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THE GHANA PHARMACEUTICAL JOURNAL

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Volume 10 Nos. 3 — 4 July — December, 1987

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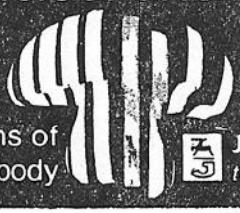

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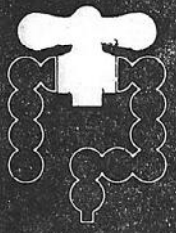

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4. The remains of a necrotic cell.

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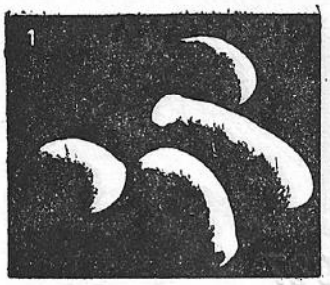

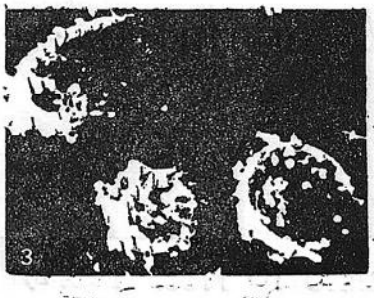

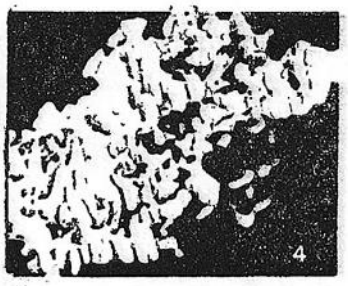

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Contents

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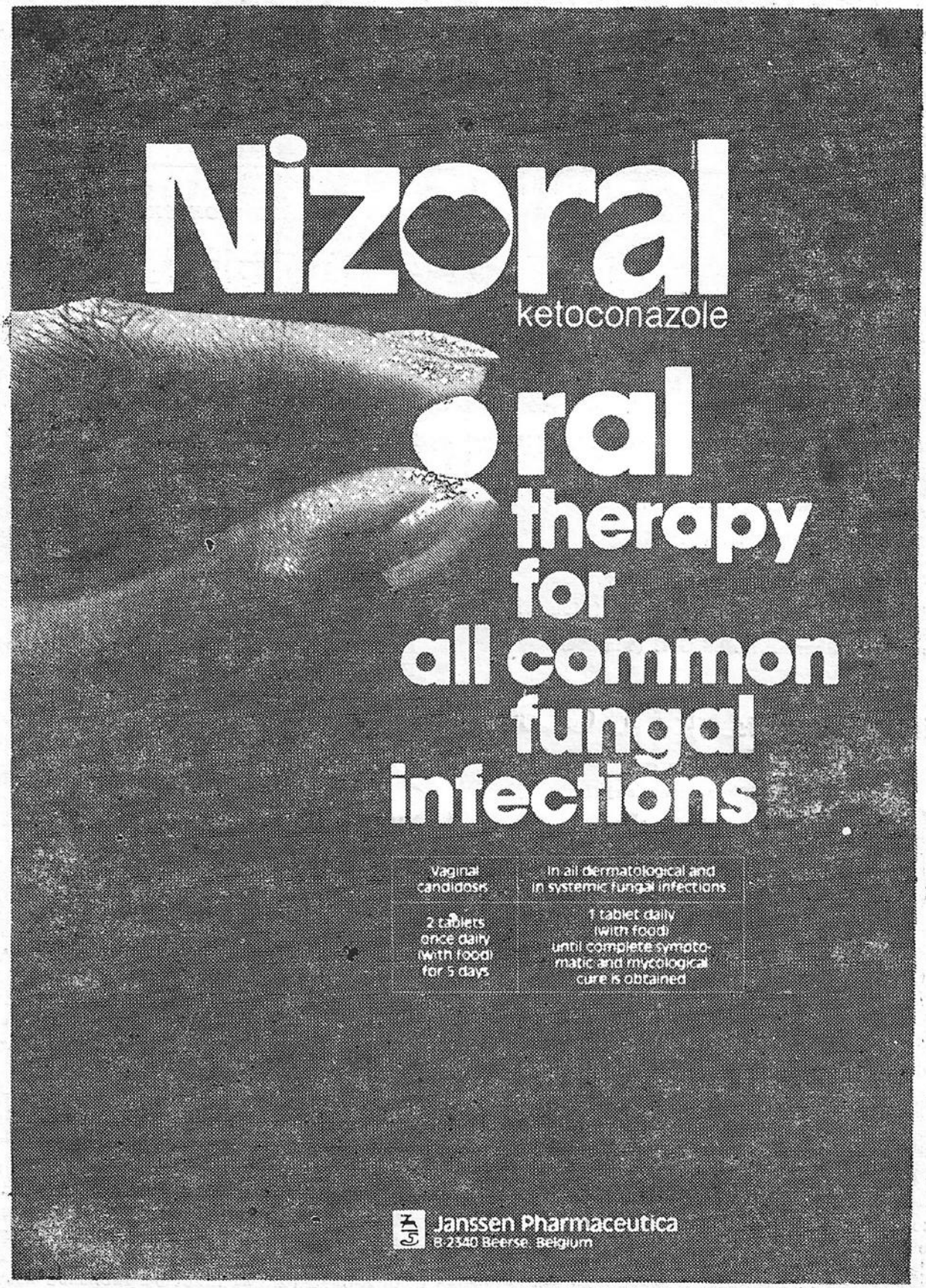

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ditorial

Catering for the Drug needs of All

IE Provision of adequate healthcare for all s, no doubt, been a major concern of governnts all over the world and the reason for s is not far-fetched.

However, it appears we have now reached frightening global situation where financial ources can no longer march up with healthre costs, and Mr J.D.D. Dees, State Secrey of the Ministry of Welfare, Health and ltural Affairs of the Netherlands in an open address he delivered on August 31 during 75th anniversary of the International Pharceutical Federation (IPF) held in Amsterm this year made mention of this fact which also fast becoming the concern of governnts.

According to Mr S.A. Botchway who the Deputy Director of Pharmaceutical rvices, Ministry of Health, some 40% of the al health budget of this country is spent on gs alone with more than 80% of this expenure in foreign exchange. Drugs also account more than 60% of the total recurrent expenure of the health budget apart from salaries l wages. Thus, one clearly sees the need to l a way out of this undesirable situation.

In the light of the foregoing, we have the owing suggestions to make:

* An Essential Drugs List and a National rmulary must be drawn up as early as possias these would not only lead to a more rational importation and use of drugs but would also make possible the availability, at all times, of those drugs that satisfy the nation's disease pattern at affordable prices.

* Practicing pharmacists should endeavour to acquire, either through self sponsorship or sponsorship by their employers, management and book-keeping skills from an institution like the Ghana Institute of Management and Public Administration (GIMPA), for with such skills, waste will be greatly minimized if not completely eliminated. Meanwhile, the Faculty of Pharmacy must enrich the management lessons taught in the final year.

* A fairer distribution of pharmacists in the country would also go a long way to encourage effective drug management and utilization and as such efforts at carrying qualified pharmaceutical services to rural areas must be vigorously pursued.

Finally, government, pharmacists and others concerned in the bid to find local substitutes to replace imported raw materials for use in local production of medicines and in the attempt at harmonizing traditional and orthodox medicines must not rest until these are achieved, for when these two goals are scored, we shall be more than half-way along the tortuous road to providing adequate healthcare for all without dissipating our usually hard earned foreign exchange.

Why the Journal

by "Herbus"

IF a Society should grow, then it means that it must go through a series of positive changes or innovations; and talking about innovations, sociologists in addition to having noted that these processes very often meet with opposition from society since people generally prefer to maintain the status quo, have also identified three ways by which innovations come about. According to these experts, a change may come about either historically, by force or voluntarily.

Historical change involves, for example, the following: let's turn our minds back to the time the White man first set foot on Ghanaian soil-presumably he came in a pair of trousers. We could also assume that a couple of local folks got attracted to the new attire while the vast majority still adhered to the local costume. Gradually, more and more folks got won over to the new way of life until today, when practically every male put on trousers.

A change by force may follow from the actions of a leadership with dictatorial tendencies. It says "henceforth no one must be seen in our local costume, all male citizens must dress up in trousers or face the consequences". It then goes on to use available instruments of coercion to carry out the command against the will of the people.

A voluntary change is effected through persuasion. The initiator of the innovation seeks to attain his goal by appealing to the intellect, mainly, and emotions of his audience. He therefore sets up a forum where matters relating to an intended innovation is discussed with a view to convincing his audience to accept and willingly carry out the innovation. A reliable forum for this sort of business can be found in a journal.

