paper drafting some first analytical conclusions of my experience.

Bimbo had been interviewed for appointment at the CSc Department in January, but some weeks later a staff retrenchment policy was published and the appointment procedure came to a standstill. She assisted with some Computer Science courses however. Dr. Ubaru and Dr. Aladesulu resigned for the private sector during the Harmattan semester, and Mrs. Adefemi announced that she was going to follow her husband to Lagos by the end of the academic year. Dr. Adigun was elected new Coordinator of the MUMPS Group. While Bimbo was busy with the tenders and the Olivetti was down, the rest of the Group had nothing practical to do either. The software support was becoming threatened.

A new problem surfaced when my account in Ife was running out of funds and I tried to transfer some from Finland. The cheque got stuck at African Continental Bank Headquarters and was returned four months later. My bank in Finland issued an International Money Order instead, but didn’t get any response from A.C.B. Meanwhile, Bimbo’s salary could not be paid since April. Embarrassed, I sent part of the arrears by mail and luckily it was not pilfered. We began to search for another bank, but by October no reliable way of transferring funds had been established yet.
On 22nd April there was an abortive coup attempt in Nigeria — the first news since our departure that narrowly exceeded the threshold of the Euro-centered Finnish press.

The coup proved out to be detached though bloody. Its secessionist message seemed to be unanimously rejected, also amongst those dissatisfied with the Government’s economic policy.

By the same time the telex line to Ife ceased working and had not been restored by October.

In July I attended a conference in Dublin during which the newly-established IFIP Working Group on the ‘Impact of Computers in Developing Countries’ (WG 9.4) had its first informal meeting (for details cf. travel report). Later Prof. Bhatnagar, the Chairman, asked me to act as a secretary to the Working Group for a year, until a permanent one could be elected.

A group of some twenty Finnish people visited Nigeria in late August as tourists, guided by a Nigerian studying in Finland, and spent some days in Ile-Ife on our advice. As the Olivetti could not have been repaired in Nigeria, Bimbo tried to arrange its transportation to Finland for repairs along with them. The transportation proved out to be expensive and troublesome. In October the task was given to Elder Dempster Agencies and Enroth Oy again, and the computer, printer, and terminal arrived in Helsinki on 15th October.

Advert in the Lagos Weekly Record, April 1921.

From Webster & Boahen: op.cit.

Olivetti (Finland) maintenance staff inspected the computer, replaced a faulty component in the power supply, and found out that the diskette drive and both the original and the replacement hard disk were irreparably damaged. The engineers supposed that some time during the repairs attempts the power cables of the drives had been connected in the wrong way — "it goes that way also if you push a bit, and it burns out everything". I began to look after replacements.

I had ordered a pair of current loop converters from the same U.K. shop as the MD of vendor no. 6 had used, and tested them between my own computer and a terminal. The scheme we I had drawn with Mr. Adewuni proved out to work alright.

The OAUTHC computer was delivered in late August. Bimbo restored the system from backup diskettes. One of the data base files was incomplete, however, probably due to the Olivetti’s unsteady operation before the final break-down. I sent a copy of the file as it was on my computer. Fortunately, the files that contained living data were alright.

Another University Teaching Hospital became interested in the Medical Records system. Bimbo prepared a tender which the Computer Science Department sent through a hardware vendor. In OAUTHC, several expansions were suggested by the staff of some departments. In OAU, Mr. Adeyekeun, a programmer at the Computer Center, joined the MUMPS Group.
5. System description

MUMPS, FileMan, and Kernel. The software used in the project is coded in MUMPS, a highly portable language developed 25 years ago for the first mini computers, and one of the few standardized by ANSI. It is an interpretive language oriented in multiuser, time-sharing systems with asynchronous terminals. It is very compact, fast to write but not so easy to comprehend. The language incorporates features of an operating system and a unique indexed data storage scheme. Due to its development site, Massachusetts General Hospital, it has traditionally been strongest in the medical field.

An important factor for the language's recent success stories — U.S. Department of Defense awarded one of the biggest software contracts ever to a MUMPS based Hospital Information System — is the set of public-domain tools developed by the U.S. Department of Veterans Affairs (V.A., formerly Veterans Administration). These include FileMan, a network-type Data Base Management System with Data Dictionary, and Kernel, a package for menu management, background task management, security control, electronic mail, and so forth. Together they make up a 4th Generation application development tool available for USD 300 (FIM 1,200/NGN 2,300) without copying restrictions.

What makes the MUMPS systems very attractive to low-end users is the availability of high-quality multiuser environments for today's powerful microcomputers. An 80286 processor with the DataTree MUMPS used in this project can support eight simultaneous users. Unix and OS/2, the other multiuser alternatives, require significantly more hardware resources, and money, for
the same performance. A multiuser MUMPS licence from DataTree costs USD 650 (FIM 2,600/NGN 4,900).

MUMPS's portability makes a virtually unlimited choice of hardware available. For a low-end single-user configuration, a PC/XT with 512 kB memory and a few megabytes of hard disk is sufficient. A two-user system is obtained simply by adding an asynchronous terminal to the computer's standard serial port. Systems for up to 32 users can be configured in a mini-computer way by using a 80386 processor, up to 2 MB of memory, serial port expansion boards, more terminals, and larger disks.

Larger and/or more powerful systems can be constructed by changing over to traditional mini or mainframe computers. Helsinki University Central Hospital in Finland, for example, has a system of interconnected VAXs serving more than 500 terminals. The applications, if properly coded, can be transported from the smallest to the largest configuration without modifications.

Today, however, there is another, more attractive way of building large and/or powerful systems. Standard microcomputers can be networked (DT MUMPS supports any NetBIOS compatible network, e.g., IBM Token Ring). Each of the micros can have terminals connected to it as well, or be used as a powerful single-user workstation. The MUMPS database can be allocated partly to each of the workstations (temporary and personal files), partly to server micros with large hard disks (300-600 MB are not uncommon today). The files can be replicated and journalled for extra reliability.

The Brigham and Women's Hospital in U.S.A. is currently constructing a 4,000 workstation and 60,000 MB system by networking over 100 server micros. A U.S. Health Center replaced a minicomputer by a single microcomputer with less than half the cost of the service contract only of the old machine — and got more processing power as well. In general, the combination MUMPS + microcomputers has proved out to outperform minicomputers costing many times as much.

What are the trade-offs of using MUMPS? There are three major ones. First, comparing a single-micro MUMPS system to a Unix or OS/2 equivalent, no standard packages like WordPerfect or Lotus can be used while MUMPS is running — the basic MS-DOS Operating System is still a single-user environment. If the micro is needed for WordPerfect, for instance, MUMPS must be halted first and the terminals lay idle during that time. There are text processing and spreadsheet packages in MUMPS also, but they are of course less wide-spread and less advanced than the MS-DOS ones. The problem can be circumvented by using a network — then any of the micros can run either MUMPS or MS-DOS applications at any point of time.

The second trade-off is the lack of good graphical user interfaces for FileMan/Kernel. The interface of the latter is straightforward and operates in natural language, true, but works in a one-question-at-a-time, or rolling mode. Forms would normally be more easy to follow, and some applications would benefit from a graphic screen.

The last trade-off is a more general one. MUMPS is a self-contained environment, which brings about some closedness as well. Latest advances in general-purpose software (new Data Base Management Systems, standard applications, data communication protocols, Operating System features) cannot usually be readily interfaced with MUMPS, leading to delays in the introduction of the former to the MUMPS community. Moreover, the language itself has not been taught to every Computer Science student. There is a scarcity of experienced MUMPS programmers which is not completely relieved by the use of 4th Generation tools like FileMan/Kernel. The scarcity is of course relatively more acute in a Developing Country.

The V.A. applications. On the hospital applications level, there are public domain (non-copyright) packages by V.A. for (1) in-patient admission, discharge and transfer, (2) out-patient appointment scheduling, (3) out-patient pharmacy, and, more recently, (4) in-patient dietetics. The complete applications portfolio used in the 170 V.A. hospitals includes other packages (eg.
laboratory, radiology) which are not currently available through the MUMPS Users Group Library.

V.A. is concerned with military veterans and consequently the applications packages include peculiarities which are not meaningful for general hospitals. Moreover, in U.S.A. terminals are assumed to be available on every ward and operated by virtually every nurse and doctor — something that is not reasonable as a first step of computerization in a Developing Country with scarce resources. For these and other contextual reasons, the V.A. applications should be considered as a model or prototype which can be experimented with but which must be adjusted to the specific requirements of a given country and hospital.

In Finland three out of the five University Central Hospitals, together with University of Kuopio and a District Hospital, formed a joint project for developing MUMPS/FileMan/Kernel based systems in early 1980s (the MUSTI project). The applications are now in operation in two dozen hospitals, big and small. While English language ought to have been replaced by Finnish any case, the V.A. applications were used as inspiration only and local applications were developed virtually from scratch, but utilizing FileMan and Kernel heavily.

In the Ife project, on the contrary, the language was no problem although the American date format still was. Thus the strategy was different: V.A. files, programs, and data entry procedures (input templates) were utilized as much as possible. Most of the huge amount of information collected at the V.A. hospitals could be skipped at least for the time being, and some new data items (fields) were added, eg. 'State of Origin'.

The Nigerian Medical Records application. The Basic Medical Records system now includes the following data entry functions: (1) Patient Registration, for entering and editing 'permanent' data of the patients. (2) Admission of a patient to a ward. (3) Transfer from one ward to another. (4) Discharge, for entering the date of discharge and whether alive or dead. (5) Discharge Summary, for entering diagnoses and other discharge conditions, after the information in question has been approved by the consultant in charge. (6) X-ray folder number entry, specially for the Radiology Department. (7) Patient Inquiry, for quick display of the most important information on a patient, and for replacing the Master Name Index card boxes.

There are two more elaborate reports in the basic system, namely the Daily Bed Status, and the Monthly Diagnoses Statistics according to the Federal Ministry of Health requirements. Both are yet incomplete by the time of writing this report. Ad hoc reports can be defined and retrieved from the data base by the Main Operators (Site Managers).

The functions have been grouped into tailor-made menus for different branches of users: Basic In-Patient Functions, Consultant Out-Patient Department, Radiology Department, Main
Select PATIENT NAME: TESTCASE, TUNDE FEMI
ARE YOU ADDING ‘TESTCASE, TUNDE FEMI’ AS A NEW PATIENT (THE 7TH)? [YES]

PATIENT DOB: [11-5-45] (11 MAY 1945)
NAME: TESTCASE, TUNDE FEMI
NUMBER: 124589

Select OTHER UNIT WHERE REGISTERED: WESLEY GUILD HOSPITAL
ARE YOU ADDING ‘WESLEY GUILD HOSPITAL’ AS A NEW OTHER UNIT WHERE REGISTERED (THE 1ST FOR THIS PATIENT)? [YES]
REGISTRATION NUMBER: [97684]

Select OTHER UNIT WHERE REGISTERED: [ ]
MARITAL STATUS: [MARRIED]
SEX: [M] MALE
DATE OF BIRTH: 11 MAY 1945 // [ ]
X-RAY NUMBER: [ ]
STREET ADDRESS: [71 MOORE STREET]
STREET ADDRESS 2: [OFF. KANISURO BAKERY]
STREET ADDRESS 3: [ ]
TOWN: [ILE-IFE]
LOCAL GOVERNMENT AREA: [ILE-IFE CENTRAL]
STATE: [OYO]
OFFICE ADDRESS 1: [65 ONDO BY-PASS]
OFFICE ADDRESS 2: [ ]
OFFICE TOWN: [MODAKEKE, ILE-IFE]
OFFICE STATE: [OYO]
NEXT OF KIN: TESTCASE, YEMISI ADELOLA
K-RELATIONSHIP: [WIFE]
IS K-ADDRESS SAME AS PATIENT’S? [YES]
TOWN/VILLAGE OF ORIGIN: [IMESI-ILE]
L.G.A. OF ORIGIN: [ILPFIN]
STATE OF ORIGIN: [OYO]
ETHNICITY: [YORUBA]
OCCUPATION: [CARPENTER]
RELIGION: [ ]
1 CATHOLIC 15
2 CHRISTIAN 1
3 CHRISTIAN SCIENTIST 16
4 CHURCH OF CHRIST 17
5 CHURCH OF GOD 18
CHOOSE 1-5: [2]

Entering a patient’s basic data. The operator’s input is squared. Fields like ‘SEX’ and ‘RELIGION’ have predetermined alternatives, one of which is selected by typing a few characters from the beginning.

