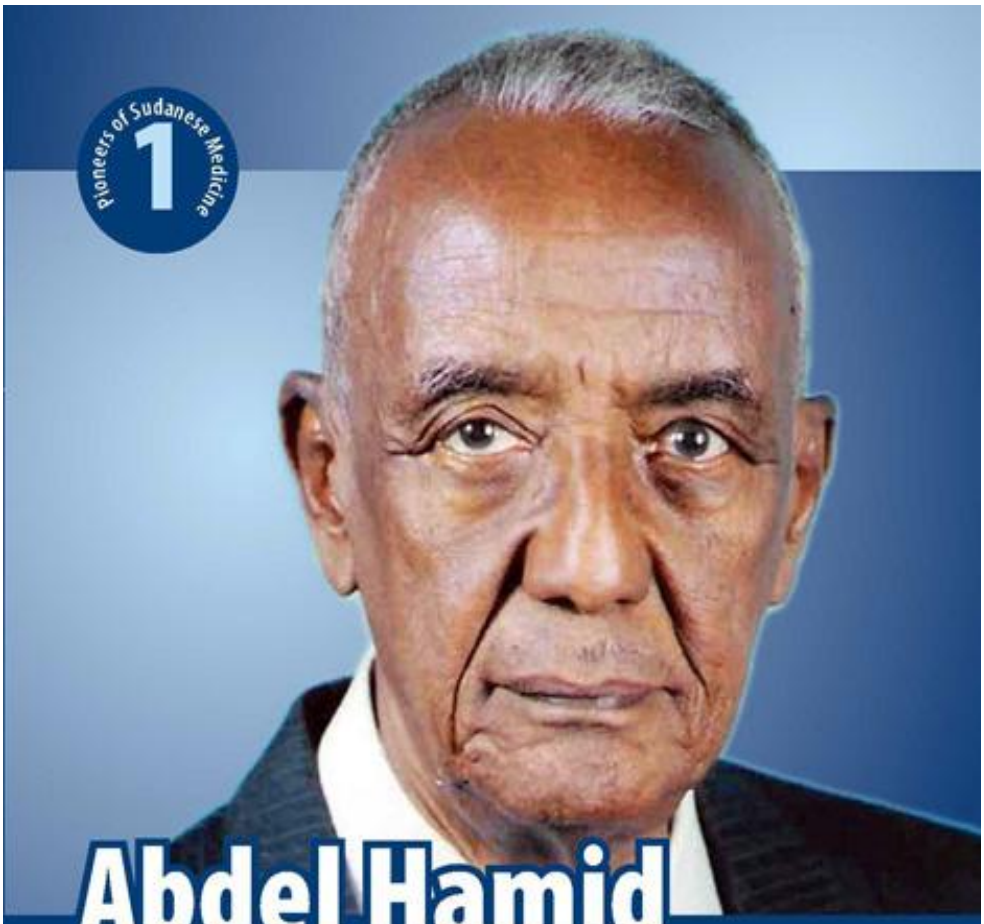

Abdel Hamid Ibrahim Suleiman

His life and work

Milestones in health policies, administration, regulation, environmental health, laboratory services, research, teaching & training

By Dr Ahmad Al Safi

Sudan Medical Heritage Foundation Publications

Abdel Hamid Ibrahim Suleiman

His life and work

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By
Dr Ahmad Al Safi

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Through his help, I was also able to collect several manuscripts, which I categorized in this monograph as 'grey literature'. The reports and manuscripts that I collected from Prof. Ibrahim and others started the Sudan Medical Heritage Foundation (SMHF) Archives. The collection I hope will grow to be as rich as the Sudan Archives in the Durham University Library in the United Kingdom.

This monograph drew heavily from Prof. Ibrahim's 'grey literature,' which he produced and carefully kept. The works I consulted were acknowledged in the appropriate places in the text and listed under Written Contributions at the end of this monograph.

This monograph is part of *The Sudan Health Trilogy,* which I am launching and which will be described fully later in this work. The *Trilogy* is a story of praise and indebtedness to the notables as well as the regular members in this profession. I had the good luck of being taught by, worked with, or contemporaneous to many of the characters I am capturing in these works. This close contact, I hope, makes me a better witness and the *Trilogy* I am compiling more interesting and informative. This work could not have materialized without their contributions, which I gratefully acknowledge.

My indebtedness goes further to those who have influenced my life and shaped my humble beginnings. In the mid 1960s, the late Prof.

Tigani El Mahi, for example, was on the expert panel of the Sudan Research Unit, Faculty of Arts, University of Khartoum. When the *Mohamed Ahmed Al Salamabi Prize* competition was first announced by that Unit, it included traditional medicine in the list of subjects to be judged. I participated in that contest in two consecutive years (1966, 1967). I won the second prize in the first round and first prize in the second. The winning work was published in 1970.[1]That was the start of a memorable relationship with the late Prof. Tigani El Mahi, and a start of my second specialization in studies of Sudanese health culture.

Studies for that competition were more than a summer vacation involvement. It was the starting point of organized research into traditional medicine in the Sudan. In 1982, I founded Traditional Medicine Research Institute (TMRI) in the National Council for Research (NCR).[2] Later, WHO, both at its Headquarters and Regional office in Alexandria,[3] recognized the ability and readiness of TMRI to contribute to its global programme of traditional medicine, and the institute was designated a WHO Collaborating Centre for Traditional Medicine in 1984. Both institutions are still functioning with a full quota of researchers, fieldworkers, support staff, and several research programmes.

I am also grateful to Prof. Abdel Hamid Ibrahim who went carefully and patiently over the several drafts of this work, Prof. Suad Mohamed Sulaiman and Ms Anna Hinchon for checking the language of this monograph. The corrections and suggestions they made greatly improved the English of this work.

Abbreviations & Acronyms

CBPH	Central Board of Public Health
CMS	Central Medical Stores
CMSD	Central Medical Supplies Division
CSB	Central Sanitary Board
CTPB	Central Town Planning Board
DGLMR	Directorate General of Laboratories and Medical Research
DRA	Drug Regulatory Authority
EMRO	WHO East Mediterranean Regional Office
FAO	Food and Agricultural Organization
FBPP	Federal Board of Pharmacy and Poisons
FIC	Food Industries Corporation
FMOH	Federal Ministry of Health
FOM, UK	Faculty of Medicine, University of Khartoum
FOP, UK	Faculty of Pharmacy, University of Khartoum
GIS	Gezira Irrigation Scheme
GM	Graphic Museum in Khartoum
GMC	Gordon Memorial College
IAEA	International Atomic Energy Agency
ICRI	Industrial Consultancy and Research Institute
IDPC	Industrial Development Public Corporation
KCH	Khartoum Civil Hospital
KTH	Khartoum Teaching Hospital
KTI	Khartoum Technical Institute
MOH	Ministry of Health
MRC	Medical Research Council
NCL	National Chemical Laboratories
NCR	National Council for Research
NDP	National Drug Policy
NDQCL	National Drug Quality Control Laboratory
NHL	National Health Laboratories
PHC	Primary Health Care

PPA	Pharmacy and Poisons Act
RHL	Regional Health Laboratories
SAD	Sudan Archives, University of Durham Library
SBCM	Supreme Board for Control of Medicines
SEDP	Sudan Essential Drugs Programme
SGPAO	Sudan Government Purchasing Agent Office
SHM	Sudan Health Museum
SMRL	Stack Medical Research Laboratory
SMS	Sudan Medical Service
SNDP	Sudan National Drug Policy
SNRO	Sudan National Records Office
TMRI	Traditional Medicine Research Institute
UCK	University College of Khartoum
UNDP	United Nations Development Programme
WCL	Wellcome Chemical Laboratories
WHO	World Health Organization
WTRLK	Wellcome Tropical Research Laboratories in Khartoum

Preface

This series of monographs aims to provide concise documentation of the lives and work of the men and women who have shaped the health care services in the Sudan. This volume profiles the life and work of Prof. Abdel Hamid Ibrahim Suleiman, the chemist and researcher.

The idea for this series originated after I finished collecting the scattered works of the late Prof. Tigani El-Mahi (1911-1970). In two volumes, I edited and published his Arabic writings in 1981[4]and the English in 1984.[5] The warm reception those two volumes had encouraged me to continue similar work on more pioneers albeit in a different way.

Work started during my fruitful expatriate period in Saudi Arabia (1989-2004), and took fresh momentum after I came back to Sudan, when I realized that this type of work could have more far-reaching value than mere documentation. I realized that allusion to several ancestors of this profession is anecdotal and reflected misinformation and superficial impressions at best. Given this dismal situation, health care providers, researchers and students are faced with a dearth of reliable sources on the bookshelves. Resource books are alarmingly few and historical writings notably deficient. Sources rest mainly in grey literature, which by definition is not readily available.

I conducted a limited pilot study on a sample of students and lecturers in the Faculty of Medicine, University of Khartoum (FOM, UK). The results were alarming. I discovered that a significant number of those interviewed knew little about the founding members of this profession. They knew even less about the nature and extent of the contribution and impact of the lives and work of the few experts they know. For example, none of those interviewed knew Prof. Anis Mohamed Ali Al Shami; very few knew Al Baghdadi, and the knowledge of

those who knew Prof. Haseeb was hazy. I was left with no doubt in my mind that something should be done.

I believe that we are not doing enough in the field of documentation. Although we say that health care providers, researchers, and students should be informed about the history of this profession, sources of information are few. History is not written or taught systematically in all health institutions. The few medical schools that started courses in this field still lack authentic sources.

Personal contributions and outstanding achievements of the pioneers of Sudanese medicine were not documented or highlighted. An approach that is more positive should be taken to correct this deficiency. There are lessons to be learnt by posterity from how their predecessors lived, and from the legacy they left. In a fresh look at the lives of the pioneers, there will be an opportunity, I presume, for the merits of these great men and women to be re-enacted and brought back to life in one way or another.

Medical history should be documented. This should be a priority, not only because it is something worthy of our immediate attention; but also because it is the one part of our medical culture, which has been totally, neglected.

Now, after so many generations, so much experience and big sacrifices, it is high time for this profession to substantiate what it has gained thus far and put it on record, for surely one good document is worth a billion spoken words.

I took this matter seriously by launching a major research project entitled '*The Sudan Health Trilogy*' for which I solicited the help of teams of co-workers, co-authors, fieldworkers, and editors. The *Trilogy* includes:

(1) *Biographical Dictionary of Health Care Professionals in the Sudan* (1903-1978). This dictionary will be a 'Who's Who' of Sudanese health care professionals (medical doctors, pharmacists, dentists and researchers), and expatriate staff, namely Britons who have served in health care institutions or contributed to health and medicine in service and research in the Sudan in the first 75 years of the 20th century. Each biographical

entry will describe an individual as faithfully and accurately as available data permits. This will require extensive information from each person or families of deceased persons to be collected and edited before each profile is accurate and inclusive.

(2) *Bibliography of Biomedical Literature in the Sudan* (1900-2000). This is a compilation of medical literature produced by Sudanese and expatriate staff working in Sudan during the 20th century. It will include published material and 'grey literature' i.e., technical reports, white papers, drafts, departmental manuals, conference papers and proceedings, relevant articles in newspapers, raw data, memoranda, project summaries, trip reports, working and discussion papers, books, manuals, unofficial government documents, studies, market surveys, pamphlets, brochures and newsletters.

(3) *Pioneers of Sudanese Medicine series*. This series will profile the individuals whose achievements were seminal to the evolution of the field and whose work has contributed significantly to the establishment and development of the medical profession. Some of these men and women have ventured into the medical field before others, into new specialties, researched the field, or made new discoveries or techniques. They collectively set respectable traditions and established a firm foundation for health care delivery, research, teaching and training. They have taught and trained several generations, and more importantly, mentored and provided guidance and encouragement to the young and aspiring generations. They were, without exception, meticulous clinicians, imaginative and illustrious teachers, and hard-working researchers. In their exemplary lives, they maintained unimpeachable professional integrity, upheld strict medical ethics, and set models of admirable behaviour.

In addition to performing its chief function, that of recording faithfully the lives and work of the main actors in the medical scene, the *Trilogy* also provides authentic information. Often we find ourselves uncertain as to whether or not a particular act or technique has been widely accepted or related to a certain person. How can we be sure? This *Trilo-*

gy should help us here. By consulting the appropriate part of this work, we can obtain necessary information on the milestones of different disciplines of Sudanese health care delivery. The danger in thinking that history starts with us, that nothing has been said or done before about the issue in question, or lay hands on what is not ours are obvious caveats. This is the *raison d'être* for launching the project of this *Trilogy*.

The generation gap that has been enforced over the last two decades was wide and unfortunate and should be bridged. The apprenticeship tradition, the hallmark of medical teaching and training, has suffered badly due to a multitude of social, economic, and political factors. Hundreds of resourceful medical scholars were forced into exile or unnecessarily alienated. The time-honoured Sudanese medical system is currently on the brink of collapse. It is at present dominated by the un-knowledgeable and inexperienced. I thought this work would help to bridge this gap, salvage lost information, and obviate eminent dangers.

Health services in the Sudan faced enormous challenges aggravated by poverty, food scarcity, poor infrastructure, significant geographic and socio-economic disparities in access to and utilization of health services over the last hundred years. No effort was spared by the different generations to cover basic needs, control infectious and non-communicable diseases, manage the sick, and deliver acceptable health services. There was constant and persistent endeavour to strengthen basic health services not only to address the main causes of morbidity and mortality but also to maintain a healthy productive workforce. The story of this profession with its difficulties, achievements and failures needs to be recollected and consolidated.

This current work is one chapter in the story. It is a reminder of the excellent work that has been done so far to build the health system of Sudan. Our past is long gone, but our history continues, it cannot be ignored; it is alive, it is continuous, it is active, and needs to be recorded and preserved.

Conservation and development of the medical system and heritage needs to be written down in history as well as stories of achievements. We need to build a sound health care system, maintain modern

schools, research laboratories, libraries, and museums. These institutions, which were once intact and functioning, are endangered or actually mal-functioning.

We need to record the history of this profession more thoroughly before it is too late. We might wake up soon to find out that we have no recollection of our past. Our medical archives (Stack Library & Ministry of Health (MOH) Library) are in danger. We lost the museums of the Wellcome Tropical Research Laboratories in Khartoum (WTRLK). The Medical Research Council (MRC) was liquidated when the National Council for Research (NCR) was downgraded to a 'Centre' over the last two decades. This devaluation had been unfortunate. It was the worst blow to scientific medical research in Sudan.

The qualities of honesty and humility that the elders of this profession cherished should be stressed and maintained. In 1966, Prof. Mansour Ali Haseeb, the first Sudanese Dean of FOM, UK (1963-1969) announced a competition for designing the current emblem of the faculty. Artists from the College of Arts, medical students, and lecturers responded. I won that competition and I was awarded £50. The evaluation panel included Drs. Abdel Halim Mohamed, Prof. Mansour Ali Haseeb, Prof. Anis Mohamed Ali El Shami, and Prof. H.V. Morgan among few others. It was Prof. Morgan who asked me to include a motto for the Faculty, and he suggested "Honesty and Humility". Whether that motto was already known or agreed upon, I have no idea. What I know for sure is that it was officially recognized in 1966 when it was inscribed on the logo.

Honesty is a self-evident word: a state of being trustworthy, not likely to lie or cheat, and not hiding facts. The second word is an important requisite demanded of aspiring young scholars. Never at any time imagine that you know everything. No matter how highly appreciated by others, have the courage to say to yourself: "I am ignorant". Do not let pride possess you.[6] Humility is having or expressing a lower opinion than is probably deserved of one's own ability, knowledge, skill, successes, etc. Humility is a visible demonstration of concern and compassion. A culture says 'I don't have all the answers and I want your

contribution'. Humility is admission of humanity. Better to admit a shortcoming, or a limitation, than to lead blindly into the unknown.

It is hoped that all graduates of that school and others would agree with the teachings of this 'motto'. However, too much humility erodes self-esteem, and a balanced conscious 'ego' and self-confidence are essential to leadership and control of one's own practice. Humility, I presume, has been taken by Sudanese physicians, consciously or unconsciously, too far to the extent of preventing documentation and publication of their work and achievements. When Prof. Haseeb used to describe the new comers to that medical school - the only one in the country then - as "the cream of the cream," he was not giving a recipe for unfounded arrogance; but was trying to strike that delicate balance between greatness and modesty.

This series of monographs, however, is written specifically to raise the awareness of readers in the academic community, and help them to be better workers. They would be, I am sure, if they were better educated about the contribution of their predecessors.

History of medicine is the history of men and women's lives. It is but the biographies of great men and women. No great man or woman lives in vain. There is probably no history, only biographies. Here is a humble attempt towards documenting the lives and work of some notable scientists.

The books of note that were written by Sudanese on the history of Sudanese medicine and medical research are those of Prof. Mansour Ali Haseeb and Dr Ahmed Bayoumi. Apart from these two works, little has been written on the subject and practically none on the lives and work of the pioneers.

Mansour Ali Haseeb dedicated his book *A Monograph on Biomedical Research in the Sudan* (1970) to the NCR for the benefit of young research workers. The monograph has been a 1500-entry bibliography of biomedical literature with a concise and highly informative introduction.[7]

Ahmed Bayoumi's *The History of Sudan Health Services* was a revised version of his doctoral thesis (University of Khartoum, 1974).[8] The primary aim of this book was to trace health services in the Sudan

through their historical development emphasizing the social, economic and administrative factors. The book no doubt filled a gap in the history of the field of health services and research in the Sudan and proved to be invaluable to health care providers, researchers and students. The book was reprinted in 2002 in two volumes: volume one: *Health Care System* and volume two: *Disease Epidemiology*.

More contributions documenting progress in medical services in the Sudan are found in the books, memoirs, reports, journal articles, and narratives of colonial doctors and administrators. These works, however, are not always available or easily accessible.

Dr Herbert Squire joined the medical services in the Sudan in 1908 four years after the inauguration of the Civil Medical Service in 1904. Ever since, he had been closely associated with this service for almost forty-three years. His book *Sudan Medical Service: an experiment in social medicine* (1958) was accurate first hand information and an excellent description of health care in the first half of the twentieth century.[9]

Colonial medical doctors wrote several invaluable books. These include Stevens, E.S., *The Sudan Year* (1912), Leonard Bousfield, *Sudan Doctor* (1954), Alexander Cruickshank, *The Kindling Fire, Medical Adventure in the Southern Sudan* (1962), and William Byam, *The Road to Harley Street* (1963). On the other hand, health and diseases in the country in the 19th century were well documented in travellers' accounts. Many European and Arab travellers visited the Sudan on their way to discover the sources of the Nile and the uncharted Africa.