Pharmacists by virtue of their training and standing in society should by all means sympathise with the last means of effecting a change-the historical type takes too long while a change by force is best practiced in the jungle.

Thus, we see here a sensible reason why the Pharmaceutical Society of Ghana must regularly publish and circulate a journal. The Journal must be employed as a tool for bringing about positive changes within the Society if the latter is to make any meaningful headway into the future.

In this regard, the Journal must serve not only to widen the horizon and raise the aspiration of pharmacists by reporting on desirable changes that are going on in other parts of the world, but must also focus attention and lead discussions on current issues within the Society that need to be redressed.

Initiating a change is a difficult task so also is the work involved in implementing it. A journal *comme it faut* must therefore praise people who endeavour to initiate and implement changes that are aimed at taking the Society up the ladder of progress and encourage others to do the same.

Wherever there are builders, there also are destroyers. A society like ours would not be an exception to this rule-we certainly possess both species. The Journal, as a matter of course, must single out these bad nuts and subject them to condemnation in its columns. This practice would not only serve as punishment for persons who harm the image of the Society but, to a large measure, also serve as a deterrent to would-be transgressors.

The Pharmaceutical Society of Ghana is only part of the whole system we call Ghana. Matters that affect the latter would in the long run, if not immediately, affect it as well. In the light of this, the Journal must encourage the discussion of national political issues, particularly those directly affecting the profession and, in fact, must go on to urge more pharmacists to strive to be part of the major policy or law making bodies in the Country.

In additions to these functions, the Journal, through advertising of pharmaceutical products and services, could ginger up economic activities and thus help to improve and keep sound the nations economy.

It would be interesting to note that the mere existence of the Journal could induce more members to cultivate the habit of expressing themselves more effectively through writing, a virtue that bears a high price tag in any society aiming at reaching great heights.

Furthermore, a journal like ours ought to be a channel for fertile minded but "Crowd-shy" members among us to get across whatever ideas they have but are unable to bring them out at Branch and National Meetings.

The Journal, to conclude, should be a major forum for reporting and debating pharmaceutical affairs, be it professional, political, scientific, clinical or commercial with a view to eventually creating a pharmaceutical services machinery that can function more effectively with dignity and will stand the test of time.

Pharmacist and Pharmaceutical Fakes

by Patrick Bruce

WITH the inception of the Pharmacy Boards role of inspecting drugs imported into the country at the points of entry, for instance at the K.I.A. from the beginning of this year some very disturbing facts have come to light. Not the least of these is the incidence of fake drugs or sub-potent imitations.

Fake drugs are drugs which are labelled as containing a determined quantity of an active ingredient but

analysis, are found to contain
e or none. When a product is
icularly successful there are
crupulous manufacturers who
n to cash in on this success and
prepared to imitate the successful
duct using the same colour or
gn of pack, the same colour and
pe of tablet and even the same
ription. But what is important
e is that the quality of the pro-
t cannot be guaranteed. The
nufacturer who sets out to imitate
uccessful drug product as close
possible has the problem that
ation in the manufacturing pro-
or of the raw materials used
result in a product that is not
tical to the original, knowing
we do how pharmaceutical con-
ons can affect the release of a
licament from two specialities
ch claim to have the same active
redient in such a way that their
acies become totally different.
Various fake products have been
nd on the market. A cross section
given below:

A brand of ampicillin with the capsules labelled "AMPI 250" from Hamburg, West Germany. This was found to contain starch.

Griseofulvin tablets made by a Nigerian Company, Imarsel Chemical Co. Limited, Plot 8 Agege, Motor Road, P.O. Box 1829, Ikeja, was found to contain only 60mg of griseofulvin as against a declared value of 125mg per tablet. It was made up with sucrose. The tablets were very sweet to the taste. The Batch number was 230284.

3. Tagamet 200mg bearing the label S.K. and F, in red and white colours. They also bear the inscription "Made in Belgium" and batch number A.K 9312. The tablets are almost identical with original tagamet tablets but these contain no cimetidine at all.
4. A ventolin Inhaler bearing the legend Allen and Hanbury Limited, London E2 GLA England and lot number ZKQ-966. This do not have the 'A &H' Logo and "Ventolin Inhaler" embossed on the inhaler. The printing is also of a poor quality.

Fake drugs are best detected by chemical analysis. This is not always possible due to the various constraints experienced in this country. But a trained eye should be able to have a reasonably good idea if a certain product is genuine or not. Three pointers which can be of assistance are:

i. A very poor quality printing of label and package. The printing may be smeared, uneven, faint or not properly placed on the label or packet.
ii. The presence of spelling mistakes. A name or ingredient may be misspelt.
iii. The omission of a logo embossed on the package. Or instead of the batch number and expiry date being stamped INTO the packet, it is printed ON it.

Large amounts of fake drugs are being dumped on African markets. With our foreign exchange problems, we are easy targets for these manufacturers who sell their products more cheaply than the original product. A recent pronouncement (July 1987) by Prof. E. Essien, Dean of the School of Pharmacy, University of Lagos indicated that 70% of drugs on the Nigerian market are fake or adulterated. With this huge flood in Nigeria we can expect some of it to spill over into Ghana.

So how can we fight this menace? What can pharmacists in particular do about this growing threat to the public? For a start, we can be more particular where we obtain our supplies from. Beware of drugs coming from Nigeria. I am sure many of our retail pharmacies will have noticed an increasing number of members of the public who come and ask for "original this". They are very few now but if the problem increases, so will they. The solution lies with us. Are we going to sacrifice quality and efficacy for costs? Are we going to cut short lives instead of profits?

If we do not judge ourselves, society will judge us and society's judgement is much harsher. What are we going to do about it?

ETTERS to the Editor

ngering Herbalists

the morning of September 22,
ard the president of the Society,
K.A. Ohene-Manu, say in a
o interview that the Society and
Ministry of Health are jointly
king out modalities for a com-
sation for herbalists who give
secrets on medicinal plants.
personally believe this is a move
he right direction and when fina-
mplemented will go a long way
elp realise the dream of govern-
t and all concerned citizens
rding the formulation of medi-
l products from our God-given herbs.

Up till now, our medicine-men have felt reluctant to reveal secrets on useful medicinal plants for fear that once the "book-long" people lay hands on these they would develop them and enjoy alone the benefits thereof while throwing them (herbalists) out of business.

Now, if herbalists should learn that some sort of royalties will be paid to them when they have helped to make possible formulations of viable medicinal products from local plants, they will be willing to divulge such vital secrets of which there are many.

It is my hope that the Society and the Ministry will work fast to see the scheme through.

Joana Akainyah (Mrs)
Martins Chemists Ltd.
Accra.

* * *

Injection by Pharmacists

Sir,

IN his contribution at the symposium on the theme of the last conference, Mr Derx Baffour lamented that pharmacists who are supposed

to be "masters of Drugs" do not possess the know-how when it came to administration of medicines via the parenteral route.

This should be a matter of concern to pharmacists and patients alike for there have been many occasions, as he rightly said, when patients are rushed to pharmacies under the grip of malaria and when only a shot of chloroquine could do the trick but were turned out because the pharmacist could not inject.

By law pharmacists are allowed to treat "simple ailments of common occurence" and since malaria obviously falls in this category, pharmacists must give medical aid through the two known means of curing the ailment, that is, the oral and parenteral routes.

I believe pharmacists are responsible enough to safely administer injections.

Alice Tuani (Mrs)
Mayfair Chemist Ltd.
Accra.

* * *

The Induction Ceremony

Sir,

I am forced, through this channel, to express my dissatisfaction at the way induction of freshly qualified pharmacists was carried out during the last Annual General Meeting Dinner.

The mention of names of several persons who did not show up, I think was not only an utter waste of time but also rendered the ceremony rather boring.

I believe a way could be found whereby only those who will be present will have their names called out. The incoming executive should look into this matter and device a more acceptable method.

Sammy Nkansah
Accra

A "Shocking" Scientific Session

Sir,

IT is hard to comprehend how a science based profession like pharmacy could organize a whole A.G.M. without adequately providing for an effective scientific session.

The way the scientific session of the 39th Annual General Meeting was organized is nothing to be proud of. Even basic items like a slide projector and a screen were not available. The absence of these and other imputs delayed the onset of the session to the disappointment of many. This is bad enough and must never be allowed to happen again.

Council must therefore do everything possible to make sure the society purchases and possesses its own material needed to make a successful session at all times.

Doris Attafua (Mrs)
Vicdoris Pharmacy
Accra

* * *

Need for Unity

Sir,

IN what looked like an attempt to rally all pharmacists behind him, the President-elect, Mr E.O. Gyamfi said during the 39th Conference Dinner that since he had been elected President, it meant that he was for all and therefore all must be for him.