<table>
<thead>
<tr>
<th>TESTCASE, TUNDE FEMI</th>
<th>OYO State</th>
</tr>
</thead>
<tbody>
<tr>
<td>71 MOORE STREET</td>
<td>65 ONDO BY-PASS</td>
</tr>
<tr>
<td>ILE-IFE</td>
<td>MODAKEKE, ILE-IFE</td>
</tr>
<tr>
<td></td>
<td>OYO State</td>
</tr>
</tbody>
</table>

Next of kin: TESTCASE, YEMISI ADELOLA (WIFE)

Same address

<table>
<thead>
<tr>
<th>Place of origin</th>
<th>Ethnicity</th>
<th>Occupation</th>
<th>Religion</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMESI-ILE/OYO</td>
<td>YORUBA</td>
<td>CARPENTER</td>
<td>CHRISTIAN</td>
</tr>
</tbody>
</table>

The patient inquiry display, showing the same data as on the Case Note Folder’s inner cover.

Operator Functions. Access to the functions is restricted per user by Kernel security/log-in facilities.

The Basic Medical Records system thus incorporates the data for administrative reports and most important medical reports. In a teaching hospital, the system assists the Statistics Section in searching for relevant cases for scientific studies (e.g. which patients, under 15 of age, have been treated for malaria within one year after having been treated for malnutrition; or how many patients treated for schizophrenia had been referred to the hospital by a babalawo, and was there any difference in the outcome of treatment compared to others). It is in the latter aspect that a computerized Basic Medical Records system opens up the most of new possibilities.

By the time the use of the basic system has become stabilized, some extensions should be installed for substantial extra benefits. The most important, in a medical perspective, are data on laboratory examinations, radiology examinations, in-patient prescriptions, and out-patient diagnoses. Together with the discharge summaries, these data would provide for highly relevant epidemiological studies and improved uses of the patients’ medical histories in individual cases. The V.A. Out-Patient Appointment Scheduling subsystem can be implemented virtually without
ADMISSION DATE: 18 OCT  1990
TYPE OF ADMISSION: [ ] FROM OUTSIDE
SOURCE OF REFERRAL: [ ] GOVERNMENT HOSPITAL/CLINIC
WARD LOCATION: [NA]
   1. MALE MEDICAL
   2. MALE ORTHOPAEDICAL
   3. MALE PSYCHIATRIC
   4. MALE SURGICAL I
   5. MALE SURGICAL II
CHOOSE 1-5: [1]
CONSULTANT: [A]OYAKUNYO, O.  [PROF]
Patient Admitted

Entering the admission data for a patient already registered.

<table>
<thead>
<tr>
<th>DISCHARGE PATIENT:</th>
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</thead>
<tbody>
<tr>
<td>Inpatient Status:</td>
<td>Admitted: 18/10/90</td>
<td>Ward: MALE MEDICAL-16 ward</td>
</tr>
<tr>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DISCHARGE DATE:</td>
<td>NOW/ [ ] (18 OCT 1990 14:57)</td>
<td></td>
</tr>
<tr>
<td>TYPE OF DISCHARGE:</td>
<td>[ ] ALIVE</td>
<td></td>
</tr>
<tr>
<td>OUTCOME OF ADMISSION:</td>
<td>[ ] CURED/IMPROVED</td>
<td></td>
</tr>
<tr>
<td>MODE OF DISPOSITION:</td>
<td>[ ] DISCHARGED HOME</td>
<td></td>
</tr>
<tr>
<td>PRINCIPAL DIAGNOSIS:</td>
<td>[ ] MALAR</td>
<td></td>
</tr>
<tr>
<td>1. MALARIA 802.4</td>
<td>FX MALARIA/MAXILLARY-CLOSE</td>
<td></td>
</tr>
<tr>
<td>2. MALARIA 802.5</td>
<td>FX MALARIA/MAXILLARY-OPEN</td>
<td></td>
</tr>
<tr>
<td>3. MALARIA 647.41</td>
<td>MALARIA-DELIVERED</td>
<td></td>
</tr>
<tr>
<td>4. MALARIA 647.42</td>
<td>MALARIA-DELIVERED W/F/P</td>
<td></td>
</tr>
<tr>
<td>5. MALARIA 647.43</td>
<td>MALARIA-ANTEPARTUM</td>
<td></td>
</tr>
<tr>
<td>TYPE *** TO STOP, OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHOOSE 1-5: [ ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. MALARIA 647.44</td>
<td>MALARIA-POSTPARTUM</td>
<td></td>
</tr>
<tr>
<td>7. MALARIA 084.0</td>
<td>FALCIPARUM MALARIA</td>
<td></td>
</tr>
<tr>
<td>8. MALARIA 084.1</td>
<td>VIVAX MALARIA</td>
<td></td>
</tr>
<tr>
<td>9. MALARIA 084.2</td>
<td>QUARTAN MALARIA</td>
<td></td>
</tr>
<tr>
<td>10. MALARIA 084.3</td>
<td>OVALE MALARIA</td>
<td></td>
</tr>
<tr>
<td>TYPE *** TO STOP, OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHOOSE 1-10: [ ] 084.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select OTHER DIAGNOSIS: [ ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select OTHER OPERATION: [ ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Discharged.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Entering the discharge summary. The ICD-9 diagnosis code can be entered as such, or retrieved by diagnosis name.

Taken together, the subsystems discussed this far would provide for all the data needed for a Billing subsystem. This would mean improved service to the patient, while manual collection of the information on hospitalization days, drug usage, operations, examinations, and the like, takes quite a lot of time while the patient is waiting.

Accounting and Personnel Management are applications domains where packages developed for other sectors can be adopted in hospitals. There exists evidence, though, that packages created in the U.S.A. or in U.K. do not fit well with Nigerian practice. If money is available for an extra microcomputer, or if the computer hours can be divided between Medical Records and Administration, then a locally made set of standard single-user packages is the easiest choice. On the other hand, if multiuser operations or closer integration with Medical Records are needed, then the most appropriate existing set of packages (probably based on dBase III in Nigeria) should be selected and converted into FileMan/MUMPS in a joint undertaking with the developer.

When available, FileMan/MUMPS based Accounting Packages would compete favourably in the general market-place in the multiuser class.
6. Successes, gains, and prospects

1. The Medical Records application. Even the very fundamental Medical Records system developed in the project provides the Hospital Administration with the basic reports days or weeks faster than before. Besides, it seems to enable the Medical Records staff to do information retrievals which would be very time-consuming or entirely unreasonable by manual means. The system does not result in workforce displacement, but in increased productivity of the Medical Records staff.

The basic system's benefits are in administration, research, and epidemiology. Direct effects on the patients' service (e.g., decreased waiting times) and medical care (e.g., improved case histories) can be acquired through the extensions discussed in Chapter 5.

The basic system was installed, although through considerable difficulties, in the OAUTHC. It is parameterized in a way enabling its application in other Nigerian University Teaching Hospitals, and probably in major public-sector hospitals in general. Private hospitals may require billing-oriented extensions. I have no experience on hospitals in other Developing Countries, but I can see nothing preventing it from being used as a prototype in any English-speaking country if overall prerequisites for computerization exist.

2. The MUMPS/FileMan/Kernel technology. It was nice to find out that the technology I proposed for the project was really appropriate for Developing Countries — I would say highly appropriate. The cost for hardware and systems software was relatively low compared to the efficiency and the multiuser characteristics. Corresponding other technologies available in Nigeria would have been more expensive and more demanding in terms of physical environment and operator training.

Systems development tools were not too complicated, although there is a step in learning MUMPS. The end-user interface was found easy to adopt.

3. Operational use. In Finland before travelling I heard skeptical comments about the would-be end-users ability to keep a high-technology system like a computer running. It proved out that this was one of the least concerns in reality. I have been successfully introducing computer systems in Finland to nurses with no prior experience with terminals or typing, and I found no difference whatsoever in introducing the computer system to OAUTHC. The Medical Records staff in charge of the system were interested, learnt quickly, and took good care of the system.

I suppose there were two major factors for the easy implementation: First, the Medical Records activities in OAUTHC were already very well organized, and the staff were highly capable people who had a good understanding of what they were doing. The contents of the system was nothing new to them, only the medium. Secondly, the Main Operators were provided with a full responsibility of the system from the very beginning. Consequently, the system was theirs and they wanted to keep it in a good shape.

What I learnt about other complicated technology, e.g. the X-ray equipment, seems to confirm that operational use is not the major problem. Of course it is possible yet to prevent the
operators from taking care of their equipment, by frequent rotation of staff, not providing them with proper training and documentation (or on-line help), not trusting in them, and so on.

Regarding to the Management's commitment, I was lucky because the OAUTHC had already decided on "going to computer". On the other hand, my project mixed up the prior plans very much. It is difficult for me to estimate whether the course of events would have been different if the initiative would have been entirely on my side.

4. Systems support. The MUMPS Group was established in the Computer Science Department, although with difficulties, and basic training was given to a number of staff members and students. The Department took over the responsibility of supporting OAUTHC and has since taken first steps in distributing the technology to other sites as well.

I was very lucky to find a person like Mrs. Soriano as my assistant and successor. She has proved out to be a very determined organizer who has contacts to many people and can established new ones when needed. The progress made in Ife during 1990 can be attributed on her for the most part.

For the time being the systems support is still of course in many ways dependent on second-line assistance from Finland. More practical experience in MUMPS programming, systems design, and hardware configurations is needed before the process in Nigeria will be self-propelling.

5. Nigeria. The choice of the country was clearly correct. The prerequisites for a viable hospital information system exist (cf. Chapter 9), and there is a lot of material available there to study "systems development by the Africans for the Africans".

I found the Nigerians to be people with self-esteem who usually took a friendly and equal stand to a foreigner. Unfortunately my Nigerian colleagues might not always be welcomed in the same civilized way in Finland.

6. North-South cooperation. Relations were established between Computer Science Department, OAU, and Computing Center, University of Kuopio. For the latter, it means wider horizons and more profound understanding of the contingency factors of informatics. For the former, some material contributions could be achieved, i.e. the Olivetti, some software, scientific journals, and photocopies of articles.

If the MUMPS Group will get more consultation contracts, its members and the entire Department will gain some extra revenue. This would not be an insignificant thing, considering the lack of funds and the pull from the private sector which are shattering the very foundations of the Nigerian higher education system.