Narratives describing personal medical experiences were popular among the Britons who worked in the Sudan during colonial period. Dr Peter Abbot joined Sudan Medical Service (SMS) as a new graduate from Cambridge University, United Kingdom, to work in El-Fashir, Rumbaik, Wau, and Li Rangu. During his service years, he acquired the MRCP, and returned to work in Medani. His short narrative or 'tale', which was solicited and edited by Donald Hawley in *Sudan Canterbury Tales*[10] was both informative and interesting to read. Dr Abbot described vividly the hospital environment of the early 1940s,

and reported on the surgical and anaesthetic set up available, the medications at hand at the time and the newly discovered and introduced drugs like '606,'[11] Dapsone, etc. He also noted the ethnic differences and variations in affliction and the high level of tolerance to pain and suffering among different tribes. The epidemic and endemic diseases of Western and Southern Sudan were recorded.

Two excellent books appeared recently, Heather Bell: *Frontiers of Medicine in the Anglo-Egyptian Sudan* (1999) and D'Arcy: *Laboratory on the Nile: A History of the Wellcome Tropical Research Laboratories* (1999).

Heather Bell's book '*Frontiers of Medicine in the Anglo-Egyptian Sudan', 1899-1940*, is an insightful and informative book. It was a revised and extended version of her doctoral thesis.[12] The author sought to describe and define the 'colonial' and the 'medical' in Sudan between 1899 and 1940. She argued that colonial medicine was centrally concerned with boundaries and frontiers of all kinds, physical and psychological, natural and imposed, real and imagined. Colonial officials, including doctors, worked at physical frontiers, between provinces, nations, peoples, and zones of infection and non-infection. The book is full of useful information dug out from primary sources in several repositories. She and other writers made maximum use of the documents and manuscripts that reside unstudied in Sudan National Records Office (SNRO), Sudan Archives, University of Durham Library (SAD), Rockefeller Archive Center, and the Wellcome Institute for the History of Medicine Library, Royal Commonwealth Society Library, Library of the Congress, USA, and possibly in several other libraries throughout the world. Bell did a good job in exploring information in some of these repositories. The book also included a useful bibliography.

Based on the Wellcome Research Laboratories Reports,[13] Prof. Patrick Francis D'Arcy (OBE) wrote *Laboratory on the Nile: A History of the Wellcome Tropical Research Laboratories*.[14] The book, which he opened with *Surat Al-Fatihah* (The Opening) of the Noble Quran described the inception of WTRLK, their progression to world-renowned centres of excellence of research into tropical diseases, and their demise.

D'Arcy's book, as its name implied, gave a full account of the legendary floating laboratory. The Sudan Government built this vessel in the Khartoum shipyards and supplied a towing launch named *Culex*, Henry Wellcome fitted and equipped the barge at his expense, and WTRLK and the London School of Tropical Medicine jointly staffed its laboratory and planned the medical research. The laboratory was a two-decked barge that was completely furnished, fitted, and equipped for the full range of tropical research. Living accommodations were on the upper deck and the laboratory was below. *Culex* was required to sail the Nile diagnosing cases, collecting specimens, making observations on the diseases of humans and animals, on disease vectors, and gathering information on the lives, customs and traditional practices of the peoples along the Nile. The boat left Khartoum on its maiden journey on April 15, 1907, bound for Taufikia in the *Sudd* area of the White Nile, under the command of Dr Charles Morley Wenyon, protozoologist to the London School of Tropical Medicine.[15] Wenyon's return journey commenced on February 17, 1908 and after a few days stay in Khartoum, he left for home, reaching London on March 22, 1908 after an absence of one year and twenty-two days.[16]

Culex was not the only floating medical vessel, although it was the first. After the First World War, civilian medical services started extending southwards from Khartoum to reach Melakal. Mr. G.R. Footner, a surgeon with an interest in administration,[17] was in charge of this area and, owing to the fact that one of the easiest ways of getting about the province was by steamer, he was provided with a hospital ship, which was named *Lady Baker*.[18] The floating hospital had a dispensary and examination rooms on its lower deck and on the upper deck an operating theatre, beds for eight patients and accommodation for the Medical Inspector. Overflow accommodation could be provided on a barge towed alongside. *Lady Baker* continued in service for over twelve years. It was replaced by another *Lady Baker* of a more modern and spacious style, a combination of steamer and barge. This remained in commission until the late 1950s.[19]

The list of mobile vessels would not be complete without a passing note on the Sudan Railways Laboratory Coach that had been on the

move throughout Sudan's railway network. Its Arabic sign, " المعمل الكيماوي", indicated possible use by the Stack Medical Research Laboratories (SMRL) staff. The Abu Naama Yacht (الرفلس أبو نعامة) is yet another vessel that had been used by the Northern Province Medical Officer of Health in his inspection tours along the Nile.

Modern organized medical service in the Sudan started with the inauguration of the Anglo-Egyptian Condominium in 1899. A medical department was founded in 1904, and Dr Jack B. Christopherson was appointed the first civilian British director.[20] However, Dr G.D. Hunter, principal medical officer of the Egyptian Army, was the first officially named appointed director of this department.[21] The Central Sanitary Board (CSB) was established on 29 October 1905 to be responsible for all matters pertaining to the general medical and sanitary policy and all aspects of public health. The SMS replaced the medical department in 1924, and Dr O.F.H. Atkey was appointed its first director. In 1949, the Ministry of Health (MOH) emerged to replace the SMS, and Dr Ali Bedri, one of the first seven graduates of Kitchener School of Medicine (KSM) was appointed the first Minister of Health in the same year. The Central Board of Public Health (CBPH) replaced CSB in 1939.

On November 30, 1898, Lord Kitchener, Governor General of the Anglo-Egyptian Sudan (1898-1899) made an appeal to raise funds to establish the Gordon Memorial College (GMC). The appeal was successful and money was raised. GMC was founded in 1900 and started work. James (later Sir) Currie was appointed its first Principal and director of education in the Sudan.

Four days before the public announcement of Kitchener's appeal, Henry Solomon Wellcome (1853-1936), an American and naturalized British industrial philanthropist, pharmacist, chemist and bacteriologist, having advanced knowledge of this project, sent a cheque for 100 guineas and an offer to contribute a complete medical equipment and stock for a dispensary in the College when it was complete. Later, Wellcome travelled to the Sudan with the first European civilians to visit the country in the winter of 1900/1901. In the Sudan, Wingate, Governor-General of Sudan and James Currie hosted him. He was briefed about the GMC project, which he already knew. Currie whis-

pered to Wellcome that there were still unoccupied rooms in the new buildings, which, were it not for lack of funds, could be utilized for auxiliary institutions including a small analytical laboratory. This piece of information was hesitantly passed to Wellcome "more in a spirit of expectation than a practical proposal'.[22]

During that visit, the Government of Sudan provided Wellcome with a boat, the *Dahabiya*, which enabled him to cruise on the Upper Nile and study the people and land. The impassioned account, which he wrote was later recalled in his statement before the Committee on Foreign Affairs of the House of Representatives of the United States in 1928 in support of founding the Gorgas Memorial Laboratory in Panama.[23]The picture he drew for the Sudan of the time was gloomy. "Famine and pestilence were abroad everywhere … not only human life, but animal and plant life and all sources of food supply were infected by disease of some kind. Nearly everything was wrecked and in a state of chaos and demoralization."

That inspection tour left a deep impression on Wellcome and made him think seriously of devising a plan to establish research laboratories in GMC in Khartoum. The friendly information passed to him by Currie bore fruit. Most probably, he made his wish clear, because Currie asked him to put his intentions in a formal request.

Wellcome wrote a request letter addressed to the Governor-General of the Anglo Egyptian Sudan Major General Sir F. Reginald Wingate (1899-1916) on September 28, 1901 asking for the acceptance by GMC, Khartoum of complete equipment for Chemical and Bacteriological Laboratories for Analytical and Research work. The laboratories, he said, would be designed:

- To promote technical education.
- To undertake the testing and assaying of agricultural, mineral and other substances of practical interest in the industrial development of the Sudan.
- To carry out such tests in connection with waters, foodstuffs and sanitary matters as may be found desirable.

- To aid criminal investigation in poisoning cases (which are so frequent in the Sudan) by the detection and experimental determination of toxic agents, particularly those obscure potent substances employed by the natives.
- To study bacteriologically and physiologically tropical disorders, especially the infective disease of both man and beast peculiar to the Sudan and to render assistance to the officers of health and to the clinics of the Civil and Military Hospitals.

Wellcome's offer was considered and gratefully accepted at the meeting of the executive committee of the GMC held in October 1901. The above-mentioned aims were later put forward as objectives for the Research Laboratories, and appeared in the front page of the Laboratories' First Report of activities in 1904.

Equipment for the laboratories, museum and library was delivered as promised in 1902 and to the specifications of the latest European standards. The woodwork and fittings of the laboratories were specially made to suit the Sudan. They were made of the finest quality English oak and East Indian teak, which had been seasoned for the Sudanese climate through high-temperature baking for several months. Earlier, Wellcome also kept his promise and provided a complete outfit for GMC dispensary.

WTRLK were housed in the East Wing of GMC buildings, and were officially opened on November 8, 1902. The laboratories started work officially on February 1, 1903. They were initially called 'The Wellcome Research Laboratories at the Gordon Memorial College' and their first, second and third reports took that name. The 'Wellcome' emerged out of Khartoum in 1903.[24] Later, the word 'Tropical' was added at the suggestion of Wellcome. The fourth report published in 1911 carried the name 'Wellcome Tropical Research Laboratories at the Gordon Memorial College'. This name was later clearly spelt in Wellcome's Will.[25]

The letter with the offer of the gift, which Wellcome addressed to Wingate, was also clear about the qualities and qualifications of the first director of the laboratories. The following specifications were put forward:

> "In order that the work of the Laboratories may be thorough and efficient it is very desirable that the Director shall be skilled and resourceful and be prepared to direct and carry out with zeal and energy all branches of work for which the Laboratories are equipped, and a man who is willing to devote his life to the work of the Institution."[26]

Wellcome did not leave things to chance. Most probably he engineered the application of Dr Andrew Balfour to the post, sat on the committee that interviewed him, and eventually shortlisted him. Later, he made sure that Balfour was well coached and trained for the job. Balfour spent one month in the London School of Tropical Medicine. He was introduced to the elite scholars of Britain at the time. Seventy-eight of London's most eminent medical and research specialists attended the farewell dinner Wellcome arranged in honour of Balfour on 8 December 1902. On his way to the Sudan, Balfour was given letters of introduction to the highest-ranking administrators in Egypt and the Sudan, Cromer and Wingate. Wingate appointed Balfour in 1902 to the post of Director of WTRLK. He was then 29 years old.

Balfour and his wife left Britain for Egypt on December 11, 1902 and after 3 weeks stay in Cairo left for the Sudan to reach Khartoum on January 22, 1903. He immediately took over as Director of the laboratories, and in 1904, he was also appointed Medical Officer of Health of Khartoum. John Newlove, who had been interviewed earlier by Balfour for the post of assistant director arrived in Khartoum and assumed his duties on April 1, 1903, Chemist Dr William Beam in October 1904, and Entomologist Harold H. King in 1906.

WTRLK, consisting of bacteriological, entomological, and chemical sections was affiliated to the Department of Education under James Currie, Director of Education and Principal of GMC, but essentially was independent financially, administratively, and professionally. The laboratories had links with the London and Liverpool Schools of Tropical Medicine providing them with material for teaching purposes, and aided the Cancer Research Fund in Britain in its enquiries.

The work carried out in these laboratories was mostly scientific research and studies with little routine work. However, over the years, routine work increased and encroached on research and significantly hampered it. As time passed, the laboratories became more concerned with routine work, training and advice.

Similar to his earlier appeal to raise funds to establish GMC in 1900, Lord Kitchener, the High Commissioner in Egypt, made yet another appeal to establish a medical school in Sudan during his visit to Khartoum in 1914. Lord Kitchener died at sea in 1916 and it was decided then to carry out his proposal in commemoration of him.

In 1924 and 1925, the KSM and Gezira Irrigation Scheme (GIS) were started respectively. The two projects created new demands on WTRLK. The Bacteriological section of the laboratory was enlarged and moved to SMRL on completion of its buildings in 1928.[27] A pathology section was added to meet the needs of teaching medical students. The Chemical and Entomological sections were also expanded to meet the demands of GIS.

From its inception, KSM was part of SMS and as such depended for its academic staff on doctors seconded from SMS. WTRLK staff (later SMRL staff) taught medical students pre-clinical subjects while clinicians from Khartoum Civil Hospital (KCH) took over teaching of clinical subjects and carried out postmortems. In September 1951, KSM was incorporated in the University College of Khartoum (UCK) and when the Sudanese parliament conferred full university status on UCK, KSM was made a faculty and named Faculty of Medicine, University of Khartoum (FOM, UK). The FOM, UK granted its graduates the combined degree of Medical Bachelor and Bachelor of Surgery (MB BS) in 1959 instead of Diploma of Kitchener School of Medicine (DKSM).[28]A list of the consecutive Registrars and Deans of the Khartoum Medical School was compiled by Haseeb and published in his Monograph.[29]

In 1926, the School of Laboratory Assistants was founded in the Bacteriology section to provide laboratory assistants to carry out laboratory diagnostic work in hospitals.

WTRLK conducted all types of research necessary for laying down the infrastructure of new government services and research in a virgin land. Research was not limited to tropical diseases, sanitation and hygiene, but covered a wide variety of subjects including traditional medicine, physical anthropology, geological surveys, soil chemistry, water, food, wide investigations on Sudan's fauna and flora, various pests of man, scorpions, snakes, mosquitoes, flies, and ticks.

The works carried out by Balfour and his team of researchers and the scientific articles he solicited from civilian and military doctors in the outposts of the country, and related articles reprinted form other journals (Lancet, BMJ, etc) were published under the WTRLK in four lavish institutional reports at Wellcome's expense. The first report covered the period February 1, 1903 to February 1, 1904; the second was published in 1906, the third 1908, together with a supplement: *Review of some of the More Recent Advances in Tropical Medicine*, by Balfour and Archibald; the fourth was issued in 1911 in two volumes A-Medical and B-General Science with a supplement.

Wellcome made sure that the first report was widely circulated free of charge to every body of note worldwide. The list, which he drew up, was added to by Wingate, Currie, and Balfour. Recipients of the leather-bound complementary copies were many. They included HM the King of Great Britain, the Czar of Russia and the emperors of Germany and of Japan, 1200 notable personalities, politicians, government officials in Britain, USA and the colonies, tropical medicine men and institutions and businessmen, editors of 181 journals and newspapers in Britain, the empire and the world, 67 libraries of universities and societies in USA and Britain. Two thousand copies were produced and supplemented by a second run of 600 to satisfy demand. The third report was the first to be offered to the public for sale.

After publishing these first four reports and supplements, no more reports were published by the laboratories though they were produced regularly. This was due to several contributing factors. James Currie, Director of Education and Principal of GMC, and civil administrators in Sudan and Egypt did not see the real worth of publishing such reports and continuing to finance them. They failed to raise £500 for Dr

Chalmers to publish even one more report. After repeated correspondences between Wellcome and Currie and the involvement of Kitchener, they asked Wellcome to continue financing the publications until 1915. In the meantime, Andrew Balfour resigned his post in 1913, the First World War broke in 1914, and Kitchener died in 1916. Until the end of the war and thereafter, priorities were different and conditions were no longer the same.

In his concluding remarks on the Wellcome laboratories, D'Arcy said:

> "In the space of just a few years, the laboratories gained international status and recognition for their pioneer work on the tropical diseases of humans, animals, and plants. It was the start of dedicated programs of research which were to continue throughout the life of the laboratories and which were to influence directly the health and well-being of the Sudanese people."[30]

These laboratories had a great impact on the development of health services, medical research, and medical education in the Sudan. They undoubtedly put the Sudan in the forefront of tropical diseases research a hundred years ago.[31]

Balfour resigned his post in 1913 to be succeeded by Dr Albert J. Chalmers (1913-1920) as director of WTRLK but not as Medical Officer of Health of Khartoum. Dr Leonard Bousfield took the post of Medical Officer of Health. Dr Robert (later Sir) G. Archibald[32] succeeded Chalmers in 1920 and was in office up to 1935.

During Archibald's tenure of the post and due to expanding educational needs of the GMC, discussion aimed at reorganizing the laboratories commenced. Discussion of the political and economic milieu of the time and the stage that lead to the evolution and devolution of WTRLK have been thoroughly reviewed by Kirk,[33] Ibrahim.[34,35]Bayoumi,[36] Bell,[37] D'Arcy,[38] and Adeel.[39]

In 1934 and through 1935, disbanding WTRLK started and their sections distributed among different government departments namely SMS, Agriculture and Forests Department, and Public Works Department. This reorganization ushered the move of research from an au-

tonomous enterprise to a government-run activity. The fate of WTRLK is summarised from the available records as follows:

1. The bacteriological section was transferred to SMS.
2. Public Works Department took the geological survey.
3. The entomological and chemical sections were transferred to Department of Agriculture and Forests. They made the foundation for the Agricultural Research Farm in Wad Medani.
4. The Chemical laboratories were split into two sections, the Soil Research Section centred at Wad Medani, and the Chemical Analytical Section, in Khartoum. The latter retained also the name of 'Wellcome Chemical Laboratories.'
5. In April 1935, SMRL were designated the official research organs of SMS, and WTRLK ceased to exist as such. Dr E.S. Horgan succeeded Archibald but as assistant director of research, MOH. SMRL was, thus, the temporal successor of WTRLK. SMRL was succeeded by the NHL in 1969.
6. In July 1939, the chemical laboratories in Khartoum were transferred to SMS and the name of the laboratories modified to the 'Wellcome Chemical Laboratories,' reflecting a new emphasis on the 'analytical' rather than the 'research' components. They, then, became part of the Research Service of SMS.[40]
7. In September 1940, due to Second World War contingency, GMC offices were evacuated at short notice for military use and what remained of WTRLK was transferred to temporary quarters in Shambat.
8. During the period May to June 1949, the laboratories were transferred from Shambat to the first floor of the River Hospital (current FMOH and WHO main buildings).
9. In 1954, the mineral analysis services were moved to the laboratories of the newly established Geological Survey Department.