This move to unite all pharmacists needs to be commended by all who genuinely have the interest of the Society at heart.

Inspite of the gains the Society has made over the years, there still remains a lot to be achieved and the medium required for any advancement to be made is unity. Let us all therefore resolve to come together and give the President, and for that matter the entire executive, the support that they will ever need in their bid to make the Society and the profession better entities than they have come to meet them.

George Lartey
Lorne Pharmacy
Accra

* * *

District Assemblies

Sir,

IN a bid to find, perhaps, a more pragmatic form of political system for this country, the government has announced on July 1 the formation of district assemblies through elections at the district level.

In this direction, it is my desire to use the columns of this journal to urge eligible pharmacists to present themselves in full swing for elections to these assemblies so that they can contribute their full quota to the development of their districts and the nation.

There is no doubt that there are certain political measures that must be taken with regards to pharmacy practice in this country if all and sundry are to taste the effects of a meaningful pharmacy service in Ghana and this can only come about if pharmacists strive to actually be part and parcel of the major decision making machineries of this country.

This is my humble advice to "the friends of the human race" and I hope it wil fall onto fertile soil.

A. G. Essandoh
Korle-Bu Teaching Hospital
Accra

AGM

The 39th Conference

THE 39th conference of the Pharmaeutical Society of Ghana has taken lace at the Christ the King Hall in Accra from October 22 to 24.

In an address, the PNDC Secretay for Health, Air Commodore (rtd.) F. W. K. KLUTSE urged pharmacists ot to feel relunctant and unwilling o move out to the rural areas and nake their services available to the najority of the population who, as t now, had little or no access to he most essential drugs which had een acquired with the income geneated chiefly by them.

The Secretary reiterated governnent's desire to see imported raw naterials for drug production replaced with local ones and the need o harmonise orthodox and herbal nedicines, all of which the pharmaist had a vital role to play in their ealization.

In his welcome address, the Presient of the Society, Mr K.A. OHENE-MANU said to adhere to he Society's practice of evolving arious "programmes which will ssist its members to give off their est in the performance of their rofessional duties for the benefit f the Ghanaian public," Council as determined to tackle various spects of professional practice at orkshops, seminars, colloquium nd conferences like this one.

Indeed, "it is in the light of this hat the National Council of the ociety decided that the theme for his year's conference must be 'Towards Effective Drug Management nd Utilization."

Qualification

The President noted that among he Health Care Delivery Team, it as the pharmacist whose training minently qualified him to be part of ny group which could partake in he various activities that defined drug management", namely drug election, procurement, distribution and usage.

He therefore expressed his dissatisfaction at attempts to select drugs for the compilation of the Essential Drugs List and the National Formulary without adequately evolving pharmacists.

According to Mr Ohene-Manu, effective utilization of drugs also meant the clinician making accurate diagnosis, selecting the best drug from those available and prescribing it in an adequate dose for the right length of time.

The President also touched on "some few matters which have been agitating the minds of the National Council and that of a lot of our pharmacists" in recent times.

Council was not happy about the view being entertained in various circles that pharmacists were affluent. This, he said, "is a myth which must be broken", for it was the cause of the present increase in the number of young people wanting to read pharmacy. The President urged the authorities of the Faculty of Pharmacy to select, through thorough interviewing, candidates who were genuinely interested in the profession to avoid situations where young pharmacists became frustrated and disillusioned when they came face to face with realities.

The other matter, he said, was the running of parallel pharmacies by some Hospital Welfare Committees. This practice, he observed did not only contravene the Pharmacy and Drugs Act since these pharmacies were not manned by qualified pharmacists, but also encouraged evasion of taxes because these "second shops" were not registered with the Internal Revenue Services.

The last concern, the President said, was the delay in confirming the present head of the Pharmacy Division of the Ministry of Health as Director of Pharmaceutical Services, noting that he had been performing actively and effectively in the "acting" capacity for the past five years.

The President finally expressed Council's deepest appreciation of the happy relationship that existed between the profession of pharmacy and the Ministry of Health, and assured the Secretary for Health that some of the suggestions he had made to Council towards extending qualified pharmaceutical services to the rural areas would be actively pursued.

The keynote address was taken up by PROF. KWAME SARPONG who emphasized the need for effective drug management and suggested the adoption of an Essential Drugs List (EDL) as a "practical approach" to ensure this.

If adopted, he said, the EDL would not only ensure the availability of essential drugs of good quality at the lowest affordable prices but it would also lead to a more rational use of drugs, facilitate the production of a national formulary and reduce the expenditure on medicine thereby increasing the proportion of the health care budget that can be devoted to other items.

Vital Aspects

He also mentioned procurement, inventory control and storage as vital aspects of drug management. According to Prof. Sarpong, while it was his "considered opinion that there are enough pharmacists to maintain the practice of the pharmacy profession at a respectable level, he did not consider that we have enough trained personnel in the area of management and control of pharmaceutical supply systems." "Such trained management personnel are prerequisite to effective management control and utilization of drugs," he maintained.

In this regard, he enjoined pharmacists who have undergone various courses in management and have also acquired rich stores of experience in this direction to consider joining hands with the Faculty of Pharmacy in imparting such knowledge to pharmacy students.

Members of the profession, Prof.

Sarpong advised, should be encouraged to pursue those courses in management offered at the Ghana Institute of Management and Public Administration (GIMPA) as well as post graduate courses in the subject and urged the Society to include management courses in its continuing education programmes.

An exhibition of pharmaceutical products was later opened by the Secretary for Health. Participating in the exhibition, which run throughout the conference, were: the Upjohn Company, Sandoz, Danafco Limited, Bikkai Limited, Namco, E.B. and Company, Glaxo, Bikaco Chemicals Limited, Letap Pharmaceuticals and GIHOC Pharmaceuticals.

Others were, J.L. Morrison Son and Jones, Phemeco and Interassociates Limited.

The activities for the second day of the conference began with the Scientific Session which took off rather late because certain essential inputs were not readily available- a flaw in the organization of the conference which was deplored by many including Prof. Dwuma-Badu, Dean of the Faculty of Pharmacy.

Contributors to this event were Dr. Kortty-Mortey, Dr. Merlin Mensah and Dr. Y.D. Fokuo. Dr. Marian Addy of the Biochemistry Department of the University of Ghana Legon, successfully manoeuvered to obtain a platform at the session to unveil some research work she had done.

The theme of the conference was discussed at a well attended symposium chaired by the President of the Society, Mr. K.A. Ohene-Manu. Panelists included Prof. Ansa-Asamoah (Vice Dean of the Faculty of Pharmacy), Mr Derx Baffour (Hagan Brothers Ltd), Mr S.A. Botchwey (Deputy Director of Pharmaceutical Services, MOH), Dr. David Ofori-Adjei (Physician, Korle-Bu Teaching Hospital) and Mr R.S. Kwarteng (Principal Pharmacist, Komfo Anokye Hospital, Kumasi).

The Hon. General Secretary's and Treasurer's reports were also presented and discussed on the second day of the conference.

The third day of the conference, Saturday, October 24 witnessed, among others, the election of officers to serve the Society for a two-year period ending in September, 1989.

Despite an earlier confusion brought about by an attempt on the part of the handlers of the electioneering process to manufacture their own list of contestants "in the interest of the Society" (a move which was condemned and rejected), elections of officers went on smoothly employing the original list obtained through constitutional procedures. Many viewed the way the confusion was brought under control as a display of great political maturity by members.

Mr E.O. Gyamfi and Prof. Ansa-Asamoah were respectively elected President and Vice-President. The posts of Hon. General Secretary, Assistant Hon. General Secretary, Treasurer and Editor went to Messrs A.K.Y. Kokukokor, Frank Boateng, E.K. Addotey and Oscar A.C. Bruce respectively. Two persons Dr. S.O. Larbi and Mr Ted Bernasko were also elected to serve on Council.

The conference was rounded off with a buffet dinner at the Bukom Night Club of the Continental Hotel in the evening of October 24.

Sixty-five pharmacists (freshly qualified) were inducted into the Pharmaceutical Society of Ghana during the dinner present at which was the Director of Medical Services of the Ministry of Defence, Col. (Dr) G. Dey.

Miss Akua Kese, one of the inducted pharmacists received the John Ocran Award instituted by the West African Pharmaceutical Federation for being the best student in their professional examinations.

FELLOWSHIP

Four more get there

FOUR Members of the Society, Mr Ebenezer Osei-Tutu, Prof. Daniel Dwuma-Badu, Mr Theophilus Clottey Corquaye and Mr Francis Martei Dickson have after years of hard work, arrived in the land of honour-they have been made follows of the Pharmaceutical Society of Ghana!