Even more important long-term benefits can be achieved through the improved access to the international scientific community. Papers by the Nigerian participants of the project have been specifically requested to some international conferences, and a few papers are being prepared. Considering the huge obstacles facing Third World academic research, even a single conference trip would be an improvement of dozens of per cents. Currently the main problem is not in finding something worth reporting on an international audience, but in finding the funding for travelling. A return ticket from Nigeria to Finland costs easily a university lecturer's one-year salary.

7. Workshop. A workshop in hospital informatics for Nigerian Medical Records officers and others has been planned by the Nigerian participants of the project. The plans have been postponed while waiting for the OAUTHC computer being installed and put into routine use. If no new problems arise, the workshop is about to take place during winter/harmattan season 1990-1991.
8. Family experience. It has been pointed out to me that I was lucky to have my family with me in the new and sometimes stressing environment. I fully agree with that. Besides, the salary from Finland and the care of my colleagues in Kuopio were absolutely indispensable, too, for the success of the project.

For myself personally and for my family, the possibility to live, work, and go to school in another culture was the greatest result.

7. Failures, errors, and problems

1. Inappropriate hardware. It is a classical error in international aid organizations to bring technology of one’s own country to the recipient country, in order to benefit the donor country. In this way, islands of dependency and non-standard systems are created. To me it is nearly an insult to donate second-hand Nokia computers or Valmet tractors to Africa — it is like saying, 'look how nice things we have — pity that you can't keep them running'.

This project almost fell victim of the same one-in-the-country syndrome. When the funds could not be raised for the hardware originally planned for, whatever was donated to the project had to be gratefully accepted. Olivetti is a very high-quality computer, but M280 was literally one in the country, with all the resulting maintenance problems.

I had not enough caution for the quality of electricity supply in Nigeria, nor all the hardware expertise needed, and the information I got from the UPS vendor was misleading. Consequently, I did not acquire good enough protection against electric hazards, which resulted in severe problems. The full range of preventive measures needed became clear to me gradually, when the worst things had happened already.

Every single piece of hardware — computer, tape drive, printer, terminal, UPS — turned out to be uncommon in Nigeria. For some part I could have avoided this by taking more time to collecting prior information about the brands popular in the country. The maintenance for this equipment is and will be partly dependent on Finnish assistance. The facilities purchased to the OAUTHC, on the contrary, have an established local source of maintenance.

2. Systems support. Already before moving to Nigeria I considered establishing the software support as one of the most critical tasks. The MUMPS Group was, however, established quite late, there were not enough practitioners in it, and the members had not enough time for learning the technology. Students could have been involved more. Later on the non-availability of a program development computer at the Computer Science Department prevented the training badly.

In beforehand I believed that the Department would have obtained a micro of its own by the time I was to arrive, and I did not pay attention enough for securing a program development computer. As a consequence, the Olivetti became an object of conflicting interests.
It can be asked if a University Department is an appropriate source of commercial support at all. I considered the alternatives — OAU Computer Center, Federal Ministry of Health, a private firm — in my memorandum of 2nd June 1989. To me all these appeared less capable and/or less realistic at that phase. I still share that view.

There is, however, a risk that the burden of systems development and support will turn out to be too much in conflict with the teaching and research objectives, and the resources, of an academic institution. In principle as well, commercial undertakings of academia should concentrate in introducing front-line technology into the society, and in obtaining in-depth understanding of processes in the "real world" through cooperation. In this respect the MUMPS/Hospital project is quite suitable today, but the Department may wish to hand over the day-to-day support to the private sector after some years.

For the time being I would say that the deteriorating economy of the Universities forms the greatest threat to the systems support. There are too few key persons in the MUMPS Group, and Mrs. Soriniyan is not even permanently employed by the time of writing the report. Steps have been taken to get some relief to these problems.

3. Adopting to the context. I think my worst single mistake was the letter I wrote to the Chief Medical Director about the Olivetti issue on 21st September. More precisely, the sarcastic style which was intended in making the letter less serious, probably made things worse. It was high time to get the unpublic feelings of distrust and conflicting interests around the computer's future to the forefront, but my way of handling the situation should have been less straightforward.

From time to time I had less severe occasions of the same type. I was coming from the rather informal Finnish organizational culture where titles are seldom quoted, people are customarily called by first names, and official matters are not administered by letters addressed to individual office-holders. If I want to open an account in Finland, I fill a form but do not write a letter to the Bank Manager ("Dear Sir").

In Nigeria, on the contrary, the administrative culture has strong British traits with all the formalities. Yoruba tradition puts much esteem on seniority too (not necessarily mechanically linked with age). In Finland it is bad behaviour to put one's nose into other people's business, as in Yorubaland such closedness is considered unfriendliness — and so on.

I tried to adapt, but it is natural that I made "cultural mistakes" by pure ignorance and in resisting things that appeared strange to me. As far as I understand, people usually took my bad behaviour with patience and understanding. Of course, many nuances escaped my attention, and even more so because I didn’t learn Yoruba but a few words.

A more avoidable fault was the fact that I did not engage myself enough in the daily work and life of the OAuthc staff. My understanding of the activities in the Hospital remained on a formal level, and I learnt to know just a few staff members with only a superficial view of their lives outside of work. Consequently, my understanding of the computer system's impact on their personal life-settings is equally vague.

My familiarization started well in April-May, but the hardware and administrative problems during the summer/rainy season lead to high temporal pressures towards the end of my stay. Plans of having meetings with clinicians, and of spending more time in following the every-day life at Medical Records Department, had to be discarded in order to save the project itself.

In Finland I had been used to project organizations which were top light and bottom heavy — that is, Management was only periodically engaged but most of the design work occurred in tightly-coupled cooperation with the would-be end users. In Nigeria it proved out that the Management’s presence had to be much stronger.

The fortnightly Project Committee meetings were sometimes rather formally oriented, at the expense of actual progress, but they were very useful in keeping the Management aware and engaged in the project. The main problem with the Committee was the thin and unstable
representation of the CSc Department in it. Consequently there was no institution which would have bound the Department in practice with the project inasmuch as was the case with the OAUTHC.

4. Operational use. The system has not been used in fully routine conditions yet, due to the change of computer and the hardware problems. Consequently, its viability is yet to be proved in practice.

The most beneficial extensions to the basic Medical Records application have not been materialized. Close cooperation between the three participating institutions is needed in order to proceed to the next phase.

5. Accounting and Administrative applications. Originally OAUTHC had plans about implementing Payroll and Medical Records in the first place, followed by a host of other administrative applications. Currently, no administrative applications have been implemented.

It is hard to say whether the deficiency can be attributed to my project. With the funds appointed by the OAUTHC Board this far, only one of the systems could have been realized, as a single-user application. Not much hardware needs to be added to the present configuration in order to expand to the administrative domain, but the systems development effort is considerable.

6. Research work. I had imagined that in Nigeria I would have plenty of time to read books and write essays in the evenings. To the contrary. Most of my time went into administrative things and various arrangements. There was much less effective working time to put into the "core" issues, compared to what I was used to. The temperature and mental stress of an unfamiliar environment took their toll too. As a result, I read no examination book and wrote not a single page of theoretical text.

Arrangements for conducting systems-developer interviews took much time, and at the end I had visited three firms only, spending some two-three hours in the interviews in each of them. The discussions were highly informative to me, and I did not encounter the restrictions I was prepared for. However, more systems developers should be interviewed and more insight procured into their every-day work, before reliable conclusions could be made.

---

Koye:
A missionary in the health ministry

*Professor Kuti... better to have basic health for all than all health services for a few.*


7. Reporting and contacts. I had not allocated time enough for reporting the results of the project. As a consequence, less channels than intended have been opened to the international
scientific community for the Nigerian participating institutions. The base for cooperation could be broader in Finland.

While in Nigeria I had finally no time to realize the plans on visiting the Federal Ministry of Health and the University Teaching Hospitals in Lagos and Ibadan. A letter to WHO, VA, and to the members of the IMIA Working Group on Developing Countries gained no response, and has not been renewed yet. Re-establishing the personal links of the Computing Center, University of Kuopio, with the Department of Veterans Affairs is under way.

8. Funding and costs

Academy of Finland, the government institution in charge of the bulk of research funding, provided a grant which covered my one year's salary, travelling for myself and my family, and miscellaneous other expenses. Olivetti (Finland) Oy donated the microcomputer and tape drive. The rest of the hardware, and a wide range of other expenses (mail, telex, phone, photocopies, remote loans, a journal subscription, freight, repairs, spare parts, software, and part of Mrs. Soriyan's salary) were paid by University of Kuopio.

Obafemi Awolowo University provided free housing, health care, and office facilities during my stay. Staff members of CSC OAU and especially OAUTHC spent uncountable hours in meetings and arrangements due to the project. University of Kuopio has let me use my working hours in the project, about 30 per cent of my working time in 1990. Universities of Tampere and Oulu donated software and periodicals. Finally, part of the expenses have been paid from the family purse. The Academy grant included a personal stipend without restrictions for use — it was partly spent to this purpose, besides covering the losses of purchasing and reselling a car, etc.

It is obvious from the above that not all of the expenses can be precisely specified. In the following, the funds and expenses explicitly ascribed to the project between December 1988 — October 1990 are summarized. The expenses of the preliminary phase have been detailed in my travelling reports of 9th September 1988 and 20th January 1989. The Olivetti repairs now under way, the printing of this report, and a great number of mailing costs and the like, paid by University of Kuopio or myself, have not been included.

The salary paid to me by the Academy in 1989 (FIM 7,777/USD 1,900/NGN 15,000 per month) was scaled according to the Nigerian price level and was roughly equal to a nurse's monthly income in Helsinki by that time, according to newspaper reports. After taxation, mortgage expenses, and other unavoidable reductions in Finland, a little above FIM 2,000 (USD 500/NGN 3,800) was left for family spending — a catastrophe in Finland, a fat salary indeed in Nigeria. We did not, however, quite learn to cut our costs as an indigene could have done.

<table>
<thead>
<tr>
<th>Funds allocated</th>
<th>FIM</th>
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<tr>
<td>Academy of Finland grant</td>
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<td>49,000</td>
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<tr>
<td>University of Kuopio hardware vote</td>
<td>40,000</td>
<td>10,000</td>
<td>75,000</td>
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<tr>
<td>Total funds</td>
<td>234,700</td>
<td>59,000</td>
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</tbody>
</table>
Donations by non-participants

Microcomputer, by Olivetti (Finland) Oy, univ. price  24,364  6,100  46,000
Compilers, by U of Tampere, list price  3,000  750  5,600
Journals, by U of Oulu, subscription price about  3,000  750  5,600

Total donations by non-participants  30,364  7,600  57,000

Expenses

Equipment, repairs, and spare parts  43,623  11,000  82,000
MUMPS licenses and V.A. software  8,056  2,000  15,000
My salary, social security, and leave allowance  105,062  26,000  200,000
Personal stipend  30,000  7,500  56,000
Other salaries and stipends  5,698  1,400  11,000
Travelling to and from Nigeria  24,933  6,200  47,000
Freight  12,364  3,100  23,000
S.T.R. Visa (travelling, courier, etc.)  4,696  1,200  8,800
Books, software, etc. purchased for CSc OAU  13,777  3,400  25,000
Conference in Dublin  4,444  1,100  8,300
Mail, phone, telex, photocopying, etc.  4,085  1,000  7,700

Total expenses  256,518  64,000  480,000

9. Conclusions

The practical goals of the project were achieved quite satisfactorily. More time is needed to observe the long-term results, and more research work is needed on the theoretical/analytical objectives. The following are preliminary conclusions from the more straightforward findings.