The links of Henry Wellcome with the Sudan were maintained up to two years before his death in 1936. In 1930, through his trustees, he offered to build new laboratories in Khartoum at a cost of over £60,000. There was no immediate response to this call. He renewed the offer two years later, but his terms were not accepted, and he withdrew his offer. Prof. Kirk commented on this, saying:

> "Unfortunately, Henry Wellcome and the Sudan Government disagreed over this project. Wellcome insisted on a first-class river-front site that would be worthy of the fine building he proposed to erect. The government, or whoever represented it, did not agree to this and suggested an alternative site. Sir Henry Wellcome had become by this time rather an autocratic old gentleman who was accustomed to having things done in the way he wanted, so the offer was withdrawn."[41]

After the death of Sir Henry Wellcome, it was revealed that his will provided for an annual endowment to WTRLK provided they were still in existence and had existed continuously since their foundation. The following extract from his will was revealed:

> "I authorize my Trustees out of the Research Fund to make grants after the first five years after my death of a sum not exceeding Two Thousand Pounds a year and after ten years after my death of a sum not exceeding Three Thousand Pounds a year to the Trustees of the Gordon Memorial College at Khartoum under the supervision of such Trustees in conjunction with the Government of the Sudan for the exclusive use of the Wellcome Tropical Research Laboratories … for so long only as such Laboratories shall be conducted on the lines and for the purposes indicated in my letter of gift of the said Laboratories …"[42]

The fact that they still survived in their chemical section did not make a case, and the Wellcome Trustees were unable to accept this view and the legacy lapsed.[43] Wellcome pledged that endowment in spite of the several disappointments and hard blows that he suffered from his spiteful kinsfolk. The dismantling of WTRLK might have been the result of several factors working individually or collectively. The re-

sult was not only redistribution of WTRLK departments but also a redefinition of the fate of research in the Sudan.

The reasons for dismantling WTRLK were many. They might have been the outcome of redefinition of domains (medicine and agriculture), the result of conflict of interests of capital (Wellcome and the Cotton industry), the inevitable result of competing fields and needs of practice (researchers and practitioners). The changing priorities of patrons, intellectual interests of successive directors and researchers, interdepartmental competitiveness, and search for self-reliance and independence played a role. The manifestation of the economic recession that loomed over the 1930s and the straightforward urgent needs and pressing government priorities that were characteristic of inter- and post-war era were instrumental. Whatever these reasons were, WTRLK seized to be that independent and autonomous body.

WTRLK established the first general purpose library that increased in size with the growth of the laboratories. The library contained books on medical, agricultural, veterinary, chemical and other sciences. Reporting on the early beginnings of this Library, Andrew Balfour wrote:

> "The United States Department of Agriculture has been approached and has most kindly consented to send its valuable publications for the use of the library, a gift of great importance considering the prevalence of fungus diseases and insect pests in the Sudan. The library itself is well stocked and is supplied with a selection of necessary scientific journals and periodicals. The authorities of the Natural History Department of the British Museum have been good enough to present it with several of their valuable publications."[44]

In its early beginnings, this library had been well supplied with books, and the number of scientific journals taken in or presented had undergone considerable addition. It became rich in biomedical journals some of which dated back to the first volume. It also contained early

published and unpublished reports, reviews and publications of the laboratory staff, visiting research fellows and commissions.

WTRLK library was divided up when these laboratories were dismantled. Each section took its share of related books. Pure science books went to WCL in MOH buildings at the Nile Avenue; medical books and periodicals went to SMRL, and agricultural books to Entomology section. This is why Hassan Hallab in *The Health of the Sudan: A Bibliography*[45] identified two distinct libraries, the Medical Research Laboratories (Stack) Library and the Chemical Research Laboratories (Wellcome) Library as the oldest medical libraries in the Sudan, and said that they came under the administration of SMS in 1937. In 1972, both libraries were combined to form the NHL Library, and were housed in the ground floor of NHL building. However, when the entomology and bilharzia sections were created in NHL, no books, and for that matter, no museum specimens were transferred from Wad Medani to Khartoum. The two sections started afresh.

In 1974, this library according to Hallab, 'contained 4000 books and 80 journals and a constant up-to-date flow of WHO publications.' He noted that the library lacked proper cataloguing and classification and that it needed the services of a professional librarian. This library still exists but is badly kept, neglected and has more or less been closed for the last fifteen years.

The current University of Khartoum Library started with the acquisition of 3000 volumes from the Higher Schools (later GMC) in 1945, and 3000 volumes from the Civil Secretary library. By 1974, this library boasted 250,000 books on its bookshelves.

The Sudan Collection in this library is rich and includes biomedical literature. The library keeps copies of medical theses accepted for higher degrees by the University of Khartoum as well as most of the theses presented to foreign universities on medical studies related to Sudan or by Sudanese.

In 1974, the family of the late Prof. Tigani El Mahi donated his library to the University of Khartoum. The donation included in addition to 14502 books, 2634 manuscripts of historical value and 640 rare maps. The donation was housed in the ground floor of the main library and

named *Tigani El Mahi Library*. After thirty-five years of being under the custody of the University of Khartoum this rare collection is now 20% less of its original size: 158 fewer maps, 2742 fewer books, and still not properly preserved, described, indexed, or made available to researchers and readers.

Currently, although there are medical, pharmaceutical and dental libraries in each new university or college, the medical library of the FOM, UK remains the largest in the country. In 1974, this library had 11,000 books, and was taking 425 journals including 42 important indexing and abstracting services in biomedical sciences. The library also received WHO publications regularly. Biological and Chemical Abstracts were available.[46]

Since he arrived in Khartoum and resumed office, Andrew Balfour started building up the two museums that were founded with WTRLK. In the first WTRLK report, Balfour had this to say about the Laboratory Museum:

> "The museum of the laboratories has progressed steadily since its formation. It is primarily devoted to the collection and exhibition of specimens and photographs showing the diseases of man and animals met with in the Sudan, and maps indicating their respective distribution. It now contains over a score of mounted specimens illustrative of human pathology and tropical disease – those of mycetoma, so prevalent in the Sudan, may be specially mentioned, several of veterinary interest, a small collection of skulls, and what promises to be a very fine and complete set of photographs illustrative of the native diseases of the Sudan, … In addition to these exhibits a collection has been made of the remedies indigenous to, or used in, the Sudan by the native races. Over a hundred different drugs have been obtained from various parts, some of considerable interest, and to facilitate the study of those of vegetable origin and of poisonous plants employed in the Sudan a plot of ground has been enclosed and what may be called a "therapeutic garden' has been started …"[47]

The 'Therapeutic Garden,' the museum, and the library were all launched together with the start of the laboratories. The 'garden' did not succeed and was soon abandoned. Of the General and Economic Museum of the laboratories, Balfour reports:

> "In this museum, but associated with the laboratories' work, are various specimens of diseased dura, a collection of mosquitoes including microscopical preparations of the three genera most common in Khartoum, examples of injurious insects such as those which destroy the melon plant, and the aphides, so destructive to the dura crop."[48]

Over the years, both museums grew markedly in size and the laboratory Museum in particular increased in terms of its pathological and entomological material, biting flies, ticks, mosquitoes, and native drugs from different parts of the country. Most probably, the exhibits of these museums were similarly distributed among the different splinters of the dismantled WTRLK.

Whether in SMRL, in WCL or in Medical Entomology section, the exhibits, which WTRLK collected through decades of hard work, were lost. The catalogues, which were published for the herbal, organic, and inorganic exhibits, and of course, the WTRLK Reports were the only reminders of these memorable bodies.

In a paper presented to the Eighth Annual Conference of the Philosophical Society of the Sudan, Khalafalla Babiker El Badri, Chief Public Health Inspector, MOH read the following regarding the Graphic Museum in Khartoum (GM):

> "The Graphic Museum in Khartoum, opened in 1936, plays a prominent part (in health education). It is a good institution for training medical and health students and it is very frequently visited by members of the public, schoolboys and girls. The Graphic Museum sends models, posters and leaflets to the outstations to form cultural shows and tribal gatherings. Other functions of the Museum include short courses to administrative officers (including police, prison and local government officers), members of the medical corps, auxiliary health workers, school boys and girls."[49]

During the sessions of the above-mentioned conference, the curator of the GM, Mr. Sayyid Baroudi and his staff arranged an exhibition of 61 items relating to the health of the Sudan.

The GM building stood east of SMRL, had a similar architecture, and occupied approximately the same area of the NHL, which was later built on its site. The Report of the Medical Services, MOH for the year 1963/1964, stated that 'The Graphic Museum has been closed since its demolition in 1962. The new building is nearing completion and is expected to open soon.'[50]

The GM, most probably was out of function even earlier when it was condemned and closed pending demolition. The 'new building' alluded to was built but never functioned as GM. It is occupied by the current FMOH Continuous Professional Development Centre situated between the two hostels of FOM, UK.

When the GM was destined to be demolished, its exhibits were packed up and stored in the new buildings. They were never unpacked and displayed for reasons unknown. The rooms that were earmarked to be museum rooms were converted into offices and the exhibits lost. Reminders of these items are to be found in anecdotal nostalgic memories of the elderly who enjoyed visiting the GM.

Currently, there is no health museum of any sort any where in the country. Even those promising nuclei, which were ambitiously established in FOM, UK in its heyday suffered.

The pathology museum, which was established with the start of the Department of Pathology in the FOM, UK, grew steadily in time, and all specimens were professionally kept and displayed. In 1964, recognizing the importance of preserving these specimens, Professor Ahmed Mohamed El Hassan upgraded this museum and did his best in maintaining it. The museum was envisaged as a repository and historical record for the interesting and rare specimens that he and other pathologists in the Sudan received everyday. The museum provided teaching material for undergraduate, postgraduate and students of health sciences. Currently, this museum is showing signs of decay,

and instead of maturing, its growth was arrested and it is in need of immediate rehabilitation.

An interesting tradition was established by the Department of Physiology, FOM, UK. It used to photograph all third year students on successful completion of the first MB. Photographs of all batches throughout the years were displayed along the corridors of the department. This photo gallery disappeared, and currently the corridors of this department are barren; the photos lost and the tradition discontinued! We are left with no more than memories.

Aware of the fate that befell all medical and health museums in Sudan, we proposed the establishment of a Sudan Health Museum (SHM) in 1982.[51] A nucleus of this museum was started in Traditional Medicine Research Institute (TMRI) and actual acquisition of artefacts began in 1984.

The proposed museum will enhance understanding of the history of health care and health care diversity in the Sudan through the study of Sudan's material health culture. It will be devoted to the collection and exhibition of specimens, artefacts, and photographs showing the disease of man and animal encountered in the Sudan. It will contain specimens illustrative of human pathology, entomology, tropical disease, public health, sanitation, and hygiene. It will also contain artefacts and pictorial documentation of Sudan's history of medicine and traditional medical practices.

The museum will have an annexed medicinal Herbarium and Botanical Garden that harbour, so to speak, the living specimens, and generate, provide access to, and transfer knowledge on the nature, extent and origin of botanical diversity of the Sudanese medicinal, aromatic, nutritional and poisonous flora.[52] It will help in training students in systematic botany and provide broad training programmes in ‘green’ biology.

The Herbarium would be used for taxonomic and ecological research, as well as for teaching and public service. It would be open to researchers, and evolutionary biologists who would be able to use the dried plants in their studies of plant form.

Over the past 20 years, another important use for the dried plant on herbarium specimens has been developed. DNA bas been extracted from the dried plant material. This DNA has been analyzed to find out more about the relationships between plant groups.

The proposed SMH is expected to offer a range of learning experiences for everyone, and will maintain a Botanical Atlas, relevant Health Care Archives, Library, Image Bank, & Phytochemical Laboratories. It will sponsor fellowships, internships, field courses, and academic activities in the history and anthropology of health and ethno medicine.

About this series

This series of monographs focuses on individual contributions of Sudanese scholars and through them sheds light on the milestones of health care services in the Sudan. To do so, I have looked into all available resources including a plethora of verbal information.

The individuals featured in this series, including Prof. Abdel Hamid Ibrahim, the subject of this monograph, fulfilled the criteria I set to identify a pioneer. The pioneers in the context of this work are the Sudanese men and women, who have established new institutions, founded new disciplines, researched the field, or made new discoveries and techniques, those who set new traditions and models of admirable behaviour. They taught, trained, and mentored, and more importantly, provided guidance and encouragement to several generations of young and aspiring physicians and scientists. They were, without exception, meticulous clinicians, arduous teachers, imaginative trainers, and hard-working researchers. They maintained unimpeachable professional integrity, upheld strict medical ethics, and consolidated sound medical traditions in a rich service career. They all worked with purpose, with principles, with culture building, and strengthening people. In every situation, they looked for better management, efficiency, perfecting techniques, practices, and processes.

Their contribution as scientists or physicians to science and life has been exemplary. They searched for continuous improvement in their lives and in the institutions in which they worked. They have been constantly involved in the pursuit of fact and truth – about everything in life. That is why they were also notable social workers, sportsmen, poets, musicians, political and social leaders, writers, and efficient administrators.

They were notable in fields other than medicine because serious minds take everything in life seriously, hobbies included. They see these leisurely activities as a source of enjoyment, fun and a target of excel-

lence; they excel in them to the extent that these amateurish endeavours turned to be in time second specializations and careers for many.

Many health care professionals excelled in sports. Prof. Abdel Hamid Ibrahim Suleiman, the subject of this monograph, had been a member of the GMC football team in 1947 and captain in 1950, as well as a member of El-Neel football team. Dr Imam Doleib (Public Health specialist & Administrator) played for the first teams of both El-Hilal and El-Mirriekh clubs. Prof. Nasr El Din Ahmed Mahmoud (Physiologist & educationist) was the goalkeeper of El-Hilal football club. Abdalla El Hag Musa (Plastic Surgeon) and Mohsin Mohamed Hussain (Neurosurgeon) were both excellent basketball players when they were young.

The several personal gifts of the late Prof. Tigani El Mahi (Psychiatrist) could hardly be categorized as hobbies. He was a serious bibliophile, collector of rare manuscripts, maps, and letters of historical value. His personal library has been proverbial. He was a famous Egyptologist and an authority in hieroglyphics. He was also interested in music and was alleged to have played the lute. I could not verify this piece of information, but I could confirm that he studied musicology as seriously as he studied other disciplines in life. When he found out that I had a TV programme on music in 1966 and I was practicing on the trumpet, he gave me a mandolin, which I presume was his. He also gave me Scholes: *The Oxford Companion to Music* (1955), Cecil Gray: *The History of Music* (1928), Gustav E. Reese: *Music in the Renaissance* (1954) and a valuable book compiled and translated into English by Baheega Sidky Rasheed titled *Egyptian Folk Songs* (1958) including several original musical scores. I was then a third year medical student!

When active musicians among medical doctors are mentioned, Mr. Ali Nour El Galil (Cardiac Surgeon) who played the Accordion, immediately comes to mind. Dr Habib Abdalla (the pioneer Sudanese Radiologist) played the piano and had a large collection of classical music, which he passed on together with the love of music to his family, namely Dr Saad Habib. Dr Labib Abdalla played the violin. Earlier still, Mohamed Adam Adham (GP, 1939 graduate) was a violinist and

composer. Dr Adham was one of the few doctors who studied music. His violin pieces the *Adhamiyat* were popular in Sudan Broadcasting Service play list in its early days. Dr Adham was the first president-elect of the Sudan Singers' Syndicate in the 1940s. He was nominated to that post by singers Ahmed El Mustafa and Hassan Suleiman.

Earlier still, Dr Mahmoud Hamdi (1929 graduate) played the violin, mandolin and lute and composed music for songs that came after the Hagieba era. He played music in some of those songs but was not noted as a practicing musician.

Few people know that Dr Zaki Mustafa (Obstetrician & Gynaecologist) was a talented saxophonist and Dr Magboul Mohamed Ali Magboul (Anaesthetist) an excellent trumpet player when they were young. Both were the products of the Sudanese secondary schools in their glorious days.

To see a glimpse of the artistic talent of Dr Al Hadi Babiker (Psychiatrist), have a look at the portrait of the late Prof. Tigani El Mahi currently on display in the Basic Skills Laboratory in FOM, UK, which he drew when he was a medical student.

Poets among Sudanese doctors are many. The list includes Dr Ali Arbab (1929 graduate) who in addition wrote poetry in English, Mahmoud Hamdi (1929 graduate), Dr Abdel Halim Mohamed (first Sudanese Physician), Prof. Mansour Ali Haseeb (first Sudanese Bacteriologist and Dean, FOM, UK), Dr Zein El Abdeen Ibrahim (Public Health Specialist, 1937 graduate), Prof. Haddad Omar Karoam (Obstetrician & Gynaecologist), Dr Mohamed Osman Giritley (GP), who also played the lute, Dr Mohamed El Hassan Abu Bakr (Physician), Dr Imam Doleib, Dr Ahmed Shadoul (Paediatrician), Dr Hasabou Suleiman (Psychiatrist), Dr El Zein Abbas Amara (Psychiatrist), Prof. Moutaz Omer Bakhiet (Neurologist), Prof. Mustafa Abdalla (Paediatrician), Dr Hussain Yacoub (Physician), Dr Omar Mahmoud Khalid (Physician), and the list goes on, and certainly is short of the younger generations.

The list of writers includes Dr. Ibrahim Anis (1929 graduate), Dr Abdalla Omer Abu Shamma (Public Health Consultant), one of the first Sudanese storywriters. Mansour Ali Haseeb translated Harold

McMichael articles on the coming of the Arabs in the Sudan. Musa Abdallah Hamid (Surgeon) is a prolific writer, translator, editor, and biographer. Dr Abdel Halim Mohamed (Physician) was a writer and literary critic.

Medical doctors wherever they worked have always been recognized as respectable figures in their communities, and were entrusted with the leadership of their social and community institutions. At a time in Sudan's history, almost all major municipal councils were lead by medical doctors. Abdel Halim Mohamed, for example, was noted to have been president or chairperson for at least twelve notable institutions in the country including the Sudan Football Association, Basketball Association, horse racing, Olympic Committee, Khartoum Civil Hospital, Khartoum University Council, Khartoum Municipal Council, Doctors' Union, and, of course, he was rotational member of the Sudan Supreme Council of State after October 1964 revolution.

Medical doctors were instrumental in founding literary and cultural clubs and discussion groups in the early days of struggle against the condominium rule. Those clubs were found where ever doctors worked. Medical doctors also contributed significantly in the formulation of the Graduate Conference, the predecessor of political parties in the Sudan. In all these forums, rules of democratic debate were being laid down.

Prof. Ahmad Al Safi contributed to the understanding and use of deliberative procedure. His book titled *A Manual of Rules and Procedure of Modern Organizations*, Cairo, (1^{ST} Edition 1999: 600 pages, 2^{nd} Edition 2007: 530 pages) is an authority manual in parliamentary procedure in Arabic. This book is recognized by critics as probably the only book in this field in Arabic in the Sudan and Arabic-speaking countries. The book is written with the purpose of empowering citizens whether organized or to be organized, to achieve professional and personal goals through efficient and effective systematic deliberations.