This took place during a buffet dinner organized to round off the activities of the 39th Annual General Meeting at the Bukom Night Club, Continental Hotel on October 24.

The citation for MR EBENEZER OSEI-TUTU said he was born on November 11 in 1934, had his secondary education in Adisadel College, Cape Coast and read pharmacy at the Kumasi College of Science and Technology.

He began his professional career in the civil service with the Ministry of Health working in Korle-Bu and Komfo-Anokye Hospitals as well as at Lawra and Wa.

Having served under various titles in the Ministry, he was appointed Director of Pharmaceutical Services in 1977. Whilst Director he was able to persuade government to appoint Deputy Directors of Pharmaceutical Services in each of the regions to compliment the two Deputies at Headquarters.

Mr Osei-Tutu compiled the First, Second and Third Editions of the Korle-Bu Teaching Hospital Formulary between 1969 and 1972 and again compiled the 1974-76 Editions of the Ghana National Formulary.

He served the Society as Hon. Treasurer and as Council member.

PROF. DANIEL DWUMA-BADU was born 49 years ago at Wiamoase in Ashanti, He entered the University of Science and Technology in 1962, after having attended the Presbyterian Secondary School, Odumasi-Krobo and the Kumasi College of Science and Technology, and left in 1965. He obtained his doctor of philosophy degree from Chelsea College of Science and Technology.

He began his professional career as a lecturer in 1970 in the Department of pharmaceutical chemistry, Faculty of Pharmacy at the University of Science and Technology; becoming head of the Department in 1973. He is now Dean of the Faculty and has the enviable record of being the first U.S.T. aluminus to become full professor of the University.

Prof. Dwuma-Badu, who has a chunk of research papers to his

credit, has been a Visiting Research Scientist to the University of Pittsburgh, USA and the University of Uppsala in Sweden. Also, as a Visiting Professor at the College of Medicine, University of Lagos, he did the pioneering work for the establishment of a School of Pharmacy at the University.

In addition, he has been Examiner in Pharmaceutical Chemistry at the University of Dar-es-salam, Tanzania and the Universities of Ife, Benin, Nsukka and Amadu Bello in Nigeria.

He has been Chairman of the Research Committee of the West African Pharmaceutical Federation from 1980 to 1987 and is currently the chairman of the Educational Committee of the Pharmaceutical Society of Ghana.

MR THEOPHILUS CLOTTEY CORQUAYE, the citation said, was born on August 23, 1934, attended the Fijai Secondary School and read pharmacy at the University of Science and Technology graduating in 1965.

He worked at the Central Hospital, Cape Coast for thirteen years before taking up appointment as Deputy Registrar of the Pharmacy Board. He is now Registrar of the Board.

Despite his onerous duties as Registrar of the Pharmacy Board, he has found time to take very active interest in the affairs of the Pharmaceutical Society of Ghana. He was once Secretary of the Central Regional Branch, Hon. General Secretary of the Society itself (1979-81), Chairman of the Editorial Committee, member of the Finance Committee and the Adhoc Committee for Extending Pharmaceutical Services to the Rural Areas, and Chairman of the Adhoc committee for working out modalities for retrieval of surplus drugs during the Golden Jubilee Celebrations of the Society in 1985.

Mr Corquaye has been the Society's representative on the Council of the West African Pharmaceutical Federation and has recently been elected Vice-President of the Federation.

MR MARTEI DICKSON was born on March 27 in 1943, attended the Presbyterian Secondary School at Odumasi-Krobo and the West African Secondary School in Accra. His professional training took place at the University of Science and Technology Kumasi, where he graduated with a Bachelor of Science Degree in pharmacy.

The citation said his most significant contribution to pharmacy was the formulation of a plasma replacement fluid. This fluid, known as Dick's plasma, has a few advantages over Haemaceal in that it exerts anti-thrombotic effects as well as having the properties of a good plasma expander. It also has a long period of excretion from the body hence giving enough time for the re-generation of lost plasma protein.

Mr Dickson has also played very active role in the affairs of the Society.

On behalf of the recipients of the award, Prof. Dwuma-Badu thanked the President and the Society for the honour conferred on them and promised that they would continue to do their best for the Society and Ghana as a whole.

KUMASI

Seminar on Prescription Writing of Today

IN Furtherance of the Continuing Education Programme initiated by the National Council of the Pharmaceutical Society of Ghana, the Ashanti Regional Branch has held a seminar on "Prescription Writing of Today" at the Nurses Training College (NTC) Hall, Komfo Anokye Teaching Hospital on September 25.

In a brief opening address, the chairman of the organising committee Dr H.B. Lartey (Paediatrician at the Komfo Anokye Teaching Hospital) said hitherto, the pharmacist had looked upon the doctor as an intruder and vice-versa, but "as partners in the Health Care Delivery Team, we think there is need for us to integrate rather than disintegrate for the interest of the patient we are all striving to assist. It is therefore envisaged, that this seminar might reverse the hitherto unhealthy trend in our almost 'strained relationship' so that together, under one banner, we can offer better service to the community at large".

Dr Lartey who is also a pharmacist, drew the attention of his audience to the fact that the seminar was not meant to be "a podium for academic instructions on prescription writing," but rather it was intended as a rapport between "friends and partners" in the health care delivery system aimed at reviewing and identifying more areas of co-operation within our different professions.

Panelists at the seminar, which was heavily patronized were Miss Mary Ofori (Senior Nursing Sister), Dr Kwami Addo-Kufour (Physician, Kufour Clinic, Kumasi), Dr J.G.A. Wood (Physician, Komfo Anokye Teaching Hospital), Mrs Eunice Ansa-Asamoah (Senior Pharmacist, Child Welfare Clinic, Kumasi) and Justice S.S. Okunor (Pharmacist).

Prof. Kwame Sarpong, Head of the Pharmacognosy Department of the Faculty of Pharmacy, was the chairman for the occasion.

Retention Fee

The Annual Retention Fee has been revised upwards by 20%. A member will, as from January 1988, pay C3,000 instead of C2,500 in order to retain their name in the Register of Pharmacists.

KUMASI

First Clinical Pharmacy Workshop

UNDER its Continuing Education Programme, the Pharmaceutical Society of Ghana in collaboration with the Faculty of Pharmacy at the University of Science and Technology has organized a one week clinical pharmacy workshop at the University.

The workshop which was the first of its kind, took place from July 26 to 31 and dwelt chiefly on Asthma and Hypertension.

Resource persons contributing at the workshop were Prof. Reginald Ansa-Asamoah, Dr A.C. Sackeyfio and Dr Fokuo all of the Faculty of Pharmacy; Dr J.G.A. Wood, physician at the Komfo Anokye Teaching Hospital; Dr A.R. Neequaye, physician at the Korle-Bu Teaching Hospital and Mrs Esther Osei, Chief Pharmacist at the Police Hospital, Accra.

Topics dealt with included the following:

a. Clinical Pharmacy Practice-Scope, prospects and problems.

b. Ward Pharmacy Practice

c. Hypertension and its Management

d. Asthma and its Management

e. Pathophysiology and Drug treatment of Asthma

f. Drug Information

In another event, the Vice-Chancellor of the University, Prof. F.O. Kwami, on behalf of the University presented paintings by Ablade Glover to Mr K.A. OHENE-MANU (President, Pharmaceutical Society of Ghana) and MR F.K. BRUCE (Acting Director of Pharmaceutical Services) for the contribution they have made towards the progress of the Pharmacy Profession and the Faculty of Pharmacy as former students of the University.

GREATER-ACCRA

Executive Re-elected

THE Greater-Accra Branch executive has been re-elected en-bloc to serve another two-year term. This took place at their bi-monthly meeting held on September 17.

It was Mr Xose Jiagge (Military Hospital, Accra) who tabled a motion to that effect noting that the executive did perform very well during their last term. He was seconded by Mr Dela Ashiagbor (Ciba, Ghana).

Mr M.A. Akiwumi, chairman of the Branch, thanked members for the trust reposed in the executive and said with due co-operation from members, he and his colleagues would give of their best.

The other officers were: Mr Dan Boakye-Yiadom, Vice Chairman, Mr Eric Aheto, Secretary, Mr Louis Nortey, member and Mrs Esther Amedzro, Treasurer.

AGM

Towards Effective Drug Management and Utilization

Below are the contributions made by the various panelists at the symposium on the theme of the 39th conference of the Society held at the Christ the King Hall, Accra.