1. Computers in health care in Africa. My experience suggests that there is no question about whether computers are useful in an African hospital, nor whether users can learn to take care of them. Computers are in Africa today, and they are appropriate technology in many cases.

The real questions are: What are the priorities in a given concrete case? What are the prerequisites? What kind of systems?

As it is (or should be) everywhere, the expenses and trade-offs of potential computer uses must be compared in every actual case with the benefits, and with competing demands for resources. There are no universal right answers, as there is no simple answer to the hungry man’s dilemma — whether to use the money in buying a fish or a fishing net. Moreover, in pilot cases a priori answers would be mere prejudices.

In my case I found out that the Hospital could obtain a useful computer system at the price of two new Peugeot 504s, without apparently harmful consequences to neither patients nor staff. But there certainly are other needs for funds in the Hospital — for drugs, for renovating buildings, and so on. Should the money have been used in the latter instead? But what about other expensive things in that case, like Peugeots and X-ray machines? Cars, like medical records, have an indirect effect only on patients’ health. Both are needed, however, and cannot be simply overruled.
Priorities must be set by the Hospital’s Management, according to their judgement of the needs and benefits, both short and long term, both direct and indirect.

Computers are still often regarded as labour-displacing technology ("automation") and therefore inappropriate to Developing Countries. I am rather skeptical about that view in general, and in the case in question I can’t see any risk of the Medical Records system replacing Medical Records staff. There is more work to do than staff or vacancies. With a computer, the staff gets more things done and spends less time in tedious and error-prone manual statistics:

The first systems are necessarily rather centralized and administrative — processing oriented. As studies in Finland show, more wide-scale impact comes with the next phase, when data entry and output are decentralized to wards or clinics and laboratories etc. In that phase, the computer is actually a communication medium, making dozens of forms and slips and thousands of steps unnecessary. But the first is needed before the second one.

2. General prerequisites to computer use. A computer system can be kept operational anywhere in the world by an external support structure like a transnational corporation or an international organization. For a self-standing computer system, however, there are some conditions which the country in question must meet.

There must be training for systems designers/programmers and computer engineers, preferably both academic and vocational. Some number of (micro) computers must be in use in the country already, and basic hardware maintenance services for these computers must have been established.

Medical records can cause suffering

Medical records, or rather the lack of them, can delay treatment leading to suffering or even loss of life.

At least that is what Tanzania found out at the Muhimbili medical centre, the country’s main consultative teaching hospital based in Dar-Es-Salam, the capital.

By 1985 the hospital had run out of space for files and lacked well-trained staff for its medical records department. It’s filing system was in shambles.

At the hospital the major complaint used to be not the long lines of patients waiting to see the doctor, but shortage of drugs or hospital beds, or rude nurses as normally the case in government hospitals. It was the missing file.

"It used to take 10 to 15 minutes to trace a single file," said Cornelio C. Ngwya, head of the medical records department. "Patients could wait for days to be treated because files were lost." Some files took a week or so to be traced. Others could not be traced at all.

The situation was so bad that questions were asked in parliament about the men at the Muhimbili medical records department.

Medical records are vital in treatment. Properly kept and readily retrievable doctors can use them to trace the medical history of patients, diagnose the nature of illnesses, prescribe drugs and mode of treatment as well as follow-up action and research.

In turn, helps to improve health services and the training of health personnel.

Almost all of the value of these records, the Muhimbili medical centre started in 1985 to recognize its medical records. With assistance from the British International Development Agency (BIDA), the centre devised a new filing system and trained its staff to handle it.

"The system is very good. It now takes less than a minute to trace a file," said Ngwya. "Now we are okay. Our statistics are very easy to get and are true. We have simplified our medical forms. Doctors are even using our records to do research. This has led to the improvement of our medical services.

The centre operates 114 new filing daily on average. Its present holding consists of some 400,000 files dating back to 1979. Before reorganizing, some 3,500 files dating earlier were destroyed in a fire because the staff had no room to hold them.

The centre employs 60 medical recorders. Although it has considered the computerization of its records, it has not done so yet. According to Ngwya, computerization would be difficult as it would require summing the old data in any case so medical records can be completely computerized." PANA


In my mind, the importance of indigenous software services has not been fully recognized. Relevant computer systems are not implemented without overall systems analysis and design, not to speak about proper software installation, even if "turn-key" packages are used (turning the key is usually not enough for implementation). Packages made in U.S.A. or U.K. do not usually meet the requirements of Developing Countries without being adjusted, and in some cases a
simple locally-developed data base application is far better. Lack of software services, then, would lead to under-capacity use of computer potential.

A final prerequisite for successful introduction of a computer system is that the work activity to be supported by the computer should already be well organized. If a hospital does not have proper Medical Records functions for the time being, a computer will not help. It is commonplace but worth repeating that a computer does nothing — but people can use a computer for doing something.

The above-mentioned general prerequisites exist in Nigeria, although the education could be more relevant and software services stronger. In other African countries the prerequisites exist at a varying degree.

As suggested already, finding capable operators should be no major problem if literate people with basic education are available. If computers can be used by elderly professors of humanities in Europe, they should not be too difficult for people who manage to repair their scrapped cars on the roadside in Africa.

3. Hardware. Computers are more expensive in Africa than in Europe (even Finland). Still the best choice of hardware is anything that is popular in the country and can be locally purchased and repaired, rather than something that is cheaper, higher quality, and globally popular, but not in the country in question. Actually, if a locally assembled micro is available and sufficiently popular, it will probably be the most reliably maintained alternative. The aid organizations’ standard clause, to the effect that equipment should be purchased from the donor country if possible, should be turned around: Equipment should be locally purchased if possible, even at a higher (initial) cost.

The hardware must be protected against steady overvoltages of, say, 500 Volts, spikes, undervoltages, and high and low frequencies. Therefor, a rugged UPS is unavoidable. The models normally used in Europe are not rugged enough, but can be protected against spikes by a simple stabilizer. Steady overvoltages pass the stabilizers and must be taken care of by, for example, a fast automatic fuse. The mains inlet must be properly earthed and not common with air-conditioners, welding machines, electric motors, or the like.

An air-conditioner is not absolutely inevitable when modern micros are used, at least temporarily, but it is better to have one for extending the UPS battery lifetime during hot season, and for keeping mould out of one’s diskettes during the rainy season. Dust covers should be used daily and the premises cleaned of dust regularly. Burglar proofs and restricted entry are essential in a poor country where copper can be stolen from live power cables.

All the protective measures should be applied to printers and terminals alike. For example, power for remote terminals should be distributed from the central UPS or from a UPS of their own.

It is usually impossible to forecast which components would be needed as spare parts, except fuses and consumables. It is of course a good idea to have two or more smaller units compared to a single big one.

Hardware configuration and site preparation guidelines like those above are actually quite simple and easy to apply, if only analyzed and compiled by a hardware expert in the first place.

4. The nature of systems development work. Systems development even in industrialized countries is not the programming and in-house "circuit design" it used to be. Quite often it consists much more of putting ready-made components together, parameterizing and adapting products made by others, developing conventions of using general-purpose packages in a given organization, planting computer facilities into work activities, taking care of all kinds of exception cases and requests for assistance. In Africa, the latter aspects seem to overwhelm the former so much that some professionals do not consider themselves systems developers at all.
Actually however, the latter type of work is even more engaged with producing systems — wholes that are more than a sum of their components. As far as my experience regards, a systems developer in Africa must be much more a "specialist of all topics" than in Europe. He or she must know something of computer engineering, electrical engineering, contracts and legal operations, banking, human communication, and so on — besides the basic skills of analyzing work activities and designing software applications.

5. The role of cultural factors. I am very reluctant to dramatize the impact of cultural differences between peoples. To me, negritude seems to have as little to do with systems development as ideas of wise white men indeed. As I have stressed already, people seem to learn what they do not know yet — in case the time, motivation, and training facilities are secured to them. The material resources and structures discussed elsewhere in this chapter seem to be more influential factors behind differences in computer use.

A systems developer is more often than not an outsider even in his or her own country. Trivially, an Igbo systems developer in Western Nigeria knows much more about the context than I do, but is as confined to using English and losing some nuances as I am. In a more relevant sense, a systems developer with a technical education and possibly a middle-class background must do some work in order to internalize the life settings of would-be users with medical or nursing educations and diverse backgrounds. Male-female traditions add a host of other potential barriers of understanding.

To put it brief, part of systems development is always overcoming of barriers, trying to get in and to understand. The developer’s personal values and emotions have much to do with his or her ability to succeed. I think much can be achieved if the developer tries to personally know the people engaged with the emergent system, identifies the least powerful ones amongst them, and considers the system’s impact on their personal destinies.

This kind of a viewpoint is of course the more important the more outsider the developer.

6. Activity networks. Any computer-supported work activity exists in order to produce some things or services to some other activity or activities. The needs of the object activities define much of the requirements for the computer system. In the other way round, a viable computer system requires a number of input activities like computer sales, maintenance, banking, communications, and so forth. In industrialized countries, most of these can be taken as granted, while in Africa the situation can be dramatically different.

When considering the implementation of a new computer system, the developer should analyze which input activities will be needed, find out if they exist, create links to existing activities, and even establish entire activities if needed and possible.

This topic is represented more specifically in my paper of 21st May 1990 (cf. Appendix B), and will be discussed in my Thesis.

7. Bureaucracy. Every African trying to travel to Finland knows that bureaucracy is not purely a Third World phenomenon. In the latter, however, inefficient and indifferent administration is quite common. Personally I met inconsistent and unpurposeful administrative practice mainly in immigration, banking, and appointment procedures. It should be noted that bureaucracy is not part of the traditional culture — flexible timing may be a popular custom, but the Mama Kofos and Moses Ogunmolas can certainly not be accused of bureaucratic practices. Also, poor administration is not by default a public sector disease.

I have tried to search for scientific explanations of the roots of bureaucracy in the Third World, but found none in the Sociological Abstracts. To me, it seems that the more there is unchecked power, the more there is bureaucracy. Checking by market forces or by democratic control decreases bureaucracy. Administration in the military style, paradoxically, creates inefficiency. I wish to elaborate on this topic in my Thesis by comparing the impacts of two
Students call for closer ties between Nigeria, Finland

The Federal Government should seek closer relations with Finland to ameliorate consular problems, the Nigerian community in Finland has
in their institutions of higher learning, adding. "No fees are charged here in the institutions." So he said.

In a reply, Nwachukwu told them that the purpose of his two-day visit was to "deepen and strengthen" bilateral relations with Finland.

The Daily Times, 27 April 1989. There is a typing error in the news: The "entry deposit" to Finland should read 20,000 Finnish marks (USD 5,000/NGN 38,000) yearly.

8. International cooperation. Africa is a net exporter of capital — that is, the Africans are giving net aid to feed the Americans and Europeans because of the debt trap. In social-security societies like Finland it is a common belief that the well-to-do should pay higher taxes so that chances could be made more equal for the less privileged. I can’t see why this should not be the case amongst the international scientific community too.

Third World academia face huge obstacles in scientific work. The number of students overwhelms the few lecturers, facilities and textbooks are outdated or non-existent, there is no hard currency for subscribing to scientific journals to libraries, international conferences are out of question due to travelling expenses, salaries lag far behind even the domestic private sector, and so on. Nigerian researchers — or doctors or nurses — who return from studies abroad and try to do their best in the universities and hospitals are every-day heroes. Giving assistance to them should be a self-evident obligation to their well-to-do colleagues, not a question of philanthropy.