The Radio and TV broadcasters were many. They start with the late Abu Obaida El Magzoub and include Dr. Omar Mahmoud Khalid and Prof. Mamoun M. A. Hummaida. In the early 1960s, Prof. Ahmad Al

Safi and the late Mrs. Awatif Osman Sherfi presented a TV Music Programme with the aim of educating the public, documenting Sudanese music, and profiling Sudanese musicians. This programme was presented when TV transmission was live, and before the foundation of the Institute of Music and Drama. The programme, which ran through several episodes, was directed and produced by the TV veteran, Mr. Faroug Sulaiman.

Dr Ibrahim Anis (1904-1961) of the second batch to graduate from KSM was instrumental in establishing professional journalism in the country. The advisory group they made for Ismail Al Atabani, editor and owner of *Al Rai Al Aam* was helpful in achieving the journalistic goals of *Soat Al Sudan* and *Al Rai Al Aam*. Dr Mohamed Adam Adham created and edited *Africa* Magazine and *Al Ghalam* newspaper in the 1940s.

Politicians among doctors are too many to recount, and the role of doctors in politics is a rich and interesting chapter to write. Mohamed El Mubarak El Fadil Shaddad, Abdel Halim Mohamed, and Tigani El Mahi held the post of the rotational Head of State at a critical stage in Sudan's history. A post they rightly deserved due to undisputed high reputation and credibility in society. Others held the posts of Prime Ministers, Ministers, and Ambassadors. Dr Ibrahim Anis (1929 graduate of KSM) was the first Ambassador of the Sudan in Washington.

The role played by medical doctors in politics, we believe, is not in the political posts they held, but in the influence they exercised as an enlightened and solid front on the political scene.

Studying the lives of Sudanese medical pioneers clearly shows that the path to success and distinction requires hard work, confident persistent toil, and professional zeal. Nothing happens arbitrarily through luck, or due to quick fixes. Among these pioneers, Prof. Abdel Hamid Ibrahim, the subject of this monograph, has been exemplary. He did his job as expected in terms of quality. His performance has been solid, fully competent in all aspects of job content and expectations. That is why he won the admiration and respect of his peers, colleagues and associates. However admirable his qualities as a man, it is his contributions as scientist that have been my chief concern in this monograph.[53]

I hope this series proves to be useful and fulfils the goals I intend it to achieve. When I started researching for this work, I discovered the magnitude of my ignorance about the basic landmarks of this profession, and in the process that of many others. This work is an attempt towards understanding what happened, our role in it and what should be done.

Abdel Hamid Ibrahim Suleiman

His life and work

Abstract

Professor Abdel-Hamid Ibrahim Suleiman, currently Research Professor and National Consultant for Drug Affairs, Federal MOH, is one of Sudan's most outstanding scientists and civil servants who has served his country in health and other public fields with distinction and dedication.

Prof. Ibrahim is a civil servant *par excellence*. He has now (July 2008) more than 58 years of continuous service in the Sudan Government, which in itself is recognition of his competence and integrity. During these long years, he has rendered very valuable services to the country and has made many outstanding achievements. He has planned, organized, managed, implemented, contributed to and influenced many major health policies, plans, events and achievements in many fields and in particular in chemical laboratory services, environmental health regulation, quality control of foods, drugs, community water supply and effluents, forensic science and toxicology, environmental contaminants, commodity standardization and specifications, health legislation, scientific consultations and studies, and in research and training.

He has been throughout the last five decades and up to now an undoubted authority in several fields of health. His vast experience, depth and breadth of knowledge about practically everything related to health made even closer associates mistake him for a medical graduate. He knows enough about health legislations, rules, regulations and standards that it would be unwise to write on these matters or to make any amendments without his consultation. Whatever he contributes in these fields is likely to be highly informative and authoritative. He has always been the trusted guide from whom help, advice and direction are sought by all levels of personnel in the fields of health, and, indeed, other public and private sectors.

In the prevailing precarious milieu, obtaining authentic information in health management became difficult. Prof. Ibrahim functioned literally and practically as a repository and living database of health information. His enormous resources were handy. He passed to others reli-

able knowledge and provided the institutions with a steady flow of accurate information regarding health matters.

Prof. Ibrahim has been an outstanding counselor and teacher. He is highly organized, with a sharp memory in spite of the inevitable memory lapses in a man approaching eighty. He is always available; you can meet him and talk to him with no formalities or protocols. Whoever asked him obtained good advice and whoever contacted him benefited from the association. His answers are ready and his advice is usually sound. He has never been patronizing or snobbish in passing his knowledge or advice on to others.

Throughout years of personal contact with Prof. Ibrahim, I can testify that, in addition, he has proved to be a reliable sounding board, offering a shrewd second opinion, and oft-needed emotional and moral support. He is content, humble and honest and his ability and willingness to share what he has with others is unparalleled. He has provided his expertise and wisdom to less experienced individuals in order to help them advance their careers, enhance their education, build their capabilities, or simply assist them to perform the job at hand efficiently. In helping others to grow, most probably, he sees this as a scientific obligation and a social imperative. After all, the young faces he sees today are the faces of the workforce and leaders of tomorrow. Moreover, during my preparation of this work Prof. Ibrahim gratefully acknowledged the help, support and contributions of his older and younger colleagues in what he has achieved.

Early years

Prof. Ibrahim was born in Khartoum on 31 May 1929. His outstanding educational career included getting third place in the national competitive intermediate schools' examination in December 1942 for entry to Omdurman Secondary School, and Grade One Cambridge School Certificate examination in December 1946 with seven distinctions and two credits (which was a national record at the time).

The following incident was destined to change his career. As his interest was to become a medical doctor, he joined the biological section of the School of Science of GMC where students spend two years before applying to join KSM. In December 1948, the class sat for the London

Intermediate examination which only two students passed, Abdel Hamid Ibrahim and Amin Altayeb Abdel Magsoud. GMC made the decision to keep both students in the School of Science against their will in order to sit for London B.Sc. examination in Science in December 1950; this was necessary for the affiliation of GMC to London University as a university college. He reluctantly remained in the School of Science, sat for GMC Diploma examination in December 1949, and was awarded a Diploma in Science (with Distinction).

In December 1950, Prof. Ibrahim sat for the London B.Sc. General Degree examination in Science (Chemistry, Zoology, and Botany) which was conducted for the first time in GMC in Khartoum. He passed with Second Class Honours. Prof. Ibrahim and his colleague were the first locally examined Sudanese to be awarded a London University B.Sc. degree. In 1952, Prof. Ibrahim proceeded to the United Kingdom where he was awarded a B.Sc. Special Honours Degree in Chemistry with First Class Honours from London University in 1954, M.Sc. (London) in Chemistry of Foods and Drugs and the Diploma of Imperial College of Science Technology, London (D.I.C.) in Chemistry of Food and Drugs, both in 1956. In addition, Prof. Ibrahim attended many instruction and training courses in diverse subjects and analytical skills needed for the work of the Wellcome Chemical Laboratories in the United Kingdom, USA, Egypt and other European countries.[54]

Career

GMC Principal (Wilcher) was unable to convince Prof. Ibrahim to join GMC as an academic assistant in Chemistry. Alternatively, he advised him and helped him to join WCL in the MOH in Khartoum as an Assistant Scientific Officer in March 1951. He was the first Sudanese graduate to join these Laboratories. In 1957, after Sudan's independence, he capably localised (Sudanized) the post of Government Analyst (GA). Except for five years of secondment, Prof. Ibrahim continued in this post until his retirement in May 1989. In his three decades of service as GA and Director of Wellcome (later National) Chemical Laboratories, he transformed the laboratories from a small

analytical laboratory with two graduate chemists (including himself) into a greatly expanded, highly specialized, well-equipped and well-staffed health laboratories. The NCL had five specialised departments and employed more than twenty analysts (in spite of over 80% continuous brain drain) with postgraduate qualifications and training from reputable laboratories and institutions abroad. As such, NCL maintained a high standard of competence and integrity and acquired national and international recognition as referee laboratories with a high level of confidence in its work.

After retirement, Prof. Ibrahim was re-employed by the Federal MOH, first as National Consultant for Chemical Laboratory Services and Drug Affairs until 2004 and then as a National Consultant for Drug Affairs. During the period 1987-1997, he also managed the Sudan Essential Drugs Programme (SEDP) as National Programme Coordinator.

There were, however, certain incidents that could have altered Prof. Ibrahim's career. The first was the offer by the University of Khartoum in 1951 of the post of an academic assistant, which he refused. The second was an offer in 1969 to make him one of four MOH under secretaries (for planning and development) which he did not accept. Next was an offer in 1971 to appoint him Minister of Higher Education and Scientific Research, which he also declined. The last was an offer from the Saudi Arabia Ministry of Commerce in 1982 to fill a post of compliance coordinator, which he could not take at the time. He also declined offers to be secretary of NCR and Managing Director of the ICRI.

Government Analyst

The post of Government Analyst (GA) (or Government Chemist as previously called as in the United Kingdom and some other countries) which Prof. Ibrahim filled for over 26 years (excluding the 5 years of his secondments) was one of the Sudan civil service's most highly esteemed posts. Prof. Ibrahim as GA was the State consultant and a legally recognized expert in all technical matters within the duties, and responsibilities of the WCL (since 1962 called the NCL), which he headed and directed. It is appropriate to mention here that the famous

national scientific evaluation of all government civil service posts by the Ministry of Labour and Administrative Reform conducted in 1978, according to job responsibilities and qualifications and experience requirements of the holder at the time, the post of GA and its holder got the top score over all other posts in the government civil service.[55]

When Prof. Ibrahim took office as Acting GA in 1957, he planned to expand and strengthen health related analytical laboratory services for regulation and quality control of food, drugs, community water supply, environmental contaminants, toxicology, clinical chemistry and forensic science (the last till 1966). He also intended to provide the customary technical and analytical services to most public sector institutions and to private commercial and industrial sectors. However, during the few years following the independence of Sudan in 1956 the public sector started to procure its goods, materials and other commodities by public, local and international tenders. The result was many substandard items and others not conforming to specifications.

Consequently, the government directed Prof. Ibrahim as GA to provide urgently the WCL with all the testing facilities and expertise necessary for the quality control of all public sector supplies. In 1960 two laboratory rooms were equipped for testing textile materials, paper and leather goods. All other existing testing sections and facilities were upgraded and supplied with up to date equipment and trained personnel. After the evacuation of the River Chest Hospital in 1961, a four room pharmaceutical testing laboratory and a large air-conditioned chemicals store were established on the first floor of the hospital central building. An expatriate Yugoslav pharmacist later headed the Pharmaceutical testing section during the period 1963-66.

At the same time of the abovementioned strengthening and expansion of WCL testing facilities, Prof. Ibrahim directed, encouraged and guided all government and public sector departments that needed routine laboratory testing services to establish their own laboratories. Prof. Ibrahim provided to these departments the help and guidance they needed including training their laboratory personnel.

Training of technicians

One of the serious deficiencies in laboratory personnel before and after 1957 was the acute shortage of qualified post secondary science laboratory technicians. As early as 1961, Prof. Ibrahim, in collaboration with the Faculty of Science, UK and Ministry of Education, initiated contacts with the United Nations and UNESCO to establish a department of Laboratory Technology in the Khartoum Technical Institute (KTI) and again in 1964 without success. On his part, Prof. Ibrahim sent NCL Senior Technical Assistant Abu Bakr Ahmed Akour to the United Kingdom for training in science laboratory technology at Paddington Technical College and to sit for the Science Laboratory Technicians Certificate offered jointly by the City and Guilds Institute of London and the Institute of Science Technology. Mr. Akour, who became NCL's Superintendent, was the first Sudanese to get the Associate Membership of the Institute of Science Technology (AIST). Prof. Ibrahim directed Mr. Akour to collaborate with the Faculty of Science, University of Khartoum's Head Technician (Mr. Davies) in conducting a joint evening part time training course for university and NCL laboratory technicians.

Eventually in 1966, an international commission for technical education visited Sudan at the request of the government to review and promote technical education in Sudan. The Committee supported the recommendations of Prof. Ibrahim and others to establish a department in Khartoum Technical Institute (now Sudan University of Science and Technology) for graduate science technicians. A Science Laboratory Technician department was established at KTI in 1968. KTI succeeded in arranging with the City and Guilds Institute in London for it to be a centre for examinations for the British Science Laboratory Technicians Certificate. Mr. Akour was later released to head that department, which has since played a major role in providing the country with much needed qualified science laboratory technicians.

The National Health Laboratories

Since the accommodation of the WCL on the first floor of the MOH building in 1949, it faced the problem of acute shortage of space and the real hazard of fire because of its wooden verandahs and roofs. In

1956, MOH applied for the inclusion of the construction of the new WCL building in the 1957/58 Government Building Programme in the area allocated for that purpose between the FOM, UK and the present building of the FOP, UK on Palace Avenue. The new building was to accommodate the WCL, the Medical Entomology, and the Schistosomiasis Departments, which were in Wad Medani. This will constitute the proposed Medical Research Institute (MRI). Later, that area was reallocated for the immediate expansion of the FOM, UK to meet the proposed larger intake of medical students, which was given top priority by the government.

An alternative piece of land was allocated for the new laboratory buildings (where the Continuous Professional Development Centre is housed now). Unfortunately, the new area contained six inhabited old government houses and needed years to evacuate. At that time, the GM building was condemned and closed pending demolition. Because of the expected difficulties and years of delay needed to remove those houses, Prof. Ibrahim suggested constructing the proposed combined medical MRI/WCL building in place of the condemned GM and building the new museum in the (now) Continuous Professional Development Centre. The change was immediately approved and Prof. Ibrahim was directed to follow up with the design of the buildings and allocation of laboratory space to the listed departments and sections. To expedite design, the Ministry of Works contracted a foreign engineering firm (Peter Muller Engineering Co.) to undertake the architectural and structural design and costing of the proposed building, which was immediately submitted for financial approval in the 1961-1962 budget.

Along with his late colleagues, Dr Mohamed Hamad Satti and Dr Sayyid Hassan Daoud, all three earnestly chased financial approvals and supervised the construction and equipment of the new 5-storey National Health Laboratory in Khartoum (NHL). By the end of 1969, the NCL Medical Entomology, Schistosomiasis laboratories and all (Stack) departments completed their move to the new NHL. During the seventies, three Regional Health Laboratories (RHL) were con-

structed in Port Sudan, El-Obied and Juba, and later in the nineties Atbara RHL was completed.

Prof. Satti, director of SMRL (1963-1968) was convinced of the necessity of building the National Health Laboratories, so much that he fought for it and solicited foreign help to support the project. He engineered in 1964 an invitation to Sir Graham Wilson, ex-director of the Public Health Laboratories of England and Wales to visit the Sudan and lend support to this project.[56] Many were not convinced about the worth of this building; they thought that the cost of the upkeep of this colossal building would far exceed its usefulness and would therefore become a liability. They discouragingly called it 'Satti's white elephant' in reference to the legendary white elephant in Southeast Asian traditions. This animal was held as sacred and protected by law from labour. Hence, possessing a white elephant is both a blessing and a curse: a blessing because the animal has a scared nature and a curse because it could be put to no practical use. Satti proved to be right; he and his colleagues won. The laboratories were built, equipped, staffed and functioned and became a landmark in Khartoum City. Probably the NHL building would have never been constructed for the next 25 years if Dr Satti had failed in his efforts at that time. The NHL soon proved its worth.

The UNDP Project

Even before the transfer of the various departments to the new NHL building, Dr Satti, Prof. Ibrahim and Dr Sayyid Daoud anticipated the great need for training of laboratory professionals and technicians abroad and acquisition of a wide range of requirements of up to date laboratory equipment, consumables and vehicles. So in 1968, the MOH requested EMRO to assign a consultant (Dr Hayder from Jordan) to prepare a submission from the Sudanese Government to UNDP for funding a 5-year project for the strengthening and expansion of health laboratory services in Sudan. The request was eventually submitted by the government to UNDP in 1971 and was approved and signed in the same year for implementation during the period 1972-1977. UNDP contributed 1,136,200 US$ to the project and Dr Bukhari from Pakistan was appointed as Project Manager. In 1973, and in order to compete with the Universities for getting the best BSc

Honours First or Upper Second graduates, the government approved an application of the National Council for Research Cadre (terms of service) for NHL scientists (researchers). By 1977, the UNDP Project and researchers terms of service greatly enhanced the capacity of the NHL, upgraded, and expanded national health laboratory services in Sudan.

Regulation and quality control

While as GA, Prof. Ibrahim was required to provide analytical laboratory services to all public sector departments until these developed their own laboratories. His goal was to strengthen and expand health related departments, namely food, water, pharmaceuticals and environmental contaminants, by providing analytical services and enacting the necessary legislation for their regulation, quality control and administration and by developing contacts and links with relevant programmes in WHO and FAO. For example, in 1964 the Ministry of the Interior decided to establish its own laboratory for forensic toxicology and scientific investigation of crime. The forensic section, which was greatly strengthened during the period 1960-1964, started a phased transfer of its activities to the newly established Police Laboratory, which was completed by 1966. Several other ministries and institutes also developed their own laboratories and started to relieve the NCL of their testing load.

As will be detailed later in relevant sections, Prof. Ibrahim was temporarily transferred to head the CMS during the period 1969-1972, and then seconded to IDPC to become managing director of Food Industries Corporation (FIC) during the period 1972-1974. On returning from his secondment in 1974, Prof. Ibrahim made use of the UNDP Project for the capacity building by postgraduate qualification and practical training of scientists and pharmacists abroad in food science and technology, food and water quality control, food microbiology, analytical chemistry, pesticide residues, pharmaceutical analysis and occupational health. By the end of this project, the trained professionals numbered more than 30, and through its activities, all departments received their requirements of laboratory supplies and equipment.

Food

Until the 1970s, there was very little legislation for the regulatory control of foods. There were a few sections in the Penal Code that prohibited the sale of adulterated food, food unfit for human consumption, and food not of the quality demanded. Local Government legislations gave local government councils the authority to control food sanitation and hygiene. The role of the WCL/NCL was to test and report on food samples submitted by public health inspectors working for the local government councils. There was no national central food control administration at MOH. Therefore, NCL was responsible for all national food science, standards and quality control issues.

In 1969, Prof. Ibrahim was transferred to CMS. In 1972, he was strongly urged to accept a secondment for two years to be the Managing Director of FIC (25 food factories) in the newly established IDPC. After a most useful and productive two years of recognized achievements, Prof. Ibrahim returned to his post as GA in 1974 with extremely useful knowledge and experience in food science and technology. This markedly enhanced his scientific and practical expertise in the food production and quality control.