1. The paper read by PROF R. ANSA - ASAMOAH, Vice-Dean of the Faculty of Pharmacy, UST.

A few weeks ago, the producer price of cocoa fell by more than 2% probably the greatest fall in recent years. On the other hand the Cedi slumped from about C160 to C176 to a dollar. This simple economic barometer shows that there will continue to be less funds available in the national coffers than ever before to turn and maintain the various national activities including that of health.

For Ghana to achieve a more effective drug management and utilisation, a completely new national drug policy is required. Addressing an International Conference on drugs in Rome last October, Pope John Paul II declared, "The development, distribution and use of drugs must be go-

verned by a particularly rigorous moral code". I believe he was referring to an international drug policy on pharmaceutical industries that will ensure an equitable distribution of pharmaceutical technology among all countries, and particularly in poorer countries, the accessibility of these medicaments to all its inhabitants alike at a reasonable cost.

Objective: The main objective of a national drug policy should be for everyone to be able to have access to the most effective and safe medicinal products of established quality at the lowest possible cost.

Components: There are a number of components of a viable national drug policy but the major ones I intend discussing are the drug requirement, supply, quality control, and safety regulatory control, and finance.

Drug Requirement: Taking into consideration the Country's financial resources, as the first step in establishing an effective drug policy, experts on drugs should make a detailed quantitative and qualitative analysis of specific drugs required in both private and public sectors. The need for such an essential drug list has been recommended by WHO but since what is essential in Thailand or Uganda may not be essential in Ghana (as was pointed out in the case of meningitis) we the experts—the pharmaceutical society of Ghana and the Ghana Medical Association, are to insure that it is our essential drug list and not a list prepared by any individual or even by the Ministry without consideration. There is the need to publish the National drug policy if it exists and for national seminars by experts on essential drug list which the Ministry intends operating.

Most pharmacists and other health workers have the false impression that an essential drug list will represent the only drugs that will be allowed into the country. No. On the contrary, government will have to ensure that drugs on the list are not only available to everyone but at all times. Other drugs that are not on the list could also be imported by the private sector.

As pointed out by the guest speaker, useful medicinal plants should be included in the essential drug list not only because the practice is acceptable to most but mainly because some of the plants may be the drugs of choice under certain circumstances. For example, reserpine i.v. is the drug of choice in hypertensive crisis. An essential drug list that discounts rauwolfia therefore is illogical. The rapid disappearance of *Cryptolepis Sanguinolenta* from the forest and research findings on Desmodium (Dr. Addy and Dr. Kotoh-Mortty) and Datura (Dr. Mensah) we heard about this morning support this contention.

Supply: This involves procurement production, distribution and logistics. Having identified the national drug requirements, an effective national drug policy should ensure that they are available.

In order to sustain the availability of essential drugs, it is imperative that we focus attention on the manufacture of these essential drugs. This means that there is a need for the re-organisation of our national pharmaceutical industries, both public and private. As I pointed out at our Annual General meeting last year, the pharmaceutical industries should attempt to specialise instead of everyone punching the same tablets. To date, none of the industries is specialised to produce medicinal plant products. I believe the time has come for the establishment of a pilot plant for the production of medicinal plant products—a plant that could dry, powder, percolate, extract and dry or powder the product for appropriate formulation. It is true that a transfer of appropriate technology will be required but I believe if we are politically and professionally motivated enough, it can be effected through foreign aid which I believe will be available since both WHO and UNIDO support such a policy. The need for the development of a chemical/petrochemical industry which will support our pharmaceutical industries in this endeavour should be paramount.

Quality Control and Safety

We are all aware of the need to ensure as experts the quality, therapeutic effectiveness and safety margin of the products we manufacture, distribute or dispense. The recent skimmed milk episode which highlights contamination due to radioactivity but is silent on possible bacteria contamination makes interesting reading.

Pharmaceuticals and raw materials imported into this country as well as those manufactured locally should all satisfy certain laid down margins of safety, which should be governed by legislation under the new drug laws of this country. For an effective implementation of these proposals I suggest strongly that the Pharmacy Board sets up a quality control laboratory and that all drugs imported into the country be tested before their release to the importer. The quality control laboratory can be set up at U.S.T. and the Standard Board Laboratory to serve to double-check the results if in doubt. In our assessment of quality, the biological activity should not be overlooked by our quality control laboratories. If imported drugs have been used elsewhere with success, information on their therapeutic activity under the Ghanaian situation should be provided.

CONCLUSION

A new drugs law which takes into consideration among other things the manufacture and use of medicinal plants is in the process of being promulgated. This country has the trained personnel and will-power to effect these changes to ensure an effective drug management and utilisation. This will go a long way to make Health for All by the Year 2,000 not only a reality but beneficial to our people.

2. The view of Mr DERX BARFFOUR, Supervising Pharmacist at Hagan Brothers Ltd., Accra.

I BELIEVE any bold attempt towards the realization of an effective management and utilization of drugs in the country, should begin with a critical analysis of the present state of the pharmacy profession: first, identifying the problems, and shortcomings inherent in its practice and then evolving the right strategies to mobilize the necessary human and material resources for the achievement of this lofty objective. But since I cannot do all the critical analysis with the limited time at my disposal, I will instead attempt to present the picture or the image of the pharmacy profession as seen by the wider society. And after unfolding this before us, I will go further to tackle the topic vis-a-vis our image.

It is unfortunate that the present picture of the pharmacy profession looks a bit blurred and distorted because to the greater majority of the people in Ghana, pharmacy means a little more than a brisk commercial activity with the service element and professionalism being relegated to the background.

It is a pity that we are now in an era where the image of pharmacy is suffering a great deal and our effectiveness in playing our proper role in the country's health care delivery system has left much to be desired, mainly because we have abandoned and denied a greater section of the Ghanaian populace with professional services.

We have entered a phase in the history of the profession in this country where the negative forces championing and promoting abuse and misuse of drugs have so much overwhelmed us and it is now a big headache containing the situation. We are also in an era where the general practice pharmacy is under siege and faces a serious threat of being swallowed up by the proliferation of many interest groups and individuals in the drug business.

Further still we have gradually moved into an era where the finest graduates are being turned out, from the Faculty of Pharmacy U.S.T. and it is a pity and most unfortunate that these fresh pharmacists on entering the system, more often than not, get disillusioned, fustrated and disappointed, mainly due to lack of job satisfaction and under-utilization of their talents.

Meanwhile, the failure and the inability of some of us to evolve the appropriate security checks to control and supervise drugs under our care, has resulted in high pilferages and this has greatly affected our integrity and tarnished our image.

In the face of these setbacks and grim picture, it is gratifying to note that, never in the history of the pharmacy profession in this country had so much been done by individuals, groups and the Pharmaceutical Society to improve our image as at now. Moreover, it is a joy to know that never in the history of the profession had so high a premium been placed on the importance of pharmacist in the health care delivery system as it is now.

After refreshing our minds on the present image of the profession, it is important to state that the establishment of the Pharmacy Board and the creation of a Pharmacy Division in the Ministry of Health, were all moves geared towards an effective management and utilization of drugs in the country. Moreover, the various provisions of the Pharmacy and Drugs Act 1961 among other things also seek to achieve this lofty goal. But despite these and other steps and efforts, we are still far from the realization of this objective.

Drug Supply

Let us now throw a searchlight on some aspects of management of drugs coming under the import programme which incidentally constitutes a major source of supply of drugs in the country.

With this system, an importer on application to the Ministry of Trade is issued with either a Specific Licence or SUL. With regards to the issue of Specific Licence, the importer will also be required to submit a current Tax Clearance Certificate, Social Security Certificate and the Proforma Invoice of the drug to be imported. Approval of the Licence enables the importer to participate in the Foreign Exchange Auction at the Bank of Ghana. On a successful bidding and subsequent allocation of sufficient foreign exchange cover, the importer can then decide when to apply for a Health Permit to enable him take delivery of the drugs on arrival at the port.

Anomaly

From this briefing, we will realize the Ministry of Health does not appear in the picture throughout the transactions and does not even know the nature of the drug being imported until, the importer applies to the Ministry for a Health Permit, when the drugs arrive at the port or is ready for shipment. This is a serious anomaly which still cries to the Ministry of Health to attract its attention.

However with regards to the issue of SUL, the Ministry of Health permit is one of the requirements which had to be met before the Licence is issued.

The Ministry of Health controls the supply of imported drugs into the country by the issue of the Health Permit. And as long as the importer fulfills all the conditions in the provisions of Section 14 of the Pharmacy and Drugs Act 1961 on the Importation of Dangerous Drugs and the Ministry has no cause to suspect that the drug being brought into the country will not be put to the use for which it is being imported, the Ministry issues the permit.

But apart from these measures, effective supply of drugs should also mean that at least the very essential drugs badly needed in the country are never in short supply; thus we should guard against the temptation of importing or manufacturing only the fast moving and cosmetic drugs at the expense of the essential ones.