International cooperation should contribute to endogenous processes in African countries. Transfer of journals and books makes it a little bit easier for African academics to stay aware of developments elsewhere, scholarships for conferences enable them to have their voices heard, joint projects and permanent relations with sister institutions give inspiration, hardware and software donations facilitate the education of the next generation.
While travelling in Denmark the artist Segun Adeku made the fascinated picture reproduced on the front cover of this report, depicting all the wonderful things technology and money can provide. The perpetual hurry seemed to be the only trade-off. After returning to Nigeria, doubting thoughts began to come to his mind ever more. His suspicions towards new technology are depicted in the picture on the back cover. In it, a robot is chasing farmers and craftsmen. It is culturally adapted with a Yoruba cap and has a user-friendly, smiling (inter)face, but despair and sorrow is still its endowment to all but the money-bags. Only innocent babies do not understand what is going on.

Computer systems are a core element in new technology. Are they going to provide the Nigerians with joy of life or despair? Is it enough to put a Yoruba cap on a hostile computer system? Are systems developers ignorant babies or carriers of the horn of plenty?

I believe both ways are possible. It depends on people, developers and others.

10. Proposals

1. Systems support. Steps should be taken to strengthen the MUMPS Group of the Computer Science Department, OAU. The most critical task is to ensure Mrs. Soriyan’s permanent presence in the Group. The new consultation agreements now under consideration would give the Group some very welcome practice and revenue, and all kinds of assistance must be given from Finland in the critical early phases of them.

The hardware facilities must be quickly repaired. More terminals and disk space will be needed shortly.

In the long run, Parts 4 and 5 as well as postgraduate students should be involved in the Group while the staff will not have time enough for all the programming tasks.

2. Expansions. The unfinished reporting programs must be completed rapidly. There are several highly useful and simple extensions to the basic Medical Records system: Out-Patient Appointment Scheduling, Laboratory and Radiology Data, Neo-Natal Data, and Prescriptions. These should be prioritized, developed, and implemented. The development tasks can be shared between Kuopio and Ife.

50,000 die yearly of maternal deaths

In Nigeria, 5,000,000 maternal deaths occur for 10 percent of the 500,000 maternal deaths that occur worldwide every year. The latest estimate, which was published in The Medical Journal of Nigeria, is that 10,000 women die every year from complications of childbirth.

In Nigeria’s most populous city, Lagos, the situation is even worse. According to the National Institute of Public Health, 10,000 women die every year from complications of childbirth.

It is important for the technology’s viability that general-purpose packages will be available, besides the Medical Records. Text-processing and spreadsheet packages in MUMPS must be acquired. Proper procedures for developing Payroll, Accounting, and other administrative applications should be identified. Probably a joint undertaking between the MUMPS Group and some private vendor would be the most fruitful alternative.
To make the potential of the MUMPS technology fully available to the MUMPS Group, a model of the microcomputer network configuration should be established. The optimal case would be if both OAUTHC and CSc OAU would have networked configurations. To this end, two lesser micros — preferably IBM — and the networking hardware would be needed. The system should be first assembled and tested in Finland and then transferred to Nigeria. Popularity and maintenance of different networking options in Nigeria should be considered.

3. Research on systems development. In 1989, the research aspect was overwhelmed by the practical aspect. More interviews are needed to complement what was initiated. A joint undertaking should be established between this author and a Nigerian researcher oriented in Information Systems.

First, preliminary contacts should be established with a majority of the companies identified in 1989 and others outside Lagos, in order to collect basic information using a simple questionnaire form modified from the one in Appendix C. CSc OAU students might help in collecting the information, for better coverage. The forms would be filled by the respondents themselves or by the students.

Second, a number of firms with outspoken systems development activities (in a broad sense) should be interviewed about development-related aspects. Especially, the health-care delivery sector should be covered (including Federal Ministry, LUTH, UCH, and vendors). A questionnaire recently used in Canada and Denmark by Bjorn-Andersen and Kumar might be applied also for international comparison.

Third, the horizontal view obtained during steps 1 and 2 above should be supplemented, if possible, by a week’s going-along with developers of a couple of firms. Both this author and a Nigerian researcher should participate.

The steps described herein would provide a lot of information of high international interest — according to my knowledge no representative studies on systems development practice in Africa has been made this far. The study would also encourage practice-oriented higher education and research in Information Systems in Nigeria. Overall summaries first, and in-depth analyzes later should be proposed to international journals and conferences by the participants.

4. Workshops on Hospital Information Systems. A national workshop in Ile-Ife based on the OAUTHC experience has been planned for, and could be held within months of the commencing of routine use of the system. Assistance from Finland should be provided in planning the programme.

Towards the end of 1991, a second workshop might be arranged, benefitting from the experience of the first one. Speakers could be acquired from several Nigerian institutions as well as from other African countries, e.g. the Gambia (Byass and others) and Zimbabwe. Also, a few speakers from Finland should be invited in order to make the contacts wider and stronger. WHO, IMIA, VA, and FINNIDA participation would be highly desirable.

The workshop should focus on Health Care Informatics in Africa in general, not only on the MUMPS technology, although with moderate arrangements and objectives. If the workshop would prove successful, maybe a biannual meeting could be considered.

It must be emphasized that regional or even subregional non-governmental cooperation between African countries is quite difficult without external funding and technical assistance.

5. Funding. Proposals 2-4 above would necessitate a 3-4 month stay in Nigeria by this author during winter/harmattan season 1991-2. The stay would comprise of three parts: First, installation and training of system expansions at OAUTHC and CSc OAU, together with finalizing arrangements for the workshop. Second, the workshop in Ile-Ife. Third, interviews and observations in systems development companies in Lagos.
The sweetness of feeling holding your new-born baby is indescribable. You are transported beyond cloud "nine" and you feel that all things are possible. These circumstances explain my absence from this past century in the world (Nigerians love rumors) that I am either in Gomina or Kassou under lock and key.

I hold and cuddle my latest flower and feel fulfilled, excited and really happy at the miracle of birth. In this state, I feel to damp the world with all its troubles. But then, I come back to earth and remember that my flower needs to live and be comfortable. So I hold and cuddle to make it happy and feel fulfilled. I have been taken over by the joy of birth.

This is the life to be lived. It is the life that I have chosen for myself. I am living my life to the fullest. I am happy and content with my current situation and I feel that I am fulfilling my destiny.

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Ogunmola, Moses, Nigerian car mechanic ........................................................................... 27, 29, 70, 89

Ogunniran, O.A. (Bayo), Medical Records Officer at OAUTHC .......................................... 47, 54, 62

Ogwu, F.J., computer engineer, lecturer at Computer Science Department, OAU .................. 22, 24, 26, 28, 30,
32-34, 37, 38, 43, 53, 54, 57, 72
Ojo, J.O. (Lola), Mrs., Medical Records Officer at OAUTHC ........................................ 47, 49, 52, 71

Okuwoga, Olu, representative of Nigeria in IFIP TC-9 ........................................ 14-16, 27

Olatoki, Samson, Medical Records Officer at OAUTHC ........................................ 47, 48

Olivetti, Italian microcomputer manufacturer with subsidiaries in Finland and Nigeria. Also the microcomputer used for program development in this project ........ 13, 16, 19, 22, 24, 26, 30, 31, 33-35, 37-41, 43-47, 49-52, 54-57, 59-67, 70-75, 81-83, 85, 86

Ooni, King of Ife, the highest traditional ruler of the Yoruba .................................. 6, 35

Oshogbo, town in Oyo State, known for its traditional religious festival, artists, and steel mill .... 40, 41, 62

Osuntogun, Adeniyi, Prof., Vice-Chancellor of OAU since 1990 ............................... 63

Oulu, University town in Northern Finland ............................................................. 15, 85, 86

Ousmane, Sembene, Senegalese novelist and film maker ........................................ 8

Oyo, the strongest Yoruba Kingdom till the 19th century, ruled over most of Yorubaland until collapsed during the Fulani jihad. Also the capital city of the former (Old Oyo, Oyo-Ile), and a State and town in present-day Western Nigeria ........................................ 6

Political events, in Nigeria ....................................................................................... 4, 5, 8, 11, 15, 22, 24, 27-29, 34, 35, 37, 41, 51, 53, 74

Project Committee, for Computerized Hospital Information System in OAUTHC, the supervisory body of the project in Nigeria ........................................ 18, 19, 21, 24, 25, 28, 29, 31, 33, 37, 39, 41, 44, 46, 47, 50, 54, 59, 60, 69, 71, 83, B - 1, B - 2, B - 2, B - 2, B - 2, B - 2, B - 2, B - 3, B - 3, B - 3

Public domain software, programs available to anybody at shipping costs, often developed within the public sector in the U.S.A. .................................................. 2, 12, 16, 75, 76

Ransome-Kuti, Olikoye, Prof., Health Minister of Nigeria. Comes from a famous family: one of his brothers is the musician Fela Anikulapo-Kuti, another brother is a human rights activist, and a foremother organized women’s resistance against colonialism (cf. Wole Soyinka: 46). ........................................ 84

Rasaki, Raji, Col., Governor of Lagos State ............................................................ 90

Religions, in Nigeria. They play a far more outspoken role than in Europe .................. 4, 6, 7, 41, 58, 62, 69

Rienhoff, Otto, Prof. Dr. med., Chairman of IMIA Working Group for Developing Countries .......................... 10

Samson, see Mr. Samson Olatoki.

Samsung, the Taiwanese microcomputer leased for the project in November 1989 .......... 61, 62, 64, 70

SAP, Structural Adjustment Policy ........................................................................ 5, 27, 28, 34, 35

Seliatu, Alhadja, indigo dyer in Oshogbo ................................................................. 40, 62

Senghor, Leopold Cedar, former President of Senegal, philosopher and poet .................. 7

Songonuga, A.O., Mrs., Chief Pharmacist at OAUTHC .............................................. 19

Soriyan, H.A. (Bimbo), Mrs., Research Assistant and my successor in the project in Ife .......... 28, 31, 37-40, 43-50, 52, 53, 55-57, 59, 61-72, 71-75, 81, 83, 85, 91, 93
Soyinka, Wole, Prof., Nigerian playwright, poet, and novelist, Nobel prize winner

Stockholm, capital of Sweden, the site of the Embassy of Nigeria closest to Finland

Sulonen, Reijo, Prof., Head of Laboratory of Information Technology, Helsinki University of Technology

Swantz, Marja-Liisa, Prof., Director of the Institute of Development Studies, University of Helsinki

Tafawa Balewa, Sir Abubakar, Prime Minister of Nigeria 1960-1966

Tampere, city in Western Finland, the site of the second biggest University in the country

Tenders for computer hardware, requesting, processing, and awarding of, at OAUTHC

Terminal connections, with MUMPS in general and at OAUTHC. One or two "dumb" terminals can be connected directly to a microcomputer running MUMPS. More of them can be connected using a port expansion board. Up to about 10 meters, the standard RS232 (voltage-level signalling) connection is sufficient, up to 400 meters can be reached by converting the signals to current loops, beyond that modems are needed

Ubaru, M.O., Dr., lecturer at Computer Science Department, OAU

UCH, University College Hospital, see Ibadan.