In 1973, with the help of a FAO expert, a new Food Control Act was enacted which made the GA the secretary of a multidisciplinary Food Control Advisory Committee (advisory to the Minister of Health). In 1974, Prof. Ibrahim went on to enact the General Food Hygiene Regulation,[57] Food Additives, Food Inspection, Food Sampling and Analysis[58]and the Registration of Pre-packed Food Regulations.[59] To ensure effective control on food quality and safety, he promoted and implemented, as with medicines, compulsory registration of pre-packed foods which is considered an innovative approach to ensure food safety and quality. In 1978, Prof. Ibrahim submitted a proposal to the Food Control Advisory Committee for the establishment of a Food Control Administration in the Directorate of Environmental Health in Central MOH. He actively followed up the establishment of the administration and the start of its activities. Prof. Ibrahim arranged for the training of the Head of the Directorate to make orientation visits to FDA, WHO, and FAO and the training of a good number of public health officers in food inspection in the Netherlands and Kenya.

In 1961, Prof. Ibrahim established a new section for laboratory work in nutrition, which was intended to function in harmony with MOH Nutrition Division and provide laboratory support for researchers in the health field and in the preparation and compilation of food composition tables and nutritive values of common food recipes. Five chemists from NCL attended postgraduate MSc and PhD courses in nutrition and allied subjects in the United Kingdom. All of them left NCL for better jobs inside and outside the country and the section was finally closed in 1980.

Internationally, Prof. Ibrahim led the Sudan to become a member of the FAO/WHO Codex Alimentarius Commission in 1965, and established a National Codex Committee to follow-up on FAO/WHO Codex activities. In 1981, he was elected Vice-Chairperson of the Codex Alimentarius Commission and member of its Executive Committee for the biennium 1981-1983.[60]

Water

The water section, which played a vital role in testing and certifying drinking water for fitness for human consumption and other uses, relied until the 1960s on trained technicians to do the routine analysis. By the end of the 1970s, seven scientists received postgraduate degrees and training in water analysis.

The only source of safe and wholesome water for domestic use in most areas in Sudan is surface water (from surface wells) and underground water (from deep boreholes). In many areas, especially Northern Kordofan, both surface and underground water contain high concentrations of nitrates (which is claimed to cause infantile methaemoglobinaemia to infants less than one year old) exceeding the national limit which was many times more than the recommended international limit. Yet the inhabitants of many villages strongly resisted the closure of government-dug boreholes because their water exceeded the national limit of nitrate content but at the same time, its nitrate content was lower than that found in their private surface wells

So, in 1968 Dr Satti and Prof. Ibrahim organized a large unprecedented multidisciplinary medical expedition to two villages in Northern

Kordofan (Um-Gozein and Al-Mazroob) to investigate the health impact of the consumption of water of extremely high nitrate content (which happened to be the only water available in those villages) on the health of the inhabitants. The team comprised Dr Nasr El Din Ahmed Mahmoud (Physiologist), Dr Osman Modawi (Obstetrician), Dr Mahmoud Mohamed Hassan (Paediatrician), and Dr Mohamed Hamad Satti (Pathologist). Prof. Ibrahim was unable to take part in this mission because of illness. No ill health effects were detected in men, women and children of all ages in the two villages!

In 1985, Prof. Ibrahim invited a WHO staff expert in drinking water standards (Dr Hind) to join a national committee of representatives and experts from all water supply agencies chaired by Prof. Ibrahim for developing for the first time national drinking water standards based on scientific evidence, past experience and the practical situation on the ground.

Environmental Contaminants

The huge amounts of toxic pesticides continuously used in Sudan for agricultural and public health purposes constituted a real health hazard. As early as the late 1950s, Prof. Ibrahim raised the alarm about the wide use of toxic insecticides on cotton in the Gezira Scheme and other public and private schemes without knowing the health hazards of their residues. A new section for analysis of pesticide residues in food, water and human environment was established and three analysts obtained their MSc and training in pesticide residue analysis for that purpose. Moreover, for the first time radioactive tracer techniques were used to follow the presence and movement of DDT used on the cotton plant, on the cottonseed, in the oil extracted from the seed and in the remaining cake, which is consumed by food producing animals. A special IAEA Class C laboratory was equipped for those studies.

During the Period 2 October to 25 November 1961, Prof. Ibrahim and Dr Zaki Mustafa attended a Joint WHO/ILO Training Course on Occupational Health at the High Institute of Public Health at Alexandria. This course was later expanded to a full postgraduate diploma course in occupational health. On his return, Prof. Ibrahim procured all the equipment needed for the physical and chemical testing of the work

environment and created a post for a chemist to do the work, but both the equipment and the post were transferred to the Occupational Health Department, MOH, in 1973.

One of Prof. Ibrahim early inputs in the prevention/control of environmental contaminants was the study undertaken by him and Mr. Khalil Kronfoli (Deputy Municipal Engineer of Khartoum) in March 1962. The Central Town Planning Board (CTPB) and the National Land Allocation Authority assigned them to investigate possible air, water and coral reef pollution from effluents from the proposed Shell Company petroleum refinery at Port Sudan. At the team's request, Shell Company arranged visits of the team to a similar refinery and to both Air Pollution Research Laboratory and Water Pollution Research Laboratory in Stevenage, England. In March 1962, Prof. Ibrahim and Engineer Kronfoli visited a similar Shell refinery in Godort (West Germany) 5 kilometres away from Cologne City and met the health officials concerned in the nearby city of Cologne. The team discussed at length with technical refinery staff, Cologne health officials and Air/Water Pollution Research Laboratories scientists all aspects of possible air, water and coral reef pollution by the refinery gaseous and liquid effluents and measures to prevent any pollution.

The 8-page report submitted by Prof. Ibrahim and Engineer Kronfoli to the CBPH was very comprehensive and scientific, and contained all the information and scientific facts about possible pollution hazards by the proposed Port Sudan Refinery and the measures to be taken to guard against such hazards.

The team recommended stringent measures to be taken and conditions to be met in the construction and operation of the proposed Refinery, which Shell Company considered as exaggerated in view of the small size of the refinery, its design, its methods of refining, (no cracking process), and the quality of the crude oil used. In the end, Shell accepted all of the recommendations, which were documented and included in the Shell Refinery Agreement with the Government of Sudan.

Pharmaceuticals

Pharmacy and pharmaceutical products

In the field of pharmacy and pharmaceutical products, Prof. Ibrahim made many major contributions and achievements. His fingerprints were evident in all aspects of pharmacy education, pharmaceutical services, national medicines policy, pharmacy practice, medicines regulation, medicines supply and rational use. His paper '*A Short History of Pharmacy in Sudan'*, which is pending publication, is a basic resource paper for many researchers and pharmacists interested in the history of the profession. As the paper is not yet finished and published and its text is thus subject to additions and amendments by Prof. Ibrahim I cannot quote its original text, but I had his consent to include many of the facts in that paper for their historical importance, and because Prof. Ibrahim was involved in one way or another in most of these happenings.

It is important to note that although medical education of doctors started in 1924, there was no pharmacy university education until 1963. The few Sudanese who graduated as pharmacists abroad practically all preferred working in private drug stores and pharmacies, which offered lucrative salaries and a much brighter future. Up to January 1954, no Sudanese pharmacist worked for the government. In February 1954, Omer Gabbani was the first Sudanese to be appointed by the MOH to work in Juba Hospital. In 1957 a second pharmacist, Ibrahim Gasim Mokhier was appointed as Chief Pharmacist, Khartoum Hospital. A third pharmacist, Suleiman Salih Eisa, joined MOH in 1957. No more than those three pharmacists worked for MOH up to 1964. Pharmaceutical services in the public sector had to be run by few expatriate pharmacists who were mostly Lebanese, Sudanese medical officers, locally trained dispensers and pharmacy attendants.

Pharmacy education

In 1954, MOH requested WHO to send a consultant to advise on pharmacy education. WHO assigned Prof. Mohamed Mohamed Motawea, Prof. of Pharmacology and Dean Faculty of Pharmacy, Cairo University to assess the curriculum, facilities, students and gradu-

ates of the School of Dispensers. Prof. Motawea, in his mission report, made the following recommendations:

1- The School of Dispensers should be closed immediately as it does not serve any useful purpose.

2- A faculty of pharmacy should immediately be established in UCK.

3- In the meantime and until the faculty of pharmacy is established, selected students can be sent to study pharmacy abroad.

The three recommendations were accepted and followed up by the MOH. In 1961, the government contacted USA Operation Mission to Sudan, which offered to train three batches of selected secondary school graduates at the Faculty of Pharmacy of the American University of Beirut (AUB) in 1961, 1962 and 1963. Prof. Ibrahim took part in the selection and processing of the first group of six secondary school graduates who were appointed by the MOH and started their studies at AUB in 1961.[61] A second group of two students followed in 1962 and a third and last group of four followed in 1963. Most of these students returned five years later as graduate pharmacists, but fewer than half of them chose to stay and work in the public sector.

The MOH, which was well represented in the FOM, UK and in the UK Council, used its influence to convince UK institutions to endorse and follow up on the need to establish a Faculty of Pharmacy. In 1962, a decision was taken to that effect. Prof. Patrick F. D'Arcy,[62] Prof. of Pharmacology at The Queen's University of Belfast and Prof. of Pharmacology, FOM, UK at the time, was appointed as the first founding Dean of the new Faculty of Pharmacy, University of Khartoum (FOP, UK). He was assigned the task of establishing and preparing the faculty to receive its first batch of pharmacy undergraduates who would be selected to spend their first session 1963-64 of the five-year Bachelor of Pharmacy course in the Faculty of Science. They would start their second session in 1964 in the new Faculty of Pharmacy. It was a great challenge to Prof. D'Arcy who managed to formulate the 4-year pharmacy curriculum, recruit expatriate academic staff, prepare temporary lecture rooms and laboratories and receive his

first batch of eighteen Pharmacy undergraduates in 1964, as planned, after completing their first year course in the Faculty of Science.

Prof. D'Arcy appointed a number of newly graduated Sudanese pharmacists as academic assistants to be trained and eventually qualified as lecturers. He was also able to recruit a number of qualified Sudanese chemists as lecturers in organic chemistry, analytical chemistry and pharmacology. In 1967, Prof. D'Arcy was superceded by Dr Ibrahim Gasim Mokhier, who became the first Sudanese Dean. In 1968, the first batch of eighteen pharmacists graduated with a Bachelor's Degree in pharmacy from FOP, UK.

In support of the newly established Faculty, Prof. Ibrahim allowed two of the NCL chemists (the late Prof. Rifaat Botrous and the late Associate Prof. Mobarak Ali Karrar) to be permanently transferred to the Faculty of Pharmacy to relieve its staff shortage. Prof. Ibrahim later became a member of the Faculty Board of Pharmacy during the period 1969-1972 by virtue of his post of Director CMS. For many years, he has been an external examiner in faculty examinations and supervisor and/or external examiner to many postgraduate pharmacy students.

The School of Dispensers was finally closed when the pharmacy students completed their first session and moved to the Faculty of Pharmacy in 1964.

In 1966, MOH established a school of pharmaceutical assistants who (like other medical assistants) were selected from qualified nurses from different provincial hospitals and given a training course of two years.

Pharmacy and medicines regulation

Since becoming GA in 1957, Prof. Ibrahim was closely involved in all drug related matters. He was a member of the Central Board of Public Health (CBPH), which was up to 2001, the drug regulatory authority (DRA) in Sudan and since then a member of the FBPP. He sat as member in practically all committees concerned with drug policies, regulation, legislation, access, rational use and training. After retirement, he was retained by MOH as a consultant in drug affairs.

In 1959, Prof. Ibrahim wrote in his published Annual Report of the GA 1958-1959 under the title 'Drugs and Pharmaceuticals', a 4-page document in which he expressed concern about laws, regulations and procedures for importation, manufacture and sale of drugs in the country without adequate control on quality, supply, use and sale. He emphasized the need for effective drug control through legislation and pre-approval of marketed pharmaceuticals by a competent qualified committee to be appointed by the CBPH and supported by a well-equipped and well-staffed pharmaceutical quality control laboratory. Dr P. Blanc, Chief Pharmaceutical Officer WHO/HQ Geneva wrote a letter addressed to Prof. Ibrahim dated 15 July 1960 requesting permission to issue the text of Prof. Ibrahim 'comment' in a WHO document to be distributed to members of WHO Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations and other specialists and for use in future seminars concerned with the study of the general principles of pharmaceutical quality control. The Under Secretary MOH gave his approval and that part of Prof. Ibrahim Annual Report was issued by WHO as one of its official documents.[63]

This was actually the start of a close relationship and collaboration with WHO in the pharmaceutical field that continued until 1999. During this period, Prof. Ibrahim became a member of two WHO Expert Advisory Panels on International Pharmacopoeia and Pharmaceutical Preparations, on Drug Policies and Management and was contracted as a WHO Short Term Consultant for ten assignments in countries of WHO EMRO, and was a coordinator of SEDP. He participated in many WHO meetings of experts and consultants, and in workshops, seminars conferences and meetings as a WHO expert, advisor, resource person, or as Sudan representative.

The Pharmacy and Poisons Acts & Regulations.

In 1959, the CBPH appointed a Drug Control Sub-committee, chaired by Dr Al-Hadi Al-Naggar and Prof. Ibrahim as Secretary, to make recommendations regarding the control of pharmaceuticals. The Sub-committee drafted a new Pharmacy and Poisons Act (PPA) and Poisons Regulations and recommended that a pharmaceutical quality con-

trol section be established in WCL. The CBPH approved the recommendations and directed Prof. Ibrahim to follow up their implementation.

The PPA was eventually enacted and came into force on 1st October 1963. In this Act, the CBPH, of which Prof. Ibrahim was a member, remained as Sudan's medicines regulatory authority and provided for the registration of pharmaceutical products with the Board. The Board was called to an urgent meeting on 16 October 1963 to look into a note submitted by its secretary regarding the regulatory situation with regard to the new PPA that came into force on 1 October 1963. He recommended action to be taken for the immediate implementation of the Act and in particular the new provision for the mandatory registration (marketing authorization) of pharmaceuticals to legalize the marketing of medicines already in the market. The CBPH Secretary in his note suggested the following:

> "For a period of 6 months from 1 October 1963 the Board will register free of charge and without any of the other formalities prescribed by section (22) (2) of the Act all brands of drugs lawfully manufactured, imported and sold in Sudan before 1 October 1963, provided that a list of such brands of drug NOW available in the country is immediately submitted to the Board. Any person wishing to manufacture, import or sell any other brand of drugs, during or after the said period of six months should make arrangements to have it duly registered."[64]

In that meeting the CBPH approved all the recommendations in the Secretary's note and later on 27 November 1963, the Minister of Health (Dr Ahmed Ali Zaki) approved the Board decision.

The Board realized that it was technically not in a position to study and decide on applications for registration of medicines. It appointed in its meeting No. 419, dated 26.3.1965, a 12-member technical committee in which Prof. Ibrahim was a member to decide on applications for registration and submit their recommendations to the Board for approval.[65]

The most important Regulation issued under the PPA was Pharmaceutical Products Registration Regulation of 1974 which is still in force (March 2008). Prof. Ibrahim is actually the only one who continued as a member of the Drug Regulatory Boards and as a member of the Pharmaceutical Products Registration Committee (and its chairperson during 1976-1989) from 1963 to 2008.

In 1992, Prof. Ibrahim was again appointed chairperson of a committee for updating health legislation. The committee was able to prepare updated drafts for the Public Health Act, the Environmental Health Act, the Food Control Act and the PPA. After 15 years of controversy and conflict between pharmacists and veterinarians (who wanted a separate Act for veterinary medicines) a new PPA was enacted in 2001. Its main change was replacement of the CBPH by a separate medicines regulatory authority, which is the Federal Board of Pharmacy and Poisons (FBPP).

Prof. Ibrahim gave special attention to the pharmaceutical testing laboratory, which was established as a separate section in WCL and headed by an expatriate Yugoslav pharmaceutical chemist in 1963. With WHO and UNDP support this section was greatly expanded, adequately equipped and staffed as a National Drug Quality Control Laboratory (NDQCL). By 1985, eleven pharmacists and two chemists were qualified with postgraduate MSc, PhD degrees and practical training in pharmaceutical analysis. In 1990, the administration of the NDQCL was transferred to the Directorate General of Pharmacy MOH, and in 2008 to the FBPP as part of the new drug regulatory authority.

Pharmaceuticals in the public sector

As mentioned before, up to 1953 all pharmaceutical services in the public sector were being run by a few expatriate pharmacists, Sudanese medical officers, locally trained dispensers and pharmacy nurse attendants. The first pharmacist to be employed in MOH was Omer Gabbani in February 1954, followed by Ibrahim Gasim and Salih Suleiman Eisa in 1957. The top pharmacy post in MOH was the Chief Pharmacist of KCH, which was filled by Ibrahim Gasim Mokhier until

1967 when he left to become the first Sudanese Dean of the FOP, UK. He was superceded by Omer Gabbani as Chief Pharmacist, KCH. Until 1970, there was no official post for a pharmacist at MOH HQ. Drug regulatory affairs were administered by the secretariat of the CBPH that included a dispenser (Mohamed Ali Lutfi).

In 1970, Senior Pharmacist Omer Gabbani was transferred to MOH Head Quarters to be in charge of the new Pharmacy Section under the Deputy Under Secretary for Pharmaceuticals and Laboratory Services (Mohamed El Sayyid Ibrahim). He was to be responsible for drug regulatory affairs and enforcement of the Pharmacy and Poisons Act 1963 and the administration of MOH pharmaceutical services. In 1967, pharmacist Salih Suleiman Eisa was transferred to the CMS to fill a new post of Controller of Medicines. In 1968, Salih S. Eisa was transferred to the Pharmacy Section at MOH HQ and was superceded by Hamid El-obeid at CMS. In 1978, the Section was upgraded to a Directorate under the Directorate General of Curative Medicine headed by Omer Gabbani who retained his post as Chief Pharmacist.

It is noteworthy that up to 1972 no government pharmacist was given a chance to attain postgraduate specialization, except for the pharmacists selected to work in the pharmaceutical quality control section of NCL who were all given the chance by Prof. Ibrahim to attend postgraduate MSc courses and training in pharmaceutical analysis in the United Kingdom. During the period 1976-1989, Prof. Ibrahim was the Chairman of the Standing Committee for Registration of Pharmaceutical Products, and at the same time continued to be the technical reference and adviser to the new Directorate of Pharmacy.

In 1978, Prof. Ibrahim chaired a committee for organizing and upgrading pharmaceutical services in the Sudan. The Committee produced an important document, which became a road map for the planned organization and development of the new Directorate of Pharmacy and promotion of pharmaceutical services in the public sector. The recommendation of this committee that the Directorate of Pharmacy should be upgraded to a Directorate General was not realized until 1985.