Effective supply of drugs also demand that we know our drug utilization patterns or consumption levels and to ensure that drugs are imported or manufactured in the right quantities to meet the level of demand.

It is in the light of these that

ıe Ministry of Health has to be ɔngratulated for its recent an-ɔuncement that the National Drug olicy of 1976 has been reviewed ıd that an essential drug list based ı the disease pattern in the coun-y had been prepared and this ill form the basis of routine drug ıpply in the country. This is very orthy of praise. But it's one thing ɔming out with a fine policy and ıother thing making sure that is implemented.

Thanks to the trade liberaliza-on policy prevailing in the coun-y now, the nation is enjoying a ɔod supply of drugs, but for the rices, which are well beyond ıe means of many patients. The igh prices has been attributed ıainly to the high importation ɔst, brought about by way of igh customs duties, income tax ıd other service charges. Thus ith such high duties the importer as no other alternative than to dd all the overheads to the price f the drug appearing on the coun-r. And as a positive step to help eat down these high prices, the overnment should as a matter of rgency seriously consider the po-ibility of waiving off a substan-al portion of the tax element of rugs. If the Veterinary drugs are ow enjoying a tax holiday, then uman beings who are by far more nportant than animals should bviously enjoy a better treat.

It is a pity that our insatiable esire to maximize our profits ɔupled with the unfavourable usiness trends have forced many f us to shamefully establish busi-ess links with people (better nown in certain circles as closed en) who are not supposed to be this field. Such unholy flirtations ith these people have greatly com-ɔunded the problem of misuse, ɔuse and indscriminate use of rugs in the country. Compromi-ng our professional ethics by ch ties have also heightened and creased the incidence of quacke-in the country.

It is a common knowledge that ese quacks and peddlers operate eely in the rural areas. So, we are a situation where these quacks e enjoying a field day and have rned themselves into kingpins. eanwhile our rural folks are ever eased with the services rendered, but it is only heaven which can fathom the irreparable harm being inflicted on them.

This practice cannot go on unchecked. And as a positive step to help arrest this situation, we should be prepared to sacrifice a little of our urban comfort and move to these areas. Secondly, the powers that be, could create favourable conditions to make the drift very attractive. This could include the provision of significant tax exemptions, cheaper sources of drugs and very soft loans.

There is no doubt that our presence in these areas will go a long way to minimize drug peddling and to educate our rural folks about the dangers associated with misuse and abuse of drugs.

Challenges

We continue to lament over the refusal of pharmacists to get established in the rural areas, we still continue to exhort pharmacists to play a vital role in the primary health care delivery system, and we persistently talk of bringing pharmacy to the doorsteps of people by the establishment of community pharmacies. But, how well have we been groomed, trained and disposed to meet these challenges vis-a-vis the complaints, ailments and first aid cases which daily come to our notice as community pharmacists?

Notwithstanding the Medical and Dental Act 1959, Section 23 & 24 which spells out those who can practice medicine and dentistry, Section 14 of the Pharmacy and Drugs Act 1961 permits a pharmacist to give medical and dental advise and first aid, provided such a service is for purposes of giving:

a) First aid treatment in cases of accident.

b) First aid treatment of simple ailments of common occurrence where it is not reasonably practicable for the patient to consult either the medical or dental practitioner.

Thus, we will realize that the Act does not specify or is silent over the diseases which can be regarded as simple ailments of common occurrence. However the nature of community pharmacy is such that it will definitely expose us to many trying challenges, and it will just be unpardonable in the eyes of the public if we fail to live up to expectation.

For example, what will be our reaction if a patient is rushed to a pharmacy shop down with malaria fever. And knowing by our training that prompt treatment could be given by the administration of Chloroquine Inj. 4cc start, as any resort to oral administration may result in the drug being vomitted out. Honestly, it would be a great pity and most unfortunate to deny a patient of such treatment, simply because the law supposedly does not allow pharmacists to administer drugs by the parenteral route and therefore the course structure at the Faculty of Pharmacy does not make provision for that. Meanwhile we are described as and are proud to be, the alpha and omega of drugs.

It is high time, the faculty of pharmacy seriously considered broadening its curriculum to make room for such courses which will reinforce in the pharmacist the concept of disease states. Further, the time is ripe for the faculty to introduce courses which will thus bring pharmacists closer to tne patients in the area of drug administration, drug interactions, hypersensitive reactions, side effects and drug compliance.

There is also the need for more refresher course to be organized under the auspices of the Pharmaceutical Society of Ghana and above all as individual pharmacists, we ought to read widely to be abreast with current developments and advances in the profession.

Again the success or otherwise in ensuring an effective management and utilization of drugs will depend to a large extent on us, the pharmacist, if:

1) We resolve to be a little more responsible and dedicated to our work, recognizing our responsibility to serve the rural as well as the urban population.
2) We resolve to place a high premium on ethical considerations, rather them on monetary gains, a much clearer and brighter image of the profession will unfold before the public.

And lastly, if we resolve to live up to the ideals of the Pharmaceutical Society and endeavour to co-operate with one another to solve common problems relating to efficient pharmaceutical services, I believe it will not be long before the very best of everything will come to us.

3. The contribution made by DR DAVID OFORI-ADJEI, Physician Specialist at the Korle-Bu Teaching Hospital, Accra.

GENERALLY, it is difficult to operate rational pharmaceutical policies in the complex political, social and technological environment in which we find ourselves these days. This applies to practically all nations, each with its peculiar problems.

For this country to adequately manage its drugs programme demands a comprehensive information base. This information must be based on sound science and should be oriented towards health and people rather than drugs. In addition there should be adequate education and training for all health workers to ensure the rational use of drugs.

We are all familiar with irrational prescribing practices and the glut of less-than-useful drugs in our pharmacies.

If the Ministry of Health were to solve all our management problems and achieve the ideal of providing the total drug needs of the country in addition to ensuring that safe and efficacious drugs were always available I would like to submit that we still will have problems, unless this is coupled with education of the public and all health workers.

Although the situation is said to have improved in recent times there is no doubt that there are drug shortages at all levels in the public health service. These shortages have resulted in patients having to purchase drugs from private pharmacies at rather inflated prices. For the moment this may be a necessary evil but we seriously have to consider the purchasing power of the average Ghanaian. For we may soon hear that all public employees should honour their prescriptions at government pharmacies, or price control for drugs may be instituted.

I would approach the issue of drug management and utilisation by attempting to answer certain questions.

1. Do we need drugs? The answer is "but of course yes? What a silly question". Even those who swear by preventive medicine will not quarrel with me.

2. Do we need every drug ? Of course not. This is where good basic information on disease patterns become vital. Without a knowledge of the pattern of diseases at all health levels we cannot adequately manage drugs. I am therefore hopeful that the efforts of the MOH/UNICEF to compile an Essential Drugs List as well as the efforts of the Centre for Health Statistics to compile health data down to the district level and beyond will go a long way in answering this question. Above all, if we are able to marry data on disease patterns and drug use, inappropriate use of drugs could be identified and corrected by proper education. For example, if we found that inappropriately large amounts of Chloroquine were being consumed by one health facility for an inappropriately low reporting of clinical malaria, obviously questions would have to be asked.

3. How do we get the drugs? They have to be purchased locally (which is preferable) or imported. This takes me into the area of drug and raw materials procurement as well as quality assurance. I am not sure whether I should venture into these realms especially since the sources of drugs in this country are many and varied. In addition to the public supply system we have supplies through private enterprise, mission hospitals, gifts from well meaning groups and organisations (limited as the quantities may be sometimes) and of course good old smuggling. The quality and usefulness of some of these drugs are doubtful. Their costs may also be prohibitive. Unfortunately, locally manufactured drugs are sometimes more expensive than the imported ones. This may be due to several factors including low production capacity, foreign exchange allocation etc. It would be ideal if we could meet most of our requirements through local production. The whole system of drug acquisition requires streamlining and there is hope in the EDL and its implementation.

4. Now we have the drugs (as we want them) How do we distribute them.? Far too often whilst there, is a shortage of a particular drug (and an essential one too) at the regional/teaching hospital level, you walk into a district hospital and find loads and loads of this drug sititing on the shelves in the pharmacy. A personnal experience — I could not get acetazolamide in Korle-Bu Hospital but you can imagine my surprise and delight when I went to Suhum Hospital and found this drug in fairly decent quantity at the pharmacy. The doctor there has rarely had cause to prescribe it. The reverse situation is not uncommon. Drugs should be distributed according to the needs of each facility as identified by information collected. The system whereby drugs move down the well trodden path of Central Medical Stores—Regional Medical Stores—District Medical Stores — Health Centre — Village Health Workers — has outlived its usefulness.