UNIFECS, University of Ife Consulting Services, the OAU unit in charge of payable services by

the staff for third parties

UPS, Uninterruptible Power Supply, a piece of equipment with batteries charged from the mains, delivering "clean" electricity and taking care of blackouts of 10-20 minutes

V.A. (U.S. Department of Veterans Affairs, formerly Veterans Administration), the developer of the public-domain hospital applications used in the project

Vendor no. 1, a representative of a medium size American minicomputer manufacturer, considered for OAUTHC computer purchases in 1989

Vendor no. 6, a small Nigerian computer vendor, considered for OAUTHC computer purchases in 1989, was interested in using MUMPS

Virus, in the project's computer. Computer virus is a program which is hidden in other programs and is able to copy itself again to other programs as soon as the infected program is executed. There are several types of viruses, ranging from annoying to disastrous. They can be prevented if only checked diskettes are used in the computer.

Visuri, Elina, Dr., Director of Research at FINNIDA
Wenger, Suzanne, Austrian artist, one of the founders of the Oshogbo school of artists, high priest of the river goddess Oshun ........................................... 41, 42

WGH, Wesley Guild Hospital, see Ilesha.

WHO, World Health Organization ........................................... 27, 79, 85, 92, 93

Willet, Frank, British archaeologist and art historian, expert in Ife archaeology ......................... 63

Yoruba, the main ethnic group of Western Nigeria and the Eastern parts of Republic of Benin.
   See Chapter 3 for historical information ....................... 4, 6, 7, 21, 36, 55, 57, 83, 91
Appendices

A. Agreement

This agreement is between the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife (OAUTHC), the Department of Computer Science, Obafemi Awolowo University, Ile-Ife and the Computing Centre, University of Kuopio, Finland.

1. The project is for the MUMPS/Fileman Technology. It is concerned with: (a) Project Development (b) Teaching and Training, and (c) Research, especially in the field of health care informatics.

2. It is hoped that the project will introduce MUMPS/Fileman for use in Health Care Information on a wide scale in Nigeria.

3. The Department of Computer Science is in charge of the project in Nigeria i.e. the Supervising agent in Nigeria. The department is therefore expected to provide the following technical support: - Introduce respective clients, i.e. Hospitals and Software development firms, to the fundamentals and attributes of MUMPS/Fileman. - Assist clients with appropriate programme development. - Assist clients with the upkeep, upgrade and efficient use of the Computer.

4. The Department of Computer Science should support the MUMPS/Fileman pilot scheme at the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife with a view to making it a model of Health Care Informatics.

5. In order to facilitate the dissemination of knowledge with respect to MUMPS/Fileman, the University of Kuopio has made available an Olivetti M280PC which is based at the Computer Science Department. The department is in charge of maintaining the facilities. (The relevant items are listed in Appendix I).

6. To facilitate the development of the project in the Obafemi Awolowo University Teaching Hospitals Complex the Department of Computer Science agrees that the Olivetti M280PC should be located in the Medical Records Department of the Obafemi Awolowo University Teaching Hospitals Complex until the 15th April, 1990. This is to allow the Obafemi Awolowo University Teaching Hospitals Complex the necessary time required to purchase and install its own Computer.

7. The University of Kuopio will in addition provide support, free of charge, through information update and any other technical and research material in the course of the project.
8. There will be periodic (six monthly) review of the project (May and November of every year) for a period of two years in the first instance i.e. 1st January, 1990 to 31st December, 1991.

9. By the end of 1991 an evaluation of the project's achievements will be made to determine its continuation or termination.

10. Obafemi Awolowo University Teaching Hospitals Complex, which is the pilot scheme, if successful, will be the first Health Care Institution in Nigeria to have a Comprehensive Medical Information System.

Obafemi Awolowo University Teaching Hospitals Complex will provide adequate support and cooperation for real life study and subsequently become the reference centre of excellence with respect to Health Care Informatics.

11. The three (3) parties recognize that a good working relationship and understanding coupled with mutual trust are essential for the success of the project.

Prof. R.O. Makanjuola,
Ag. Chief Medical Director
'For and on behalf of
Obafemi Awolowo University
Teaching Hospitals Complex
Ile - Ife

Dr. A.D. Akinde
Head, Dept of
Computer Science,
For and on behalf of
Dept of Computer
Science, Obafemi
Awolowo University
Ile-Ife.

Mr. Mikko Korpela
For and on behalf of
University of Kuopio,
Computing Centre
B. List of memoranda and publications

Only papers by this author are included in the list below. Valuable information is recorded also in the minutes of the OAUTHC Project Committee, and the Staff Meetings and MUMPS Group Meetings of the Computer Science Department, OAU. Some of the memoranda contain confidential information and cannot be made available to third parties.

<table>
<thead>
<tr>
<th>Date</th>
<th>Subject, number of pages</th>
<th>Addressed (or distributed) to</th>
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<tr>
<td>17/6/86</td>
<td>Vuurovaikutteisten atk-järjestelmien psykologiaa (On the psychology of interactive data processing systems. In Finnish). Examination paper. 18 p.</td>
<td>(Prof. Sulonen)</td>
</tr>
<tr>
<td>28/4/87</td>
<td>Research Plan. Computerized Information Systems for Developing Countries: Ergonomics Guidelines for Designers and Implementors, Based on the Nigerian Experience. Seventh revision. 21 p.</td>
<td>(Academy of Finland, etc.)</td>
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<tr>
<td>14/12/87</td>
<td>Working Plan 1988-89. 1 p.</td>
<td>Doctoral Education Program for Information Systems Science</td>
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<tr>
<td>18/1/88</td>
<td>Information Systems Development and Research: Methods, Perspectives, and Fundamental Problems. Fourth revision. Unfinished examination paper. 15 p.</td>
<td>(Prof. Järvinen)</td>
</tr>
<tr>
<td>(15-18/2/88)</td>
<td>How a Hospital Computer and a Health Center Computer Began to Talk to Each Other. Paper presented at INFORMATICS'88, International Conference for Health, Havana, Cuba. 14 p.</td>
<td>-</td>
</tr>
<tr>
<td>June 1988</td>
<td>Ergonomics of Developing Countries. Occasional Papers 3, University of Helsinki, Institute of Development Studies. ISSN 0785-5060. 20 p.</td>
<td>-</td>
</tr>
<tr>
<td>10/6/88</td>
<td>Health Care Informatics in the Context of a Developing Country: Projektiedotus (Project proposal. In Finnish). 3 p.</td>
<td>Board of Computing Center, University of Kuopio</td>
</tr>
<tr>
<td>9/9/88</td>
<td>Travel Report. Exploratory visit to Obafemi Awolowo University, Ile-Ife, Nigeria, 6-22 May 1988. 9 p.</td>
<td>(University of Kaopio, Academy of Finland, etc.)</td>
</tr>
</tbody>
</table>


20/1/89 Travel Report. IFIP TC8/TC9 Working Conference on Impact of Information Systems in Developing Countries, New Delhi, India, 24-26 November 1988. 6 p. (University of Kuopio, Academy of Finland, etc.)


(9/3/89) Computerized Hospital Information System Project: First Meeting of Project Participants. Agenda. 2 p. (OAUTHC Management)

20/3/89 Workshop on MUMPS, Micros, and the VA Tools. Tentative plan. 1 p. (Dr. Daini)

(21/3/89) Matters to Board Meeting on 22/3/89. 1 p. OAUTHC Project Committee


22/3/89 Prototyping with the VA System by the Technical Group. Draft. 1 p. (MUMPS Group)

23/3/89 First Report to the Supervisory Board. 6 p. Supervisory Board in Finland

2/4/89 First Impressions from the Hospital "Sight-Seeing". 2 p. (OAUTHC Project Committee)


3/4/89 Issues for the Meeting of the Hospital Information System Project Members at Computer Science Department on 4/4/89. 1 p. (MUMPS Group)

4/4/89 Clarification of the Responsibility Areas of the Participating Institutions. Diagram. 1 p. OAUTHC Project Committee

26/4/89 Proposal (on a seminar, lectures, and a workshop at the CSc Dept.). 1 p. (Dr. Daini)

3/5/89 Fundamental Choices. Materials for discussion. 6 p. OAUTHC Project Committee

15/5/89 Cost of Hardware Expansion. 3 p. Dr. Bamgboye

29/5/89 OAUTHC Support — MUMPS Development Team. Ideas for consideration. 1 p. Dr. Daini, Dr. Aladesulu
The Ife Project - Report 1989

2/6/89  Software Support Arrangements. 8 p. Dr. Bamgboye

14/6/89 Re: Five Proposals to Instal Computer at OAUTHC. 2 p. Mr. Dosumu

19/6/89 On the Course of Events in my Visa Affair. 7 p. Ass. Registrar (Immigration), OAU

21/6/89 Re: The Sixth Proposal to Instal Computer at OAUTHC. 1 p. Mr. Dosumu

2/7/89 Choice of Computer Hardware and Software. 7 p. OAUTHC Management

3/7/89 The New Request to the Tenders. 2 p. (OAUTHC Tenders Committee, vendors)

(5-25/7/89) 4th Generation Systems Development Tools Using MUMPS and Micros. Lecture notes. 13 p. (Computer Science staff and students)

10/8/89 Second Report to the Supervisory Board. 12 p. Supervisory Board in Finland

21/8/89 Analysis of Tenders and Proposal. 4 p. Mr. Dosumu

13/9/89 Tasks to Be Done before Board Meeting. 2 p. OAUTHC Project Committee

21/9/89 Concerns about the Future of the MUMPS Systems. 4 p. Prof. Makanjuola.

3/10/89 Purchase of Computer Hardware and Software: Cost Estimates. 2 p. Mr. Abiodun

7/10/89 Management Meeting on the Computer Project. Proposals. 2 p. Dr. Bamgboye

16/10/89 Final Proposal on Purchasing of Computer Hardware and Software. 3 p. Mr. Abiodun

26/10/89 Third Report to the Supervisory Board. 5 p. Supervisory Board in Finland

13/11/89 On Reducing the Expenses of the Computer System. 5 p. OAUTHC Project Committee

27/11/89 Urgent Actions in the Computer Issue. 1 p. OAUTHC Management


C. Interview reports

Copies of a questionnaire form, reprinted below, were mailed to the respondents in beforehand. Parts 500 and 600 were found inappropriate in practice and replaced by more general questions during the interviews.

The interview transcripts have unfortunately not yet been checked by the respondents. The write-ups should be considered as the author's understanding of what was discussed. Corrected reports will be published in my Thesis. Any errors are apologized.

The Interview Questionnaire

100. COMPANY PROFILE

101.1. Name

101.2. Address

101.3. Phone

102. Established
When was the company established? Give the year.

103. Ownership
1. Indigenous
2. Mixed Nigerian and foreign
3. Related to a transnational company

104. Number of personnel
What is the number of persons employed by the company altogether, including senior staff, junior staff, and management? Give a rough figure if the precise number is not available.

105. Annual turnover
What was the annual turnover of the company (in Naira) during the latest fiscal year? Give the year also if it was not 1988.

106. Percentage of turnover from software development
How many per cent of the turnover would you estimate to come from your own software/systems development, as opposed to hardware sales, sales of ready-made software packages, etc.? Give a rough figure.
107. Services given
Which of the following services does the company offer?
1. Hardware sales
2. Hardware repairs/maintenance
3. Software packages, like spreadsheets
4. Systems analysis and design
5. Bureau services (processing)
6. In-house data processing department
7. Consultation
8. Feasibility studies
9. Project management
10. Training and education
11. Supplies sales

108. Representations
Which hardware or software products does the company represent? Are these sole or shared representations?