Also in 1978, Prof. Ibrahim chaired another committee to recommend ways and means for supporting local drug production and for use of

the local drug manufacturing capacities in supplying the CMSD with essential medicines. The recommendations of the committee were upheld by local drug manufacturers and were endorsed by the ministers of Health, Industry and Finance.

In 1997, Prof. Ibrahim chaired a committee appointed by the Minister of Health to develop a detailed study and implementation plan for transforming the pharmaceutical control departments into an autonomous SBCM. The document was prepared but the project was suspended because of government financial constraints at the time.

Recently in 2007, Prof. Ibrahim prepared a draft for new regulations for registration of pharmaceutical products to replace the 1974 regulations. The draft that has been prepared is pending approval by the Board.

The national drug supply system

Since the 1940s, SMS had its own Central Medical Stores (CMS).[66] The stores were of limited capacity and were housed partly in the eastern part of the present Directorate of Pharmacy offices with some warehouses at Kilo 5 south of Khartoum. In 1952, the CMS were moved to their new and present premises in Khartoum South. Until that time, the CMS Director was a British medical doctor and his 'number 2', the Controller of Stores, was a non-medical British official.

CMS imported, stored and distributed drugs, dressings, disinfectants, public health pesticides, medical laboratory supplies, medical gases, hospital instruments and equipment to all public sector health facilities. With regard to drugs, until the mid 1960s, CMS imported and supplied about 85% of the country's requirement of drugs and dressings and practically all laboratory supplies and medical equipment.[67]

Before independence, all medical supplies for the public sector were ordered through SGPAO in London directly from specific well-known reputable suppliers, mostly British companies. In 1957, Assistant Director MOH, Dr El-Hadi El-Nagar became the first Sudanese to be

appointed as Chief of Division Medical Supplies as the post of Head of CMS was called at the time.[68]

For the first ten years, Prof. Ibrahim as GA was closely associated technically with CMS and together with Chief Pharmacist Ibrahim Gasim Mokhier and other senior medical specialists took part in revising drugs and dressings items in the CMS tender book, in drugs and dressings tender selection committees, and in arrangements for the laboratory analysis of samples of drugs and dressings taken from delivered consignments in NCL.

Rehabilitation of CMS

During the period 1969-1972, Prof. Ibrahim was called upon and accepted a temporary transfer to rehabilitate the CMSD. During his three years as Director, he managed to re-organize the CMS and establish a sound drug supply management system based on bulk procurement of all medical supplies by tenders on a biennial basis in accordance with a specific timetable. He converted the imperial system of measurements to the metric system, brought a railway siding into the CMS and established a training centre for supply personnel.

In 1986, at the request of MOH, WHO called on donor countries to help Sudan in implementing its main NDP components, including the top priority rehabilitation of CMS and upgrading its supply system. In 1986, the Government of Netherlands responded and signed an agreement with Sudan Government for the complete physical and technical rehabilitation of CMS. During the period 1986 up to 1991 and under the leadership of CMS Director Pharmacist Abdel-Rahman Al-Rasheed, all drugs and other storage facilities were completely overhauled and expanded, new cooling systems were installed, standard operating procedures for good storage practice were implemented and a modern organizational chart for management of CMS was designed.

The National Drug Policy

One of Prof. Ibrahim's major achievements in the drug field is his advocacy of the concept of essential drugs since 1977, and the formulation of SNDP in 1981. As chairperson of the national multidiscipli-

nary committee appointed by the Minister of Health for the purpose, and against strong private drug sector opposition, the committee was able to formulate a comprehensive NDP document that addressed almost all drug related components. This document was approved and adopted by the Minister of Health in 1981, and was considered by WHO at the time a great achievement and an example to be followed. This was followed by the selection of a National List of Essential Drugs in 1982, which, although not adopted at the time, laid the foundation and methodology for the selection of the national lists of 1985, 1987, 1995, and 2007, in all of which (but one) Prof. Ibrahim was the main editor.

In 1986 MOH asked WHO for support in the achievement of the main objectives of the NDP, namely to make good quality essential drugs available to the population at the PHC level and promote their rational use. WHO, impressed by Sudan's 1981 NDP, positively responded to the MOH request. WHO urged the Netherlands government as a donor to directly undertake the rehabilitation of the CMS drug supply system by direct agreement with the government, and at the same time fund an essential drugs programme to be implemented by WHO in Sudan. The Dutch government agreed to both. (The rehabilitation of the CMS by the Dutch government has been mentioned earlier).

WHO assigned two consultants (Jens Hasfeldt and Lemm Proos) to formulate a 5-year Plan of Operation for a SEDP.

The first phase (1988-1992) of the programme aimed at developing and testing new strategies for improving the drug supply system, upgrading diagnostic, prescribing and dispensing skills of health workers, improving patient compliance, public knowledge, attitudes and practices in drug use. The newly designed strategies were tested in River Nile State. The success of the first phase prompted WHO to approve a second phase (1993-1997) during which successful strategies were replicated in other states.

In spite of Sudan's considerable economic, administrative and political problems and constraints at the time, Prof. Ibrahim ably managed SEDP, which had a great positive impact on all drug related activities

in Sudan: on strategies, policies, education, training, safety, efficacy, quality, access, regulation, rational use and operational research.

While Prof. Ibrahim was Manager and National Coordinator of WHO-supported essential drugs programmes, he planned, followed up and guided the implementation of several on-going essential drugs projects. These included the strengthening of the Directorate of Pharmacy, the computerization of pharmaceutical products registration activities, the upgrading of drug control laboratories, the establishment and maintenance of the Drug Information Centre in KTH, and the coordination of donor activities. He competently managed the SEDP, which WHO considered to be one of the best-managed and successful WHO-supported essential drugs country programmes.

The National Health Insurance System

In 1995, Prof. Ibrahim chaired the Technical Committee appointed by the Ministerial Committee for the establishment of Sudan's first Health Insurance Public Corporation (later Fund). The Technical Committee submitted a comprehensive report incorporating a plan of action, proposed budgets, and a draft of the law to be enacted to establish, administer, finance and run the National Health Insurance System.

Laboratories and Medical Research

In 1997, Prof. Ibrahim chaired a committee appointed by the Minister of Health to study the organizational structure and job descriptions of the DGLMR. The committee produced a comprehensive report, recommending the establishment of an autonomous public corporation, and outlining a detailed organizational structure, job descriptions, budgets and a draft of the law to be enacted to establish, administer and finance the project. The project like other similar projects could not be implemented because of governmental financial constraints.

Public health services

Prof. Ibrahim contributed to other public health services in many ways. In short, in the field of community water supply he is given credit for the development of the first national guidelines and stand-

ards of drinking water quality based on local scientific evidence and experience. He organised, with Dr Yusri (MOH Sanitary Engineer at the time) in 1967, the first training course in water supply for public health personnel in water quality surveillance. With the widespread use of pesticides in agriculture and public health, he developed the small toxicology laboratory into a department for Contaminants and Pesticide Residues in 1975 for the surveillance of pesticide residues and other contaminants in food, water and human environment.

Food Industries Corporation

In 1972, Prof. Ibrahim, at the request of Prof. Ahmad Abdel-Rahman Elagib, Director General, IDPC, was appointed as the Managing Director of FIC (incorporating 25 public sector food factories). After two years of achievements, as recognised by the Minister of Industry (the late Musa Awad Bilal) who wanted to extend his secondment, Prof. Ibrahim insisted on returning to the NCL in 1974.

Central Board of Public Health

Prof. Ibrahim continued to be a member of the (Statutory) CBPH from 1957 to 2000 and Secretary of the (Statutory) Food Control Advisory Committee from 1974 to 1989. In 1982 and again in 1991 he was appointed as Chairman of a Committee for updating health legislation that prepared drafts for new health acts and regulations. He played a leading role in the enactment of the new Pharmacy and Poisons Act of 2001. He was appointed as a member of the FBPP since its establishment in 2002 and until now (2008). He has been the Chairperson of the Standing Committee for Drug Registration from 1976 until his retirement in 1989 but continued as a member until the present time (2008).

National research & education

National Council for Research

In 1966, Prof. Ibrahim, and other prominent scientists, made major contributions in the efforts to form the NCR, which was established in 1970.[69] They submitted to the Prime Minister at the time (Mohamed

Ahmed Mahgoub) a 10-page memorandum which they regarded as a contribution to the then ongoing series of meetings sponsored by the Prime Minister and headed by Dr Abdel Halim Mohamed on ways and means to establish a national council for scientific research as promoted at the time by UNESCO. The memorandum addressed the controversial issues, suggested solutions to them, and helped to bridge many gaps during meetings. Later, Prof. Ibrahim and other scientists continued their efforts until the NCR was finally established in 1970 and its secretariat accommodated in the fifth floor of the NHL.

Sudan Essential Drugs Programme

Earlier under the heading (National Drug Policy), it was mentioned that SEDP, managed by Prof. Ibrahim, aimed to develop and test new strategies for improving the drug supply system, upgrade diagnostic, prescribing and dispensing skills of health workers, improve patient compliance and public knowledge, attitudes and practices (KAP) in drug use. All newly developed strategies were designed, tested and evaluated for future replication nationally.

The Programme also included a component of operational research in drug stability, antimicrobial resistance (AMR) and drug use in health facilities and communities. In these strategies, studies and surveys, the Programme developed research protocols, made baseline and post intervention surveys to measure impact, developed indicators and made recommendations on improvements. This was part of what SEDP was doing and did during its 10-year existence (1988-1997) and most of its activities have been documented.

Prof. Ibrahim may not have been the primary researcher in all these studies and surveys, but as manager, coordinator and leader of SEDP has actually guided, contributed, took part in the development of study protocols, their implementation plans, and analysis of results, conclusions, recommendations and documentations. Some of the areas covered by SEDP studies were:

- Health Area drug distribution system.
- Drug Ration Kits distribution methodology.

- Drug stability studies (local and global) during transport, storage and distribution.
- In-service training in rational use of drugs (for prescribers and dispensers at all levels).
- Revision of curricula in formal education (medical and pharmacy).
- Studies of drug use in health facilities and communities (several studies).
- Information, education and communication (IEC) to improve public KAP on drug use.
- Antimicrobial resistance studies on bacterial urinary tract and gastrointestinal tract infections in Khartoum Province.

As expected, both locally produced and WHO protocols of these studies are being updated and used by researchers.

Pharmacy and Medical Education

A sizeable part of this biography has already been devoted to the history of pharmacy education and services and the contribution of Prof. Ibrahim and others in its development. Mention was also made of Prof. Ibrahim role in training laboratory staff and technicians for the health laboratories and other government and public institutions. Mention has been made of his inputs as member in UK Council and Faculty boards and as an external examiner and or supervisor to tens of postgraduate students. But mention should be made of Prof. Ibrahim's role in the promotion of the concept of essential drug and subjects like rational drug use, drug supply management, drug quality assurance and for conducting SEDP training course for medical, pharmaceutical, paramedical, and auxiliary health personnel (13 cadres) in which 2367 participants attended between 1990 and 1998.[70]

Moreover, in an effort to convince faculties of medicine and pharmacy to update their curricula, Prof. Ibrahim arranged for many of their lecturers to attend courses and workshops abroad on modern pharmacotherapy teaching, rational drug use and other relevant subjects at

SEDP expense. He also invited foreign academicians to advise on updating faculties' curricula.

Ever since he has been an active member of several research bodies and was a member of the MRC during 1975-1985 and President of the Science and Technology Research Council and member of the NCR during 1988-1989. He is currently (2008) a member of the National Research Ethics Committee.

University of Khartoum

Prof. Ibrahim has been a member of UK Council 1974 to 2001, at times a member of its Executive and Finance Committee, a member of the Faculty Board of Science and Faculty Board of Pharmacy, UK. He was awarded the Honourary DSc by UK in appreciation of his services to the University. He was also a member of the Admission Committee for Higher Education and an external examiner in the Faculties of Science and Pharmacy. Since 2006 and up to now, he is a member of Pharmacy Specialization Board (2008).

Recognition

In recognition of his academic excellence and distinctive professional achievements, Prof. Ibrahim was honoured by the State[71] and several academic bodies.[72] He was granted several academic awards, honours,[73] affiliations to international bodies,[74] and entrusted with several WHO assignments.[75]

With his wide knowledge and varied long experience, Prof. Ibrahim has always been called upon for help. He chaired or was a member of several committees (statutory, standing or *ad hoc*), renowned academic and official bodies,[76] and sports associations[77]and boards, or working groups. Whatever his capacity in these bodies, he was always the mastermind and the active force with the most valuable input.

Hobbies and pastimes

On the social side, Prof. Ibrahim is a leading national figure in the sports field. He was captain of GMC football team, a leading first class club football player, secretary and president of Elneel sports club in Khartoum, secretary and vice-president of Sudan Football Associa-

tion, honourary member of the Sudan Olympic Committee, member of Sudan Basket Ball Association, member of Sudan Boxing Association, and member of the National Council for Sports. He was one of the national pioneers in the promotion, organization and management and regulation of sports in general and football in particular. He has drafted in the past most of the basic laws, regulations and rules that govern the establishment of sports organizations and manage their activities and games.

Written contributions

During most of his working life, Prof. Ibrahim has been on the highest echelon of Sudan's health institutions: the National Health Laboratories, Central Medical Supplies Division, National Council for Research, Medical Research Council, Sudan Essential Drugs Programme, Federal Board of Pharmacy and Poisons, Pharmacy Specialization Board, Sudan Medical Council, Central Board of Public Health and other health, academic, and research bodies. He has been an active and productive member in these organizations. Since these types of organizations are known for generating large amounts of grey documents, Prof. Ibrahim, trustworthy and well informed as he was, spent a sizable portion of his time in these organizations producing the needed documents.

He produced a large number of technical reports, white papers, book sections, drafts of health acts and regulations, departmental manuals, conference papers and proceedings, lecture notes, raw data such as operational research surveys, memoranda, *ad hoc* publications, project summaries, trip reports, working and discussion papers, unofficial government documents, studies, market surveys, pamphlets, brochures, and newsletters. Most of Prof. Ibrahim's contributions were confined to Wellcome Chemical Laboratories annual reports and SEDP publications. Whatever his contributions, they have all been of high quality in language, format and content.

A sizable volume of Prof. Ibrahim contributions, thus, resides in the field of grey literature.[78] These documents like any other 'grey literature' are characteristically not always easily available. Identification and acquisition of this type of literature pose difficulties for librarians and other information professionals. It lacks strict bibliographic control, meaning that basic information such as author, publication date or publishing body if any may not be easily discerned. In addition, non-professional layouts and formats and low print runs of this literature make the organized collection of such publications challenging compared to more traditional published media.[79] Aware of this situation, we collected and archived Prof. Ibrahim documents among others and made them available for researchers.[80] Some of Prof. Ibrahim written contributions is listed below.

Publications

1. Nile Province Essential Drugs Programme (First Edition 1990) (Editor Prof. A. Ibrahim), (Second Edition 1993) (Editor Prof. A. Ibrahim).
2. National List of Essential Drugs (1982, 1985, 1987, 1995).
3. Primary Health Care Wall Treatment Chart. 1995 (Editor M.H. Gabir).
4. National Drug Policy documents: drafting, editing and translation of the National Drug Policy documents in 1981, 1997, 2005 (Prof. A.H. Ibrahim).
5. Concept of Essential Drugs, 1990 (Editor Prof. A. Ibrahim).
6. *In Service Training Manual in Rational Use of Drugs* 1990 for Medical Officers (Editor Dr M.H. Gabir).
7. *In Service Training Manual in Rational Use of Drugs for Medical Assistants* 1990 (In Arabic – Editor Dr M.H. Gabir).
8. *Medical Assistant Manual*, 1990 (First Edition) (Editor Dr M.H. Gabir).
9. *Sudan National Formulary*, 1991 (Editor Dr M.H. Gabir).
10. Public Education in Rational Use of Drugs 1993 (Editor Ms Ilham Abdalla Bashir) 1993.
11. Antimicrobial Resistance in isolates from patients with diarrhoea and urinary tract infections, 1995 (Editor Prof. Hassan Sid Ahmed).
12. *Medical Assistant Manual* 1996 Second Edition (Editor Dr M.H. Gabir).
13. *Pharmaceutical Assistants Manual 2002* (Editor Pharmacist Kamil Koko).
14. Malaria in Sudan, Diagnosis, Chemoprophylaxis and Treatment 1997 (Editor M.H. Gabir).

Papers contributed in different forums

- **Report on quality control of drugs and pharmaceuticals**. Abdel Hamid Ibrahim. WHO/Pharm/Exa/30 dated 24 August 1960.
- **Sudan Folk Medicine and Materia Medica,** Catalogue of vegetable samples with notes on uses. Annual Report of the Government Analyst, Wellcome Chemical Laboratories for the year 1958-1959, MOH Republic of Sudan; APPENDIX II; pages 29-40.
- **Sudan Folk Medicine and Materia Medica,** Catalogue of mineral samples with notes on uses. Annual Report of Government Analyst, Wellcome Chemical Laboratories for the year 1959-1960, Ministry of Health Republic of Sudan; APPENDIX II; pages 23-29.
- **Examination of Pharmaceutical Preparations in Sudan.** Part of the Annual Report of the Government Analyst, Wellcome Chemical Laboratories for the year 1958-1959, Ministry of Health Republic of Sudan, which with MOH approval, WHO chose to publish as a document (Ref. WHO/Pharm/Ex/30 dated 24 August 1960) for distribution to members of WHO Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations and other specialists and for use in future seminars, as indicated. (The published part was seven pages).
- Abdel Hamid Ibrahim and Khalil Kronfoli. **Joint Report on the Trip arranged by Shell Co. (Sudan) to Amsterdam, Cologne and London** between 13th and 22nd March 1962 to investigate possible air and water pollution from the proposed Port Sudan Refinery (8 pages) submitted 2 April 1962.
- **Chemical Examination and Quality of Drinking Water.** A paper presented in the Seminar on Community water Supply in Sudan held at the Faculty of Engineering University of Khartoum in December 1967. Later published in *Sudan Engineering Society Journal* No. 18 June 1970, pages 22-30.
- **The Wellcome Chemical Laboratories.** A written Contribution (26 pages) presented in the Eighth Annual Congress of the

Philosophical Society of the Sudan on The Health of the Sudan, A Study in Social Development, 14-15 January 1960 at the University of Khartoum (Proceedings published in a book in 1963.