5. The drugs have arrived at the health facility—how do we use them?

The area of drug use is one that most of us are familiar with. Unfortunately it is also the area that requires a lot of improvement.

Prescription

It is not usual to find doctors telling their patients the 'poisons' they are being fed, let alone the side-effects to expect and the precautions to take. Polypharmacy is a fairly regular practice for both in-patients and out-patients. The attendant risks of drug interaction, over or under dosing and non-compliance should be considered by all prescribers. There is also the practice of over prescribing. All these contribute to drug wastage. I do not think the costs of drugs form part of our choice of treatment. In fact, sometimes one is tempted to wonder whether, fashion is not the major deciding factor. For example, Mr

A approaches a friend doctor or pharmacist with a fever which is thought to be malaria. It is not unusual to have Fansidar prescribed because it is the latest antimalarial in town. Prescribing Generics is much cheaper but this practice is not part of us yet.

Dispensing

It is also sad to note that we have the situation where patients are sold drugs for diseases like hypertension, asthma etc. in bits and pieces. Are we justified in selling to a patient one or two tablets of Aldomet or Lasix or Ventolin. The patient may not be in the position to afford the correct amount but it is our responsibility to educate as well as sell.

Recently we sent a public health nurse round some forty pharmacy shops in the Accra-Tema area posing as the mother of a child less than 5 years old suffering from diarrhoea. None of the shops asked the mother to take the child to a clinic. Only two shops sold her ORS and she paid C50.00 per sachet in one shop and C150.00 in the other. The rest sold her various preparations including antibiotics alone or in combination with kaolin/pectin. Chloramphenicol was freely prescribed just as ampicillin. My favourite prescription was an unidentified worm expellant.

I must add that half the shops visited had their registered pharmacists present. Pharmacists and pharmacy shops have a role to play in the health care delivery system. They should not see themselves only as vendors of proprietory medicines but also as advisors to the public. Shop attendants who are delegated the responsibility of dispensing should be properly trained, particularly in the area of dosage forms.

Drugs are biologically active substances with an innate potential to exert adverse as well as beneficial effects at pharmacological dosage. Therapeutic progress is inherently associated with risk.

Patients also respond in various ways to drugs, At the moment there is no clear cut mechanism for recording adverse drug reaction's in this country.

For effective drug utilisation adverse drug reaction monitoring is necessary. In our environment where all sorts of people advise on drug treatment it may be helpful if names of drugs and dosage strength were written on their packet /container . This simple gesture—needless to say—has several advantages. Finally, patients and the public should be educated continously on the proper use of drugs, and the hazards of self-medication and drug abuse.

Mr Chairman, I would like to submit that all these efforts in improving the present system will be in vain if we do not at the same time develop a feedback system to monitor, evaluate and change where appropriate.

If I have been sketchy and produced a catalogue of woes, I do not apologise. For one cannot manage without identifying problems. I feel the topic for the Society's annual meeting is appropriate and I hope the awareness it generates will form a basis for improving drug management and utilisation so that we can avert "Death for all by the Year 2000".

4, The paper presented by MR S.A. BOTCHWAY who is the Deputy Director of Pharmaceutical Service at the Ministry of Health.

Drugs and pharmaceutical products play an important role in any health care delivery system since they improve and maintain the health and well-being of people. The provision of essential drugs and vaccines therefore form one of the vital components of an effective health care delivery system which promises good health as a fundamental right of all.

It is estimated that about 40 % of the total health budget of this nation is spent on drugs alone with more than 80 % of this expenditure in foreign exchange. We are well aware of the scarcity of foreign exchange in this country for the importation of needed essential drugs.

Drugs also account for more than 60 % of the total recurrent expenditure of the health budget apart from salaries and wages. Drugs are costly and the economic impact of drugs cost on the national health programmes is very enormous.

However in spite of the substantial expenditure on drugs the majority of the population who are mostly rural dwellers and those who live in urban slums have little access to the most needed essential drugs due to unfair distribution of the limited resources resulting from inefficient management and irrational prescribing and misuse of drugs. Paradoxically, the high expenditure on drugs cannot therefore provide the essential drugs needed by the majority of the population.

The recent trends in drug development and research based on modern scientific development and the high technological advancement have made available a large number of new drugs and pharmaceutical products circulating in international commerce. Substantial numbers of new remedies are added to the already large number of drugs in circulation every week.

It is reasonable to expect that for the optimal use of the limited financial resources, the available drugs must be restricted to those drugs proved to be therapeutically effective, safe, economically sound and capable of satisfying the health needs of the majority of the population. This calls for a national drugs policy as an integral part of a national health policy.

The Primary Health Care system to which this country is committed is the bedrock of the national health policy. The objective of the Primary Health Care System is the attainment by all Ghanaians by the Year 2000 of a level of health that will permit them to live socially and economically productive lives and to combat and prevent the diseases that commonly afflict the population.

One of the vital components of the Primary Health Care programme is the provision of essential drugs and vaccines in the right quantities needed.

In order to achieve effective drug management and utilisation, the logistics of drugs supply must be efficiently managed. The primary functions of the drug logistics cycle include:

Selection
Procurement
Distribution, and
Use.

National Drugs Policy:-

The large variety of pharmaceutical products available in circulation and the frequency of new discoveries resulting from the rapid trends in drug development and research is making it difficult for prescribers and pharmacists to be rational in their selection of drugs and treatment.

The problem is aggravated by the aggressive promotional activities of multinational pharmaceutical companies and the strong influence of advertising and promotional techniques sometimes based on incomplete and biased information. The results of these activities force the replacement of the age old drugs of proven efficacy and reliability with new products which have not been sufficiently tried and evaluated at several times more expensive than the old products.

There are thousands of drugs and pharmaceutical products circulating in international commerce which are either identical or very similar in action but sold under different names. In a situation of unlimited number of available drugs prescribers face a difficult problem of selecting the most appropriate preparation for each patient.

Most countries of the world including the highly industrialised and technologically advanced are becoming concerned about the problem of satisfying the increasing demand for drugs. In a developing country as Ghana with such a high rate of population growth weighing heavily on a rather depressing economy and a slow rate of development it has become increasingly difficult to satisfy the essential drug needs of the majority of the population within the constraints of limited financial resources. This is seriously militating against one of the vital components of the Primary Health Care system i.e. the availability of essential drugs to improve and maintain the health and well-being of the population.

An effective drug management and utilisation can best be achieved under a national drugs policy and the development and adoption of an Essential Drugs Programme as an integral part of a National Health Policy to ensure social justice and equity. For effective management it is important that the limited financial resources must be properly managed to procure the most essential drugs which have been proved to be "therapeutically effective, safe, capable of satisfying the health needs of the majority of the population and at a reasonable cost that can be afforded by the society and the country".

It is worthy to note that the Ministry of Health has prepared a draft National Drugs Policy and an Essential Drugs list and the preparation of a National Formulary based on the Essential Drugs List is actively under consideration. Some of the main provision of the National Drug Policy are as follows:

* All purchases of drugs and prescriptions must be in their generic names.
* The local pharmaceutical manufacturing industries will be encouraged to produce the selected essential drugs to satisfy the needs of the country and if possible for export.
* The number of the local pharmaceutical manufacturing industries to be kept within reasonnable limits to ensure efficient use of resources.
* Vaccines and other essential drugs not produced locally will be imported as usual by open competitive tender.
  Consideration will be given to bulk importation by open tender to reduce cost.
* Quality control of all drugs in circulation in the country will be assured through the use of accredited local laboratories.
  The Ghana Standards Board is being strengthened with support from W.H.O. to form the nucleus of a Regional Quality Control Laboratory to monitor drugs in circulation and to serve the West African Region.
* Local production of vaccines and biological products to be encouraged.
* Research, development and formulation of herbal medicine will be actively supported.
* Systematic education and training in Drug Management will be organised for persons concerned.
* Education of the public on drug use, action and effects will be systematically organised.
* Prescription practices will be guided by the use of the National Formulary which will contain reliable, unbiased information.
* It is also proposed that the importation of raw materials for the local production of essential drugs will be organised by bulk.
* The local manufacturers will be encouraged to pursue more vigorously the substitution of imported raw materials with local ones to reduce cost.
* The Drugs Control Unit of the Ministry of Health will be reorganised to monitor the operations of the local pharmaceutical industries for quality assurance.
* The Essential Drugs List is designed to support the PHC programme and is categorised to serve the needs of the various levels including the highest referral level and specialist use.

There are 4 drugs for the community level, 25 for health centres/ Health Posts manned by Medical Assistants, 75 extra in hospitals and 235 extra for Specialists making a total 302 dose forms.