121. Strong points
What are the areas where you would think that the company is especially strong, or which factors benefit most to the company’s competitive edge? For example, 'representative of a well-known computer manufacturer', 'good knowledge of banking operations in Nigeria', 'a large customer base', 'highly experienced staff'. You are not restricted to these examples.

122. Main problems
What are the main problems of the company according to your opinion? For example, 'difficulties in obtaining hard currency', 'lack of computer awareness among potential customers', 'high rate of change of trained Computer Scientists', etc. You are not restricted to these examples.

190. Can the company be referred to by name
Your responses are treated with confidence and used purely for scientific purposes. If you wish, your answers will be represented in such a way that the company cannot be identified. You can also specify any part of your answers as confidential. So, can the company's name be included in the research report?
1. Yes, can be referred to by name
2. No, the name must not be identified

200. PERSONS INTERVIEWED

201. Names and positions of the respondents
300. SYSTEMS DEVELOPMENT OPERATIONS

301. Organisational position
Are the systems development operations organised as a separate unit? If so, who is heading the unit (e.g. 'Systems Director', 'Senior Project Manager') and whom is the head of the unit reporting to? Describe the relationships between Systems Development and Sales, Training, Maintenance, or whatever other units there are.

311.1. Number of customers
How many customers does the company have, roughly, with software development services? Don't include customers who only need hardware sales or foreign-made software packages like spreadsheets, but not any programming or data base design.

311.2. Number of new customers
How many new customers of the above-mentioned type did you get during the latest 12 months?

312. Types of customers
Are the systems development customers of the company of a specific type - banks, oil industry, government, educational institutions, etc.? Do different types of customers need different kinds of services? For example, 'about a quarter of our customers are banks, we make tailored mainframe systems for them, and the rest are diverse kinds of small and medium scale enterprises that use our Accounts Package'.

313. How the customers are found
How does the company usually get its new customers? Do they come to you or do you have to go to them? For example, 'we are a well-known company, they send requests for tenders to us', or 'usually because of our advertisement in the newspapers', or 'our Sales Manager makes visits to companies which operate in the same field as our old customers and educates them about the benefits of using our systems'.

314. Is it remunerative
If you compare the systems development operations with hardware sales, training, and so on, do you think the former is financially more or less profitable? For example, 'I think we don't get much profit from the systems development work, but it is important for getting hardware sales customers', or 'all of our income comes from systems services'.
321. Application areas
Which kind of applications is the company mainly engaged with? For example, 'banking', 'accounts and payroll', 'hotels'.

331. Hardware used by the customers
What kind of hardware configurations do your customers usually have? For example, 'a single AT compatible micro with 20-40 MB of hard disk', 'minicomputers with about 50-100 MB of disk space and about 10 terminals', 'batch-processing mainframes', and so on. Tell the type of computer (micro/min/mainframe), number of terminals or work stations, amount of disk capacity, and mode of operation (interactive/batch).

332. Development hardware
What kind of hardware is available to your software development staff? Specify the configuration in the same way as with the previous question.

341. Software tools
What kind of operating systems, programming languages, data base management systems, or other software tools do you use? For example, 'MS-DOS and dBase III with some COBOL programming'.

342. How much own development vs. packages
What percentage, roughly, of your software customers need something developed by your own staff, compared to those who only need text processing, spreadsheets, or the like? For example, 'about one third of our customers have mainly our own software products, and another third have some'.

343. How much programming vs. specifying
When you think about the systems developed by your own staff, what percentage of the development work, roughly, is programming, compared to specifying (using 4th Generation tools like dBase, Oracle, and so on)? For example, 'most of our work is done with dBase, and I would say that only about 10 per cent of it must be done with Cobol'.
344. How much tailoring
When you again think about the systems developed by your own staff, what percentage of your customers need individual tailoring, compared to those who can use your software package as such, without major modifications? For example, 'we are working on such a diversified sector, almost all our customers need tailor-made systems', or 'only about one customer in five needs some extra programming, others can use our highly parameterised Accounting Package as such'.

345. How much after-sales support
Now if you think about the software services as a whole, what percentage of that work deals with after-sales support (software maintenance, debugging, modifications), compared to what is done before and during the initial installations? For example, 'three of our ten software staffers are dealing with after-sales service only'.

351. Methods used in analysis and design
Does the company apply some formal or semi-formal methodologies in systems analysis and design, either commercially available (e.g. Yourdon) or self-made? Is it divided into specific phases, or is it iterative? For example, 'we specify the system in a prototyping mode at the customers site', or 'we have created our own Systems Description Forms, which are used in the analysis phase and approved by the customer before we start implementing the system'.

352. Documentation of the specifications
How comprehensive or detailed documents are usually produced about the system specifications before or during the implementation?

353. Methods used in programming
Does the company apply some specific programming methodologies, like the Jackson Structured Programming (JSP)?
400. SYSTEMS DEVELOPMENT STAFF

401. Number of staff
How many people are employed as systems analysts/designers, programmers, or the like?

402. Positions
Which kind of formal positions there are for the software staff? For example, 'Project Manager', 'Programmer'. How many people are employed at each of the ranks?

403. Education
What kind of formal education in the field of Computer Science do the software development staff have? For example, '3 of them have B.Sc. in Computer Science, 1 of them has M.Sc., 2 of them have programming courses only'.

404. Experience
How long working experience in this profession do the software development staff have? Use the classes <1, 1-2, 3-5, 6-10, >10 years. For example, '1 has less than 1 year, 4 have 1-2 years, 2 have 3-5 years, 1 has more than 10 years'.

405. Age distribution
What are the ages of the software development staff? Use the classes <20, 20-24, 25-29, 30-34, 35-39, 40-49, >49 years. For example, '1 is under 20 years, 2 are 20-24 years, 1 is 30-34 years'.

410. Work organisation
How is the work organised within the systems development unit? For example, do you have temporary project groups ('task forces'), do you have a named person in charge of each of the customers, are some people in charge of new development and some others in charge of after sales support, and so on.
CASE: A "NICE" PROJECT
The following questions apply to one of your projects which you would regard to as a fruitful one that you really enjoyed.

501. Customer
Give the name of the customer, if it is not confidential. Describe the customer company - for example, 'a used-car dealer in Lagos with about 20 employees', or 'a State Revenue Office in the North'.

502. When started
When did the project start? Give the year when the request for tenders was received, or the work with the project was started in some other way.

503. How long
How many months did the project take altogether, from the beginning to the commissioning? If it is still in progress, estimate.

504. Who initiated
How did you get this customer - through advertisement, some specific marketing efforts, through a request for tenders, or how?

511. Type of system
Describe the type of the system in question - for example, 'an interactive multiuser system for sales orders'.

512. Type of hardware
Describe the hardware configuration, as with question no. 331.

513. Software tools
Describe the software tools used in the project, as with question no. 341.

521. Project organisation
How was the project organised? That is, what kind of supervisory organs were formed and how was the development work organised within your company.
522. Role of end users
How were the would-be end users of the system involved in the analysis, design, and implementation phases?

523. Role of the customer's management
Was the customer company's top or middle management actively involved in the system analysis and design? What kind of relations there were between the management and your project staff?

524. Phased or iterative
Were the system specification and implementation tasks executed as consecutive phases, or iteratively (implementing some features concurrently with specifying the details of them)?

525. Methods
Did you use some specific systems analysis/design methodologies in this project? Cf. question no. 351.

526. How much documentation
How much of the system specifications were documented during the project? Did the customer organization formally accept the specifications?

527. End user training
How were the end users trained in using the system? Are there some kind of operating manuals or handouts for them?

528. Who maintains
Is the same project staff involved with updating and debugging of the system as well, or is there some other kind of arrangement concerning the maintenance of the system?

529. How much after sales support
How much work has been needed this far in debugging and upgrading or expanding the system?

530. The customer's EDP staff and awareness
Are there any Computer or Data Processing professionals employed by the customer company? What about the "computer literacy" of the other staff with the customer company?
551. Narration of main course of events
Give a brief "project history", describing the main events and phases during the project life-time.

552. What makes this a "nice" project
Why did you select this as a "nice" project? What were the features of this project that make it a "nice" one?

553. Reasons for success
Thinking about this project, which factors would you say contributed to its success?

591. Other remarks
Are there any other remarks - information or viewpoints - that you would like to add, to complete the portrait of this project?
CASE: A "DIFFICULT" PROJECT
The following questions apply to one of your projects which you would regard to as a troublesome one that you wouldn’t like to have again.

Customer
Give the name of the customer, if it is not confidential. Describe the customer company - for example, 'a used-car dealer in Lagos with about 20 employees', or 'a State Revenue Office in the North'.

When started
When did the project start? Give the year when the request for tenders was received, or the work with the project was started in some other way.

How long
How many months did the project take altogether, from the beginning to the commissioning? If it is still in progress, estimate.

Who initiated
How did you get this customer - through advertisement, some specific marketing efforts, through a request for tenders, or how?

Type of system
Describe the type of the system in question - for example, 'an interactive multiuser system for sales orders'.

Type of hardware
Describe the hardware configuration, as with question no. 331.

Software tools
Describe the software tools used in the project, as with question no. 341.

Project organisation
How was the project organised? That is, what kind of supervisory organs were formed and how was the development work organised within your company.
622. Role of end users
How were the would-be end users of the system involved in the analysis, design, and implementation phases?

623. Role of customer’s management
Was the customer company’s top or middle management actively involved in the system analysis and design? What kind of relations there were between the management and your project staff?

624. Phased or iterative
Were the system specification and implementation tasks executed as consecutive phases, or iteratively (implementing some features concurrently with specifying the details of them)?

625. Methods
Did you use some specific systems analysis/design methodologies in this project? Cf. question no. 351.

626. How much documentation
How much of the system specifications were documented during the project? Did the customer organization formally accept the specifications?

627. End user training
How were the end users trained in using the system? Are there some kind of operating manuals or handouts for them?

628. Who maintains
Is the same project staff involved with updating and debugging of the system as well, or is there some other kind of arrangement concerning the maintenance of the system?

629. How much after sales support
How much work has been needed this far in debugging and upgrading or expanding the system?

630. The customer’s EDP staff and awareness
Are there any Computer or Data Processing professionals employed by the customer company? What about the “computer literacy” of the other staff with the customer company?
651. Narration of main course of events
Give a brief "project history", describing the main events and phases during the project life-time.

652. What makes this a "difficult" project
Why did you select this as a "difficult" project? What were the features of this project that make it a "difficult" one?

653. Reasons for difficulties
Thinking about this project, which factors would you say contributed to the troubles?

691. Other remarks
Are there any other remarks - information or viewpoints - that you would like to add, to complete the portrait of this project?
Interview Report for Data Sciences Nigeria Ltd.

Data Sciences Nigeria Ltd
2, Ola-Ayinde Street
Off Airport Road, Ikeja
P.O.Box 6352
Lagos

Interviewed on 9 NOV 1989

COMPANY PROFILE

Established
1974

Ownership
Indigenous

Number of personnel
200

Annual turnover

Percentage of turnover from software development
minor

Services given
Hardware sales
Hardware repairs/maintenance
Software packages, like spreadsheets
Systems analysis and design
Bureau services (processing)
In-house data processing department
Consultation

Representations
Digital Equipment Co., Kodak, Racal-Milgo

Strong points
Representative of a well-known computer manufacturer.
First indigenous firm to go to micros.
Maintenance culture.