- **The Chemical Laboratories, Ministry of Health.** Information Paper (10 pages) dated 26 August 1969, summary of their past, present and planned future, achievements, constraints and recommendations for future development.
- **Certification of Imported Pharmaceutical Preparations.** Paper (8 pages) Presented at a WHO Travelling Seminar on Quality Control of Pharmaceutical Preparations, Islamabad Pakistan 9-21 March 1970 (Ref. EM/SEM.QUAL.CTR.PHARM/18b 11 March 1970).
- **Role of National Drug Regulatory Agencies in Collection, Evaluation and Dissemination of Information about Drug Usage in the Country.** Paper (4 pages) presented at Inter-country Meeting on National Drug Policies and Management organized by WHO, Manama Bahrain, 21-26 November 1983.
- **Optimal Use of National Drug Quality Control Laboratories in Relation to Drug Regulation**. Paper (8 pages) presented at Inter-country Meeting on National Drug Policies and Management organized by WHO, Manama Bahrain, 21-26 November 1983.
- **The Role of the Analytical Laboratory in Food Control Services.** Paper (in Arabic, 6 pages presented at the Public Health Officers Conference held in the School of Public Health Officers in Khartoum, I June 1984.
- **Republic of Sudan Country Paper** (6 pages, with annexed summary of Sudan 1981 National Drug Policy 6 pages) presented at the International Workshop and Seminar on Methods and Experiences in Planning for Health: Essential Drugs organized by the Nordic School of Public Health, Gotenburg. 9-19 June 1986.
- **A memorandum on the need to correct the present relationship between the Central Ministry of Health and different**

decentralized government authorities in health services. Memorandum (in Arabic, 10 pages) prepared and presented at the request of the Minister of Health at the annual meeting of the National Health Council in 1986.

- **Sudan Essential Drugs and Primary Health Care Support Programme.** Short paper (3 pages) presented in an Orientation Workshop on the Bamako Initiative sponsored by UNICEF held in the Faculty of Medicine University of Khartoum in September 1989 which was attended by the team of experts assigned the survey of PHC services in North Kordofan Province and development of a plan of operation to implement the Bamako Initiative.
- **Components of a National Drug Policy.** Paper (9 pages) presented at the national Workshop on National Drug Policy on Essential Drugs organized by WHO, Mogadishu, 9-13 September 1990.
- **Main Components of Drug Legislation.** Paper (6 pages) presented at the national Workshop on NDP on Essential Drugs organized by WHO, Mogadishu, 9-13 September 1990.
- **Operational Research.** Paper (7 pages) presented at Consultative Meeting for Programme Managers of Essential Drugs Projects, Sana'a, Yemen, 9 - 13 December 1990.
- **Running a Drug Quality Laboratory in Developing Countries.** Paper (9 pages) presented at Consultative Meeting for Programme Managers of Essential Drugs Projects, Sana'a Yemen, 9-13 December 1990.
- **The Role of the Analytical Laboratory in Drug Control**. Paper (4 pages) presented at the Follow up Seminar on Drug Regulation, Information and Quality Control organized by the German Foundation for international Development (DSE), Villa Borsig, Berlin Germany, 22-26 June 1992.
- **A Review of Drug Control in Sudan**. Paper (7 pages) presented at the Follow up Seminar on Drug Regulation, Information and Quality Control organized by the German Foundation for International Development (DSE), Villa Borsig, Berlin Germany, 22-26 June 1992.

- **Components of a National Drug Policy.** Paper (in Arabic, 9 pages) presented at a national Workshop on NDP organized by WHO, Sana'a' Yemen, 27-29 December 1992.
- **Short papers on Sudan's and Yemen's experiences and methodologies in developing their National Drug Policies** presented to the Meeting of Regional Experts on formulation and implementation of national drug policies and pharmaceutical master plans organized By WHO, Brazzaville 26 – 30 April 1993.
- **Development of Health Laboratory Services in Sudan 1903-1994.** Paper (Nine pages in Arabic) presented in a seminar entitled Towards an Effective Role of the National Health Laboratory held at NHL Khartoum 4-6 April 1994.
- **Process for formulation of a national drug policy (methodology).** Paper (in Arabic 6 pages, presented in a national conference 10 – 11 September 1997 on Syria Strategy of Local Drug Production and its Continued Development.
- **The Role of Analytical Laboratories in Food Control.** Paper (in Arabic 7 pages) presented in a national Workshop on Food Control at NHL Khartoum, October 1999.
- **Drug Situation in Sudan, and Sudan Essential Drugs Programme.** Two short country papers presented in the Regional Consultative Meeting on National Drug Policies, Alexandria Egypt, 6–8 September 1999.
- **Policies, Strategies and Future Plans of Local Drug Production in Sudan.** Report of a 3-member working group chaired by Prof. Ibrahim and presented by him in a one day Seminar in Hilton Hotel Khartoum on November 2001.
- **Review of 2005–2009 National Medicines Policy.** Paper (in Arabic 10 pages) was to be presented in the national Conference organized by the Federal Ministry of Health for Upgrading Health Services in Sudan which was to be held in Khartoum 25-27 February 2006 and which was postponed indefinitely.

- **Sudan Essential Drugs Programme (Final Report). A summary of activities and achievements since 1988**. Report by Prof. A. Ibrahim, Coordinator of Sudan Essential Drugs Programme. December 1999, 16 pages.
- **Historical Background of the Analytical Laboratories and Central Research in Ministry of Health** (Unpublished short paper in Arabic). 30 September 1994.
- **Local Manufacture of Medicines in Sudan – Past and Present**. (Five pages).
- **A Short History of Pharmacy in Sudan**. (11 pages to be completed).

Assignments reports

On many occasions, WHO contracted Prof. Ibrahim as a Short Term Consultant (STC) to undertake special technical assignments in countries of the East Mediterranean region with specific technical terms of reference that included organizing or conducting workshops, seminars, presentation of papers, drug situation overview or analysis, submission of an Assignment Report and an Executive Action Document (EAD) in accordance with WHO format that include findings, recommendations and plan of action. The following is a list of some of Prof. Ibrahim's STC Assignment Reports:-

- **Sana'a Yemen, 22 January–18 February 1986.** Subject: Establishment of a Governmental Drug Quality Control Laboratory. The 45-page report included building layout plans, internal laboratory fittings, furniture, services, equipment, instruments, labware, chemicals and reagents, reference books and periodicals, graduate and technical staff and their training locally and abroad and a phased programme of implementation. The laboratory was established exactly as planned in Sana'a'.
- **Mogadishu, Somalia, 9-19 September 1990.** Subject: Participant in a Workshop for formulation of a National Drug Policy (NDP) and selection of a National List of Essential Drugs for Somalia. Report: 32 pages; EAD 6 pages, and a proposed NDP document drafted by STC.

- **Muscat, Sultanate of Oman, 1–9 November 1990.** Subject: Registration and quality control of pharmaceutical products. Report: 26 pages; EAD 9 pages.
- **Sana'a' Yemen 31 July–12 August 1991.** Subject: Evaluation of Yemen Essential Drugs Programme. Joint Report with Dr W. Bannenberg and Mr. Ingvar Mohlin 80 pages, EAD 6 pages.
- **Islamabad, Pakistan, 21 November 1990–6 December 1991.** Subject: Development of a NDP for Pakistan. Report: 27 pages, EAD 3 pages, and a proposed NDP document drafted by STC.
- **Sana'a' Yemen, 16 December 1992–3 January 1993.** Subject: Participate in a Workshop for formulation of a NDP for Yemen. Report: 36 pages, EAD 2 pages, and a proposed NDP document drafted by STC.
- **Beirut, Lebanon, 27 October–11 November 1999.** Subject: Comprehensive Analysis of the Pharmaceutical Sector in Lebanon. Joint assignment and report with Dr Helen Borda and Janos Podgani. Report: 28 pages, EAD 13 pages (excluding annexes).
- **Tripoli, Libya, 3 November–1 December 1995.** Subject: Evaluation of available laboratory facilities in Ministry of Health and Faculty of Pharmacy Al-Fateh University of Medical Sciences for adoption of one as the official National Drug Quality Control Laboratory. Report 26 pages, EAD 4 pages
- **Damascus, Syria, 21 February–11 March 1997**. Subject: National Drug Policy of Syrian Arab Republic. Review and preparation for workshop for updating Joint Report with Dr H. Borda 16 pages, EAD 7 pages. Report Translated by Prof Ibrahim into Arabic (40 pages).
- **Damascus, Syria, 1–11 September 1997.** Subject: Updating the National Drug Policy of Syria. Report in Arabic 6 pages, with annexed draft of updated NDP in Arabic 12 pages, EAD in Arabic 4 pages, EAD in English 3 pages. During the assignment, Prof. Ibrahim attended and presented a paper in a Conference on Strategy of Development of National Drug Produc-

tion on 10 September 1997 on Process of Formulation of a National Drug Policy.

References and notes

[1] Ahmad Al-Safi. *Native Medicine in the Sudan*, Sudan Research Unit, Faculty of Arts, University of Khartoum, 1970: 74 pp. (Photostat).

[22] Dr Ahmad Al Safi was the founding Director of TMRI (1981-1989).

[3] The office was filled twice by two eminent Sudanese psychiatrists: the late Prof. Tigani El-Mahi (1959-1964) and the late Prof. Taha Baasher (1972-82); both were interested in traditional medicine.

[4] Ahmad Al-Safi; Taha Baasher, Editors. *Tigani Al-Mahi: Selected Essays*. Fist ed. (with an introduction by Taha Baasher). Khartoum: Khartoum University Press; 1981; University of Khartoum, Silver Jubilee-1956-1981. 187 pages.

[5] Ahmad Al-Safi; Taha Baasher, Editors. *Tigani Al-Mahi: Selected Essays*. [Arabic] Fist ed. (with an introduction by Dr Ahmad Al Safi). Khartoum: Khartoum University Press; 1984; University of Khartoum, 180 pages.

[6] Kaplan, Michael (editor). *Essential Works of Pavlov*. Bantam Books, NY. 1966, page 385.

[7] Haseeb, M.A. *A Monograph on Biomedical Research in the Sudan*. Volume 1: Introduction and Bibliography. Khartoum University Press, Khartoum, 1972. 121 pages.

[8] Ahmed Bayoumi. *The History of Sudan Health Services*. Kenya Literature Bureau, Nairobi, 1979. 351 pages.

[9] Squires, Herbert Chavasse. *The Sudan Medical Service: An Experiment in Social Medicine*. London: Heinemann Medical Books, 1958: 138 pages.

[10] Hawley, Donald. *Sudan Canterbury Tales*. (Arabic translation by Mohamed Ahmed El Khadir El Tom). Abdel Karim Mirghani Centre, Khartoum, 2007: 480 pages.

[11] '606' is the anti-syphilitic Novarsenobillon.

[12] Bell, Heather. *Frontiers of Medicine in the Anglo-Egyptian Sudan, 1899-1940*. Clarendon Press, Oxford, 1999: 261 pages.

[13] Balfour, Andrew (Ed.) *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; 1904 (First Report); *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; 1906 (Second Report); *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; 1908, (Third Report); *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; 1911, (Fourth Report). The Wellcome reports were and still are classical documentation of the work carried out in the first two decades of the 20th century.

[14] D'Arcy, Patrick Francis. *Laboratory on the Nile: A History of the Wellcome Tropical Research Laboratories*. The Haworth Press, Binghamton, New York, 1999: 281 pages.

[15] D'Arcy. Op. Cit.

[16] D'Arcy. Op. Cit.

[17] G.R. Footner (FRCS) was the first senior surgeon and the first lecturer in surgery to the Kitchener School of Medicine.

[18] Lady Baker (Austrian by birth) accompanied her husband Sir Samuel Baker in his travels of exploration of Central Africa. She was the first European woman to render medical work in those regions.

[19] Squires. Op. Cit. Page 48.

[20] Dr Jack B. Christopherson (1868-1955) was best known for developing treatment for schistosomiasis using injections of tartar emetic or potassium antimony tartarate in Khartoum Civil Hospital during the First World War. Squires (1958) commented on this achievement saying that it was 'probably the most significant contribution to medicine made by a member of the Sudan Medical Service'. This medical milestone was commemorated in Sudan in 2003. Prof. Abel Rahman Mohamed Musa (MRCP, FRCP) and coworkers initiated the idea of honouring Dr Christopherson by fixing a plaque in Ward 4 (Arbaagi), currently in the west wing of the old Khartoum Civil Hospital buildings (currently the National Council for Medical Specialization Board) where he carried out

his historic work. A symposium was also held on bilharzia in the same place.

[21] Bell, Op. Cit. Page 23.

[22] Currie, J. The education experiment in the Anglo-Egyptian Sudan, 1900-1933, *Journal of the African Society*, London (quoted by AAA Adeel. Henry Wellcome and the Sudan. 18 September 2000, electronic copy).

[23] Gorgas Memorial Laboratory: Hearings before the Committee on Foreign Affairs, House of Representatives, Seventieth Congress, first session on H.R. 8128 to authorize a permanent annual appropriation for the maintenance and operation of the Gorgas Memorial Laboratory. 1928. Washington: United States Government Printing Office.

[24] Currie to Wellcome, 3 Aug. 1903, File 3c, Box 42 Miscellaneous correspondence 1903 WA (quoted from Heather Bell, footnote, page 62).

[25] D'Arcy. Op. Cit. Page 243.

[26] Letter of Gift addressed to Wingate.

[27] Stack laboratories were built to commemorate the death of Sir Lee Stack who was assassinated in Egypt in 1924.

[28] Bayoumi. Op. Cit. Page 100.

[29] Haseeb, M.A. Op. Cit. Page 17.

[30] D'Arcy. Op. Cit. Page 57.

[31] D'Arcy. Op. Cit.

[32] For a concise summary of his work in Sudan, see Squires (1958). Op. Cit. Page 11.

[33] Kirk, R. Sir Henry Wellcome and the Sudan. *Sudan Notes and Records*, 37: 79-89.

[34] Abdel Hamid Ibrahim. Development of Health Laboratory Services in Sudan 1903-1994. Paper presented in a seminar entitled Towards an Effective Role of the National Health Laboratory held at NHL Khartoum 4-6 April 1994: 9 pages in Arabic.

[35]Abdel Hamid Ibrahim. Chemical Laboratories, Ministry of Health 26 August 1969: 10 pages in Arabic.

[36] Bayoumi. Op. Cit.

[37] Bell. Op. Cit

[38] D'Arcy. Op. Cit.

[39] Ahmed Awad Abdel Hamid Adiel. (Two electronic reports) Andrew Balfor of Khartoum at http://www.geocities.com/aaadeel/abofkrt.html, and Henry Wellcome and the Sudan at http://www.geocities.com/aaadeel/hsw.html.

[40] Abdel Hamid Ibrahim. The Wellcome Chemical Laboratories. A written Contribution presented in the Eighth Annual Conference of the Philosophical Society of the Sudan on The Health of The Sudan, A Study in Social Development, 14-15 January 1960 at the University of Khartoum (Proceedings published in a book in 1963. A 39-page manuscript is also found in Sudan Medical Papers of Robert Kirk. Reference GPR/0115/RCMS 122. Cambridge University Library: Royal Commonwealth Society Library, London: 26 pages.

[41] Kirk, R. Op. Cit. Pages 79-89.

[42] Extract from Will of Sir H. Wellcome (Deceased).

[43] Kirk, R. Op. Cit. Page 84.

[44] Balfour, Andrew. (Ed.) *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; First Report. 1904: Page 13.

[45] Hassan Hallab (Ed.). *The Health of the Sudan: A Bibliography*. Faculty of Medicine, University of Khartoum. Golden Jubilee (1924-1974), 1974.

[46] University of Khartoum. Op. Cit. (Introduction).

[47] Balfour, Andrew. (Ed.) *Wellcome Research Laboratories Reports*. Department of Education, Sudan Government, Khartoum; First Report. 1904: Pages 9, 11.

[48] Balfour, Andrew. Op. Cit. Pages 9, 11.

[49] Khalafalla Babiker El Badri. Health Education of the Public. In: The Health of the Sudan: A Study of Social Development. Proceedings of the Eighth Annual Conference 14th & 15th January 1960. The Philosophical Society of the Sudan, Khartoum, 1963: pages 130-131.

[50] Report of the Medical Services, Ministry of Health for the year 1963/1964. Page 80.

[51] Ahmad Al-Safi. Museum of the History of Medicine and Health Culture in Sudan. Proposal memorandum presented by Traditional Medicine Research Institute, National Council for Research, Khartoum to UNESCO 1985.

[52] A herbarium is a collection of well-identified, dried and pressed plants that are mounted on paper and arranged in cases in some type of retrieval scheme. The label on each specimen has information such as the plant name, the name of the person who collected the plant, and when and where it was collected. Often, information on the plant community it was growing in (such as grassland, forest, etc.), the soil type, pollinators, or plant uses are also noted on the label.

[53] This monograph is based on Abdel Hamid Ibrahim resume, list of publications, grey documents, written statements, and extensive interviews and personal communications with him.

[54] Three months training in Scotland Yard, Tropical Products Institute and Government Chemist Laboratories in London in 1959; Two months training course in Occupational Health at High Institute of Public Health, Alexandria in 1961; Two months training at FDA/USA offices and laboratories in Rockville, Washington, Philadelphia and Harrisburg in 1970.

[55] A famous national survey designed and implemented in accordance with internationally recognized methodology by the Ministry of Labour and Administrative Reform in 1978 for the quantitative scientific evaluation of every post in the civil service using a scoring system for duties, responsibilities, qualifications requirements, working conditions, etc. including interviews with job holders resulted in the post of Government Analyst and Director of the National Chemical Laboratories getting the highest score as the number one post in the civil service (مشروع تقويم وترتيب الوظائف بواسطة الجهاز المركزي لتقويم وترتيب الوظائف عام ١٩٧٨).

[56] For more information on the Wilson report, see Bayoumi, Op. Cit. Pages 134-135.

[57] General Food Hygiene Regulation. Copy in SMHF Archives under Abdel Hamid Ibrahim Suleiman Collection.

[58] Food Additives, the Food Inspection, Sampling and Analysis Regulations. Copy in SMHF Archives under Abdel Hamid Ibrahim Suleiman Collection.

[59] Registration of Pre-packed Food Regulations. Copy in SMHF Archives under Abdel Hamid Ibrahim Suleiman Collection.

[60] The Codex Alimentarius Commission was created in 1963 by FAO and WHO to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this Programme are protecting health of the consumers and ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations. The Codex Alimentarius, or the food code, has become the global reference point for consumers, food producers and processors, national food control agencies and the international food trade. The code has had an enormous impact on the thinking of food producers and processors as well as on the awareness of the consumers. Its influence extends to every continent, and its contribution to the protection of public health and fair practices in the food trade is immeasurable.