Main problems
Government policy on foreign exchange causes delays.

Can the company be referred to by name
Yes, can be referred to by name

PERSONS INTERVIEWED

Names and positions of the respondents
Mr. Mike O. Oparemi, Director - Software Services
Mr. Rotimi W. Ojo, Systems Programmer
(Bureau & Systems Development Division)

SYSTEMS DEVELOPMENT OPERATIONS

Organisational position
Systems Development Department is part of Software Division
(one of the four main divisions).

Number of customers
   About 10 for software development

Number of new customers
   3

Types of customers
   All kinds of companies, mainly big ones. Micros are sold both to big and small companies.

How the customers are found
   Through marketing, through competition. They come by themselves also because the company is so well-known.

Is it remunerative
   Profitable, but tasking. Not as profitable as hardware maintenance.

Application areas
   No special.

Hardware used by the customers
   Mainframes, minis, and micros.

Development hardware
   VAX, PDP-11 with RSTS/E and RSX-11M+, IBM compatible micros.

Software tools
   On DEC computers: Programming languages BASIC+2 and FORTRAN-77, with ordinary files.
   On micros: Dataflex and dBase III+.

How much own development vs. packages
   100 per cent own development.

How much programming vs. specifying
   On DEC computers: 100 per cent programming.
   On micros: More than 50 per cent programming.

How much tailoring
   100 per cent tailored for each customer.

How much after-sales support
   Normal updating. We make "preventive maintenance" visits to customers monthly.

Methods used in analysis and design
   A standard methodology developed in-house.

Documentation of the specifications
   1. Functional systems specifications.
   2. Program specifications.

Methods used in programming
   Structured programming methods, developed in-house.
SYSTEMS DEVELOPMENT STAFF

Number of staff
12

Positions
1 Systems development manager
3 Systems analysts or Senior systems analysts
5 Programmers or Senior programmers
3 Trainee programmers

Education
All have B.Sc., some M.Sc.

Experience
7 less than five years, 5 more than five years.

Age distribution
All are up to 35 years old.

Work organisation
Permanent projects with project managers.

CASE: A "NICE" PROJECT

CASE: A "DIFFICULT" PROJECT

Reasons for difficulties
It's difficult if you are not familiar with the field.

Creating awareness is important - it takes time but then you can get through. Our contact persons are usually already aware of computers, but sometimes some people are "jealous" of their information, and end users have fears about job security and about becoming redundant.

End users participate in systems analysis and approve the functional specifications before the implementation starts. They may come back to it afterwards, wanting to change something, but that's business.

Our customers always have some computer staff of their own, or new customers recruit staff. So our contact persons are always computer people.

Budget requirements lead to stepwise system implementation, everything cannot be implemented at once even if that would be reasonable. In the beginning formalities can hinder the projects, but when people become aware they are eager to make things proceed. "Politics", or changes in management positions may cause difficulties for projects, while the new management wants to check what it's about before they let things go on.

Main obstacles to systems development: Telecommunications, electricity, transportation. They cause time delays.
Interview Report for Debris (Nigeria) Ltd.

Debris (Nigeria) Ltd.
110, Obafemi Awolowo Way
P.M.B 21464
Ikeja
Lagos

Interviewed on 10 OCT 1989

COMPANY PROFILE

Established
1979

Ownership
Indigenous

Number of personnel
About 45

Percentage of turnover from software development
Less than 20 per cent (about 60 per cent from hardware sales).

Services given
Hardware sales
Hardware repairs/maintenance
Software packages, like spreadsheets
Systems analysis and design
Bureau services (processing)
In-house data processing department
Consultation
Feasibility studies
Project management
Training and education

Representations
Sole: Epson, Psion, Concurrent Computers (mini), AEES (UPS).
Shared: Compaq, Hyundai.

Strong points
1. Personnel - trained, specialized -> excellent services.
2. Training, both theoretical and practical - "the best computer institute".

Main problems
1. Importation - high demand but difficult to get foreign exchange.
2. Telecommunications.

Can the company be referred to by name
Yes, can be referred to by name

PERSONS INTERVIEWED

Names and positions of the respondents
Mrs. Bisi Odeyemi, Director.
Mr. I.S. Adeyemi, Marketing Director.

Dr. I.A. Odeyemi, Managing Director, was called on briefly
after the interview.

SYSTEMS DEVELOPMENT OPERATIONS

Organisational position
Software Group - Head reports to the Managing Director.

Number of customers
2 long-term projects currently, besides yearly projects like examinations processing.

Number of new customers

Types of customers
Government establishment.

How the customers are found
Government: By invitation (bid for tenders). About one out of six by selective tender.
Private: Customers are looked for. The company is well-known, which brings customers.

Is it remunerative
Less so - it is a thing of the future. Must be priced competitively.

Application areas
Payroll and examinations.

Hardware used by the customers
1. Minicomputer with 8-10 terminals, 300 MB disk.
2. Customers come to use our micros.

Only interactive systems are developed nowadays.

Development hardware
1. Minicomputer systems are developed by the customer.
2. Eight microcomputers (ATs: up to 40 MB, XTs: 10-20 MB).

Software tools
1. Minis: COBOL.

How much own development vs. packages
Software sales is 100 per cent own development. Packages and compilers are sold along with hardware sales.

How much programming vs. specifying
See question 341.

How much tailoring
Everything tailor-made, owned by the customers.

How much after-sales support
Contracts are supposed to be for fixed time, but customers tend to demand free after-sales support.

Methods used in analysis and design
Systems investigation to identify shortcomings.
Then interaction with the customer, modifications, and development of the new system.

Documentation of the specifications
Investigation and design document prior to programming.
Approved by the customer.

Methods used in programming
Structured programming

Documentation of the system
1. Programmer manual
2. User manual and operator manual

SYSTEMS DEVELOPMENT STAFF

Number of staff
About 5 in Lagos, plus the management.

Positions
1. Part-time senior systems analyst on management level
2. Chief programmer
5. Programmers

Education
All graduates in Computer Science, plus in-house training.

Experience
1. with fifteen years, 1 with 10 years, 5 with three years.

Age distribution
Programmers 23-30, management over 40 yrs.

Work organisation
Programmers are attached to one project each, senior staff participates in all projects.

CASE: A "NICE" PROJECT

What makes this a "nice" project
Basically: in-house projects are "nice" because they are within your control - own facilities, own personnel for processing and checking, etc. Also, when you are dealing with knowledgeable and interested customers (i.e. the contact person by the customer is such).

CASE: A "DIFFICULT" PROJECT

Reasons for difficulties
Basically, projects are "difficult" when you are dependent on the customer to collect input data or provide machine time, to verify your reports, design the forms.

Main obstacles are the poor infrastructural facilities: telecommunication, poor electricity supply resulting in generator use resulting in break-ups (inverter UPSs are absolutely necessary). With government organizations bureaucratic procedures may cause some delay.
Good will is important. Education of the contact person can help (from general topics to details). Initial resistance of the end users can be overcome by interaction with and education of them.

Implementation-time changes to system specifications are dealt with the contact person, absorbed if minor, returned otherwise.
Interview Report for Senil Computers (Nigeria) Ltd.

Senil Computers (Nigeria) Ltd.
44 Opebi Road
P.O.Box 2886
Ikeja
Lagos

Interviewed on 9 NOV 1989

COMPANY PROFILE

Established 1983

Ownership Indigenous

Number of personnel 45

Annual turnover 5.0 million naira

Percentage of turnover from software development Less than 2 per cent

Services given
Hardware sales
Hardware repairs/maintenance
Software packages, like spreadsheets
Systems analysis and design
Bureau services (processing)
In-house data processing department
Consultation
Feasibility studies
Project management
Training and education

Representations
Delta Gold, Amstrad, Sanyo, IBM.

Strong points
Highly experienced staff and prompt response to customers' requests.

Main problems
1. Difficulties in obtaining hard currency.
2. Lack of computer awareness among potential customers.

Can the company be referred to by name Yes, can be referred to by name

PERSONS INTERVIEWED

Names and positions of the respondents
Sunday O. Fajinmi, Managing Director

SYSTEMS DEVELOPMENT OPERATIONS

Organisational position
Both in-house and Joint Implementation Committee work.
Number of customers
10

Number of new customers
4

Types of customers
Government, educational institutions, commercial enterprises.

How the customers are found
By prospecting and referenced from our satisfied customers.

Is it remunerative
We don't get much profit from the systems development work, but it is important for getting hardware sales customers. Sometimes it is given away to sell hardware.

Application areas
Accounts and payroll. Hotels.

Hardware used by the customers
A single micro with 20-40 MB of hard disk (IBM PC, Amstrad, Delta Gold, Zomer), or a minicomputer with about 50-100 MB of disk space and about 10 terminals.

Development hardware
2 x Delta Gold (640 KB memory, 5.25" diskette, 40 MB hard disk).
2 x Sanyo. Amstrad. IBM. Zomer 386 25 MHz (compatible).

Software tools
CP/M, MS-DOS, OS/2, and Unix.
BASIC, C, COBOL, RPG II, Pascal.

How much own development vs. packages
20:80

How much programming vs. specifying
20:80

How much tailoring
100 per cent

How much after-sales support
30 per cent

Methods used in analysis and design
Semi-formal

Documentation of the specifications
Very comprehensive documentation.

Methods used in programming

SYSTEMS DEVELOPMENT STAFF

Number of staff
8
Positions
- 2 Systems Analysts/Designers
- 4 Programmers
- 2 Other

Education
- B.Sc. and HND minimum

Experience
- 1 with less than two years
- 7 with three to five years

Age distribution
- All are 25-29 yrs

Work organisation
- Temporary project groups. In a small company the chief executive knows about everything - that makes things fast, and there is no waste of resources - we can't afford to lose the project. The trade-off is the difficulty to raise funds.

CASE: A "NICE" PROJECT

CASE: A "DIFFICULT" PROJECT

Reasons for difficulties
- The obstacles are human, software, hardware, and environmental.
- The main obstacles are 1. human problems, 2. availability of funds, 3. getting people to use it properly.

We are all human beings - in the beginning people just say 'yes yes' without thinking about things enough, then at a critical point they become disappointed. People resent changes, they must be taken with. Sometimes they start holding information, or giving biased information to protect themselves.

It is important that who is in charge of affairs - the Managing Director for example - is initiated into the project. The team leader must be convinced and have authority to move people along. There is a misconception that computers lead to job reduction, but actually what happens is that boring tasks are removed. Sometimes people come and say that a friend got a computer, I want it also, here's the money. In that case you can't go and see what would be needed really.

Mass awareness can be created through improved education - that's government job, but the government has fears about computers. Within a given enterprise, computer apprehension courses can be arranged for management (middle and low also) and key personnel.

Availability of funds: Customers are restricted to the budget, decision-making takes a long time - when an approval for amendment is obtained, it may already be used. The customers should ensure sufficient funds before even getting a consultant. The head of the project should be a senior person, that makes sure that the funds are raised. Time is not so much needed of him, but commitment. We usually have a working-group committee which reports to the implementation committee.

Getting people to use it properly: Odd things happen - people can be too lazy to use a manual or ask for assistance.

Machine errors are due to the environment, or more properly due to lack of adequate environmental protection. Antistatic carpeting, cooling, and stabilized power supplies are needed.

In the beginning running costs are budgeted for 12 months, but that can change afterwards. Problems with foreign exchange and bureaucracy lead to excessive stocking of spare parts. Inflation leads to delays in projects while the allocated funds become insufficient.