[61] The six students were Abdel-Rahman Al-Rasheed Sid Ahmed, Gasim Ibrahim Gasim Mokheir, Mohamed Hamed Abdalla, Hassan Mohamed Ahmed Hassan, Mohamed Awad Omer El Huwaig, and Abdel Azim El Sheikh Medani.

[62] Patrick F. D'Arcy (1927-2001), OBE, Bpharm, PhD, DSc, DSc (Hon), FRPharmS, Cchem, FRSC, FPSNI. Prof. Emeritus of Pharmacy in The Queen's University of Belfast, Northern Ireland, United Kingdom, formerly Prof. of Pharmacology and Dean, Faculty of Pharmacy, University of Khartoum, Sudan (1962-1967).

[63] Report on quality control of drugs and pharmaceuticals. Abdel Hamid Ibrahim. WHO/Pharm/Exa/30 dated 24 August 1960.

[64] Minutes of CBPH Meeting held in the Under Secretary Office on 16.10.1963.

[65] Call by Secretary, CBPH (Dr Zein El Abdeen Ibrahim) dated 20 March 1965 to members of the Technical Committee for Registration of Drugs to attend a meeting on Saturday 27 March 1965 to look into applications for registration of new unregistered drugs and to make necessary recommendation to CBPH.

[66] Excerpts from an unpublished paper by Abdel Hamid Ibrahim Suleiman titled (A Short History of Pharmacy in the Sudan). Copy in Sudan Medical Heritage Foundation Archives under Abdel Hamid Ibrahim Suleiman Collection.

[67] As for the private sector, most reputable multinational drug companies had licensed local agents (importers/wholesalers) in Sudan and distributed their products through licensed private pharmacies. Private pharmacies supplied about 15% of the drugs consumed in Sudan at that time. Until 1960 there were no drugs locally manufactured.

[68] The first pharmacist to become Director, CMS was Abdel-Rahman Al-Rasheed Sid Ahmed in 1979.

[69] A memorandum to establish a body called the National Council for Research and Technology was proposed by Dr Abdel Halim Mohamed in 13 June 1966 and the matter discussed in a ministerial meeting. The issue was supported by Prof. Mustafa Hassan, Dr Gafar Karrar, Dr Mohamed Abdul Rahman Ziyada, and Mr. Abdel Hamid Ibrahim. This group issued a vindication memo in 16 June 1966. Coincidentally, Dr Mohamed Hamad Satti proposed in 1966 the creation of a Medical Research Council and a Higher Scientific Council for Research under which all research disciplines were to be included.

[70] Sudan Essential Drugs Programme (Final Report). A summary of activities and achievements since 1988. Report by Prof. A. Ibrahim, Coordinator of Sudan Essential Drugs Programme. December 1999, 16 pages.

[71] The State awarded Prof. Ibrahim the Golden Sports Medal in 1982 and National decoration with Medal of Competence (Wisam Al-gadarah) in 2001.

[72] He received several appreciation awards from Sudan Pathologists Association and Sudan Pharmacists Association.

[73] He was the first Sudanese to be awarded Fellow of the Royal Society of Chemistry (FRSC), United Kingdom in 1969; he was made Research Prof. by a Joint Health Researchers Assessment Board in 1973, and was awarded the Honourary Degree of Doctor of Science (DSc) by University of Khartoum in 1987; Chartered Chemist (CCHEM, U.K) in 1978.

74 Prof. Ibrahim was elected Vice Chairman FAO/WHO Codex Alimentarius Commission (1981-1983); Member WHO Expert Advisory Panel on the International Pharmacopoeia and Pharmaceutical Preparations

(1986-1998); Member WHO Expert Advisory Panel on Drug Policies and Management (1996-2003).

[75] He was Short Term Consultant (STC), Sana'a Yemen, Establishment of a Drug Quality Control Laboratory, 1986; STC, Mogadishu Somalia, Development of National Drug Policy (NDP) and selection of a list of essential drugs 1990; STC, Muscat Oman, Drug Regulation and Quality Control 1990; STC, Sana'a & other cities, Yemen, Evaluation of WHO Essential Drugs Programme 1991; STC, Islamabad Pakistan, Development of a National Drug Policy 1991. STC, Sana'a, Yemen, Development of a National Drug Policy, 1992-3; STC, Tripoli Libya, Evaluation of Drug Quality Control facilities1995; STC, Damascus Syria, Comprehensive Analysis of Drug Situation, 1997; STC, Damascus Syria, Updating National Drug Policy, 1997; STC, Beirut Lebanon, Development of a National Drug Policy, 1997. This is in addition to participation as WHO expert or resource person in many meetings of experts, consultations, consultative meetings and workshops abroad.

[76] Membership of Prof. Ibrahim in official national statutory Boards and Committees include: Member of the Central Board of Public Health, 1957-Now; Member, Khartoum University Council, 1974-2001; Member, Executive and Finance Committee, University of Khartoum, 1974-1984; Member, Academic Staff affairs Committee, University of Khartoum, 1974-1980; Member, Faculty Board of Science, University of Khartoum, 1957-1961; Member, Faculty Board of Pharmacy University of Khartoum, 1969-1972; Member, Board of Directors National Chemicals Company, 1970-1971; Member, Board of Directors Industrial Production Public Corporation, 1972-1974; Member, Medical Research Council, 1975-1985; Member, Science and Technology Research Council, 1971-1988; President, Science and technology Research Council, 1988-1989; Member, National Council for Research, 1988-1989; Member, National Board of Drinking Water & Effluent Disposal, 1981-1984; Member of Standing Committee for Registration of Medicinal Products, 1963-now; Chairman, Committee for Registration of Medicinal Products, 1976-1989; Member, Supreme Council of Sports and Youth Welfare, 1982-1985; Secretary, Food Control Advisory Committee, 1985-1989; Chairman, Committee for Registration of Pre-packed Food Products, 1979-1989; Member, Higher Education Admission Board, 1987-1989; Member, FBPP, 2002-Now.

[77] Tens of tokens of appreciation were presented to Prof. Ibrahim on various occasions by the State, Sudan Olympic Committee, Sports Associations, Sports Clubs and others. He was awarded Sports Medal decoration in 1983 and the International Olympic Committee Trophy in 1998.

[78] This type of literature is defined as "information produced on all levels of government, academia, business and industry in electronic and print formats not controlled by commercial publishing, where publishing is not the primary activity of the producing body." (Luxembourg, 1997 - Expanded in New York, 2004).

[79] Sudan Medical Heritage Foundation is establishing an archive of published and unpublished medical documents (original texts or copies) produced by individuals or institutions. These documents will be indexed, described and made available to researchers in hard copy and online. Deposition of these documents is invited.

[80] SMHF Archives.

Photo Gallery

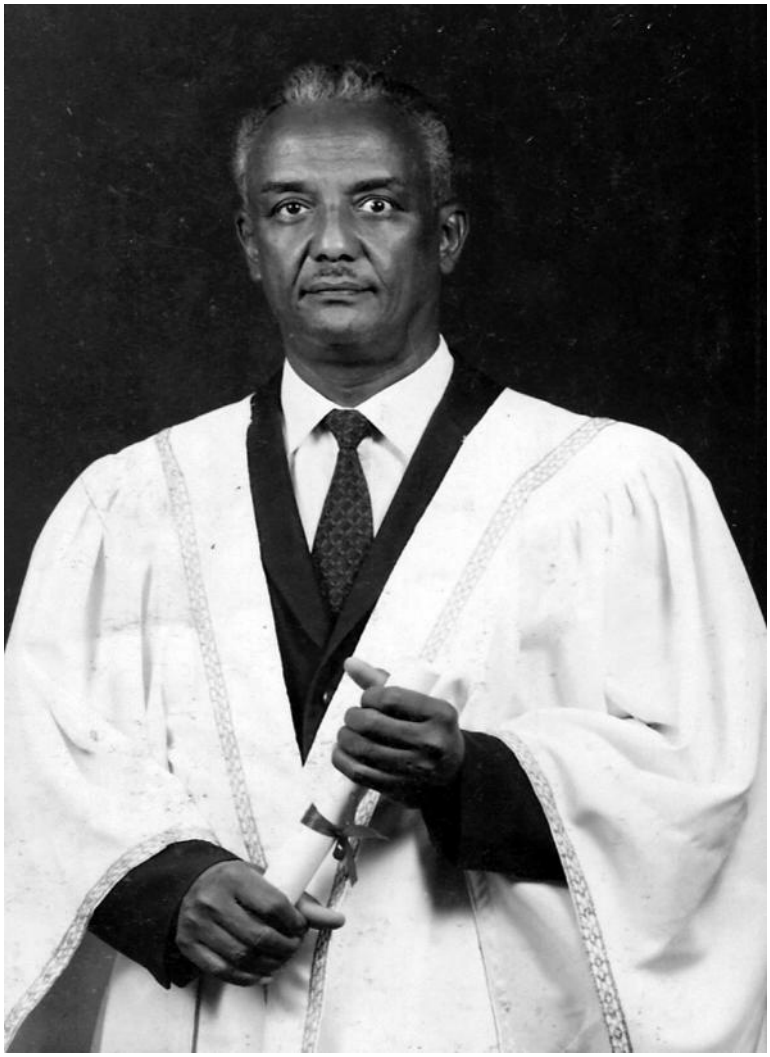


Figure 1: Abdel Hamid Ibrahim Suleiman at the ceremony of conferring on him the Honourary Doctor of Science degree by University of Khartoum in 1988

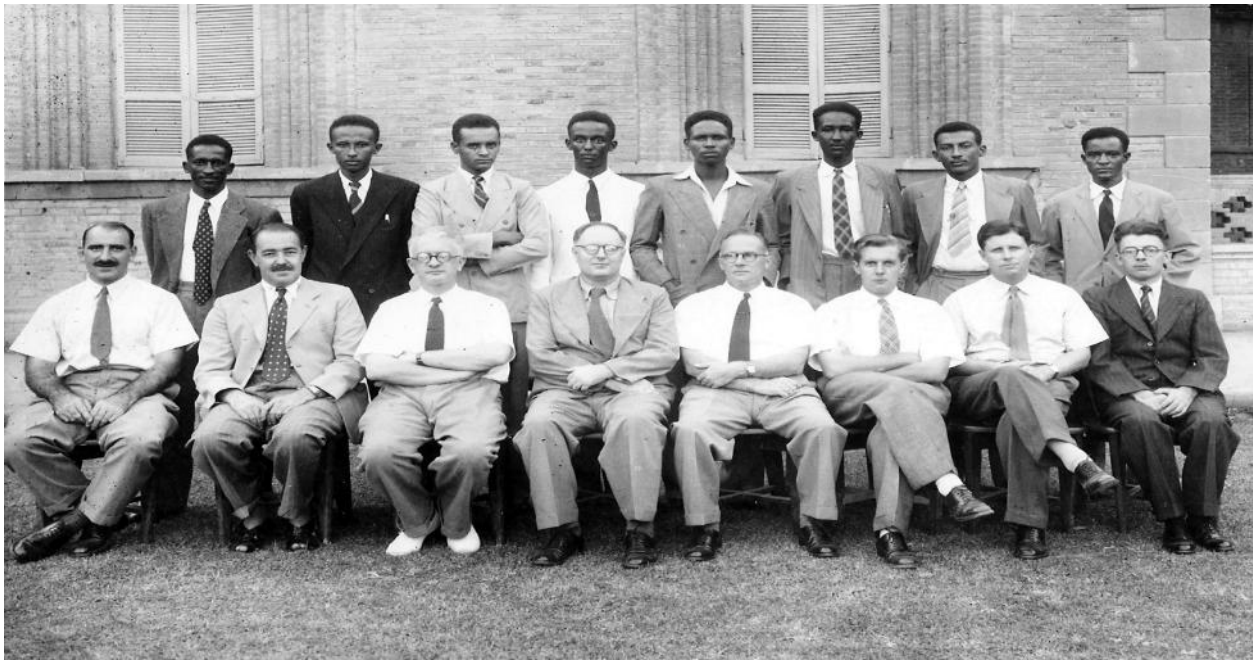


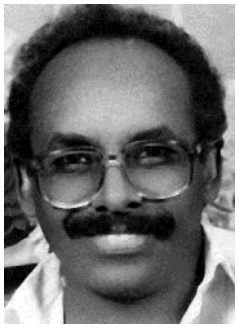
Figure 2: GMC Diploma class of 1949 and their academic staff (Prof. Ibrahim fourth from left, standing row)

Figure 3: GMC BSc (London) two-student class of 1950 & their academic staff (Prof. Ibrahim second from right, sitting & Sayyid Amin Al Tayeb Abdel Magsoud second from left, sitting)

Figure 4: Board of Directors of El-Neel Sports Club, Khartoum on winning the 1963\64 Football League Championship (Prof. Ibrahim, club secretary, second from left, sitting)

Figure 5: GMC Football Team 1948 (Prof. Ibrahim third from left, standing

Biographer's profile



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Professor Ahmad Al Safi is an Anesthesiologist, researcher, editor, and administrator. He is currently Professor of Anesthesiology, Khartoum College of Medical Sciences, & Executive Director, Sudan Medical Heritage Foundation. He is member of several standing committees in the Sudan Medical Council.

Prof. Safi graduated in 1971 from the Faculty of Medicine, University of Khartoum, Sudan, worked, and trained in the prestigious Royal Infirmary, Edinburgh, UK (1973-77). He achieved academic distinction by attaining the DA (RCP RCS) in 1976, Fellowship of the Faculty of Anaesthetists of the Royal College of Surgeons (FFARCS) of England in 1977, and Fellowship of the Royal College of Anaesthesia (FRCA), England. In 1982, he had orthodox training in traditional Chinese medicine and acupuncture as applied to Anaesthesia, analgesia and therapy in Nanjing (China).

He had strong foundation and experience in almost all subspecialties of Anaesthesia and intensive care. In thirty-six (36) years of medical

career, in addition to hands-on clinical practice, he managed departments of Anaesthesia, research institutions and hospitals. He had been consultant Anesthesiologist and Intensivist for the last twenty-seven (27) years in different hospitals around the world including the 1200-bed Khartoum Teaching Hospital in Sudan. He was one of the founding anesthesiologists of open-heart surgery with the late Mr. Ibrahim Mustafa and neurosurgery with Mr. Hussain Sulaiman Abu Salih in Shaab Hospital, Khartoum in 1980 and beyond.

In the period 1978-88, he carried out important studies for the Sudan Medical Council, Sudan Medical Association, and Ministry of Health. In 1982, the Sudan Medical Council asked him to study (Postgraduate Medical Qualifications: Recognition and Equivalence). The study became the preamble for the *Specialist Register Ordinance*. In 1984, the Sudan Medical Association and Ministry of Health asked him to study (Teaching Hospitals Organization and Management in the Sudan). The study became the preamble for the *Teaching Hospitals Organization and Management Ordinance* and the *High Council for Teaching Hospitals Ordinance* in 1985.

In the years 1989-2004, he occupied key posts in the medical services in ARAMCO Khafji Joint Operations (KJO) in Saudi Arabia. During this period, he contributed significantly to the promotion of health care management in the northeastern region of Saudi Arabia. In 1999, he was appointed Chairperson for the KJO Healthcare Quality Improvement Programme.

Prof. Safi was a student and disciple of the late Prof. Tigani El Mahi (1911-1970). Due to this memorable relation, Prof. Safi developed a love for the study of sociology, anthropology and history of Sudanese health culture. He dedicated the last thirty-five years in studies in these fields. To perpetuate Tigani's legacy, Prof. Safi spent ten years (1970-1980) collecting Tigani El Mahi's scattered works, which he edited with the late Prof. Taha Baasher (1922-2008) and published in two volumes titled *Tigani El Mahi Selected Essays* in Arabic and English in 1981 and 1984 respectively.

Prof. Safi wrote extensively on health issues in both Arabic and English. His voluminous book *Traditional Sudanese Medicine* (2006) is a wide-ranging 740-page account of traditional Sudanese medicine targeting health care providers, students of medicine, pharmacy, veterinary, agriculture, medical sociology, medical anthropology, and folklore. The book contains a 2500-reference bibliography of traditional medicine and history of medicine, and a 600-item Sudanese *materia medica*.

In 1981, he founded the Traditional Medicine Research Institute in Medical Research Council (National Council for Research). This institute was designated a World Health Organization Collaborating Centre in Traditional Medicine in 1984. He was founding director for this institute for ten years, and was a member of the WHO Expert Advisory Panel for traditional medicine in the Eastern Mediterranean Region (1982 for over ten years).

In 2005, he founded the Sudan Medical Heritage Foundation as a non-profit, non-governmental organization, and the Health Heritage Studies Centre as a charitable company. Both organizations are dedicated to health systems research, development, & conservation of the Sudanese health care heritage and resources.

Prof. Safi has an extensive record of accomplishments in working with and in groups for four decades. He founded or co-founded several organizations – governmental and non-governmental - and held executive offices in many, and memberships in many more.

His Arabic book (المرشد إلى قواعد وإجراءات الهيئات التداولية) *A Manual on Rules and Procedure of Deliberative Assemblies* (first edition 1999: 630 pages, second edition 2006: 580 pages) puts him in the forefront of Sudanese and Arab writers who have drawn attention to the field of parliamentary procedure. Critics have noted that this book is probably the only one of its kind in Arabic, and that it provided and invaluable toolbox for modern organizations in a country undergoing democratic transformation.

Prof. Safi was Editor of *Al Hakeem Medical Journal* (1968-1970), Editor-in-Chief, *Sudan Medical Journal* (1984-1988), Editor, *Sudan Studies Bulletin* (1984-1988), and Advisory Editor and referee, *Social*

Science and Medicine, Aberdeen (1984-1994). He is currently running a service called *Sudan Editors* aiming at improving Sudanese academic writing tools. SE service is run by a team of professionals, ex-editors, postgraduate supervisors, and authors specialized in producing and editing corporate communications and academic and postgraduate manuscripts.

He is currently launching a major documentation project called the *Sudan Health Trilogy* including:

- *A Biographical Dictionary of Health Care Professionals in the Sudan* documenting the lives and work of the men and women who have served in health care institutions or contributed to health and medicine in service and research in the Sudan in the period 1903 - 1978. This work will be a 'Who's Who' of Sudanese health care professionals, Britons, and other expatriate staff.
- *Pioneers of Sudanese Medicine series* documenting the lives and work of the men and women who have shaped health care services in the Sudan. The series will profile the individuals whose work has contributed significantly to the establishment and development of the medical profession.
- A *Bibliography of Biomedical Literature in the Sudan* (1900-2000) a compilation of medical literature on the Sudan by Sudanese scholars and expatriate staff produced during the 20th century.

His current fields of concern and study include health delivery systems with emphasis on anaesthetic safety and medical emergency preparedness, health culture, traditional medicine, history of medicine, and capacity building of civic society institutions.