* The use of the Essential Drug List as at present is limited to the Ministry of Health and not applicable to the private sector. It is expected that the Essential Drugs List and the proposed National Formulary will be submitted to a National Seminar for discussion after which a final version will be prepared.

Colleagues may be called upon at a later date to discuss the desirability of a National Essential Drugs List for the country applicable to all.

* The unavoidable constraints and the limitations on the available financial resources call for an efficient management of the drug supply system to be able to fulfil the objective of satisfying the real drug needs of the population under the Primary Health Care Programme. The primary activities of the drugs logistic cycle which embrace selection, procurement, distribution and use need to be rationalised to become effective.

Procurement:-

The objective of an efficient drug supply management is the procurement of the right *Quality* drugs in the right *Quantity*, at the right *Time* from the right *Supplier* for the right *Price*. The right price is the most economic price and not the least price.

An efficient procurement method should aim at each giving the following vital objectives:

(i) Obtain the lowest possible price
(ii) Assure supplier realiability in terms of quality and efficacy.
(iii) Ensure constant availability of the essential drugs.

There are four purchasing methods which are considered appropriate to achieve efficiency.

Open Tender
Restricted/Selective Tender
Negotiated Procurement
Direct Procurement.

There are advantages and disadvantages in any of the recognised purchasing methods.

Evidence available has shown that purchases conducted by the private pharmaceutical importers have been limited to the "Direct" method because of the special relationships that exist between the supplier and the importer.

It is difficult to accept that this method of purchasing ensures effective drug management and utilisation considering the limited foreign exchange resources. It is also difficult to accept that the price is the "lowest possible" since there are no competitors for purposes of comparison.

Distribution of Pharmacies:-

If social equity is to be achieved through the Primary Health Care programme then there should be constant availability of the essential drugs needed by the majority of the population wherever they live—whether in the rural areas or in urban slums. But how can social equity be achieved when more than 80 % of pharmacies are located among less than 20 % of the population who live in the urban centres?

It is of interest to note that out of the total of about 500 pharmacies more than 300 serve Greater-Accra, and more than 80 % of those in Accra are concentrated within 1 kilometer square in the city centre. The picture is not different in the other regional capitals and towns.

It appears the trading aspects of pharmacy practice have outweighed the professional functions. Hence their concentration within the areas of economic activity. As a result of the high concentration of pharmacies in a comparatively smaller area there is keen competition for sales turnover. Moreover the ownership of the pharmacies has a very strong influence on their mode of operations. The lay pharmacy proprietor places more emphasis on the trading activities with less consideration to the professional service—of course the lay proprietor has no professional service to offer. This has given rise to classified drugs being sold over the counter without valid prescription in contravention of the pharmacy and Drugs Act 61.

The business names of these pharmacies reveal the nature of the operations e.g. ..... Pharmacy and Trading Co., ... Brothers, ... Agencies, etc.

We were informed by the President in his welcome address that only 90 out of about 500 pharmacies are owned and run by pharmacists.

It is disheartening to recall a serious allegation recently made that "Pharmacy is the most abused profession in Ghana."

All efforts must be made by the Society and the regulating authority to correct this impression by returning the profession to the qualified owners. Pharmacy for Pharmacists.

The Primary Health Care Programme:-

The target date for the Primary Health Care is the year 2000 which is only about 12 years from now. The million dollar question to ask is this: is the objective attainable for Ghanaians by that date? Considering the state of existing health infrastructure and the rate of new infrastructural development and the logistics support, the target seems out of reach. It was envisaged that populations of 200-5000 should have certain health facilities on the ground by now but this have not been achieved yet. However with the improvement in drug management and utilisation and the rationalisation of supply, distribution, and use of drugs it is possible to achieve the target as far as the supply of essential drugs are concerned i.e. the constant availability of the needed essential drugs for the majority of the Ghanaian population irrespective of the socio-economic status wherever they may live including the rural areas or urban slums at an affordable cost.

Note: *At the time of going to Press the contribution of the fifth panelist Mr R. S. Kwateng (Deputy Director of Pharmaceutical Services, Ashanti Region) had not reached the Editor.*

FIP

FIP in Conference

OVER two thousand pharmacists representing 65 national pharmaceutical organizations have participated in the seventy-fifth anniversary meeting of the International Pharmaceutical Federation (FIP) held in Amsterdam, Holland from August 31 to September 4.

The President of FIP, Dr J.A. Oddis of the USA, who described the meeting as "an historic and joyous event" also observed that the period between the birth of FIP and now had seen unparalleled progress in many areas, especially in Science and Technology. He said pharmacists had seen dramatic changes in the profession and "although our horizon have expanded as a result of this progress, our world has become smaller".

"Today, more than ever before, we are aware of the need for improving communication among individuals and among nations" and are in a position to "play an important role in increasing international understanding. We can do this because we are health professionals with a common goal: to use our knowledge and skill to meet the health needs of our patients". Dr Oddis hoped that the FIP "is destined to become an even more effective force in the world-wide community of pharmacists".

In an opening address, Mr J. D. D. Dees, State Secretary of the Ministry of Welfare, Health and Cultural Affairs touched on the alarming global situation where health care costs are beginning to outstrip financial resources and hinted that in the Netherlands, these had reached the point at which measures must be put in place to halt the dramatic increase in drug costs. The Dutch government, he added, had recently decided to adopt new policies to that effect.

The opening ceremony was performed in the presence of HRH Princess Margriet of the Netherlands. Dr H. Schellekens (the Netherlands) delivered the inaugural lecture which was on "Biotechnology after the goldrush". He dealt with development problems being posed by new generation of recombinant DNA products like interleukens, growth factors etc.

Dr Schellekens said these were quite specific and had broad biological activity and that because of their specificity, toxicity testing had become a problem while their multiple biological activities had made it difficult to find their indications. He was of the opinion, therefore, that although the importance of recombinant DNA for health care would be tremendous in the long term, development would delay the putting on the market of such products, rather to the disappointment of investors and scientists.

Included, also, in the programme of the conference were 12 main symposia, series of "Up-date Lectures", individual oral and poster communications and sectional meetings for the various branches of the profession.

Others were, the usual meeting of the Third World discussion forum, a survey of the FIP's history presented in a slide show by Mr G. Griffenhagen of the USA and, of, course, a number of entertainment activities.

FIP

The Andre Bedat Award

AN award named after Mr Andre Bedat, immediate past-president of FIP, to honour "a pharmacist who is an outstanding practitioner having made significant contributions to pharmacy at the international level" is to be instituted by the FIP to stand alongside the already existing Host Madsen Medal for scientific achievement.

In principle, it will be awarded every two years at any FIP congress and candidates may be proposed by members of the Federation.

President of FIP, Mr J. A. Oddis, said the first recipient would be Mr Bedat himself, in appreciation of his contribution as editor, practitioner, organiser and "counsellor to us all".

FRANCE

France's Unused Medicines

AN Association of French pharmacists known as Pharmacie sans Frontieres is collecting and helping to send unused drugs to thet hird world.

Offices run by volunteer pharmacists have been set up throughout France and these are charged with the collection of in-date, unused drugs. They check their condition and then sort them out for use in countries like Nigeria, India, Vietnam, Bolivia, etc.

Several drug companies are contributing to the association's efforts by donating drugs which they have over produced.

A French pharmacist, Jean-Louis Machuron founded Pharmacie sans Frontieres in October, 1985.

FRANCE

Cost of Drugs Justified?

MR R. Santier, President of Sanofi in France has condemned the "money-hungry" picture being painted of the pharmaceutical industry.

He was speaking at a meeting at the Ipharmex exhibition in Lyon on October 23. Mr Santier noted that "there are still no treatments for 60% of known diseases" and this situation opened up an unlimited possibilities for development, especially in biotechnology.

More research was therefore needed and this involved the use of high technology equipment and more investigations into the secondary effects of medicines.

He hoped that higher drug prices now prevailing in France would allow increased income for the French pharmaceutical industry for use in financing research works.

GREATER-ACCRA

Blood Bank in Trouble

AS at October last year, the blood bank at the Korle-Bu Teaching Hospital has been operating with only 80 units as against a minimum of 150 units of blood that should be available at any given time.

This was made known by Dr J.K. Acquaye of the Blood Bank and who is also the Medical Administrator of the hospital.

He attributed the critical state the bank finds itself to the deliberate refusal on the part of patients to replace blood given them during surgical operations carried out on them and described the situation as unfortunate.

The hospital is not only suffering from a shortage of blood but also from that of anaesthetics and gauze. According to Prof. Kofi Oduro, who is the anaesthetist in charge of the Hospital surgical operations are progressing at a rather slow pace because of these shortages.

GREATER-ACCRA

Acquire Book-keeping, Accounting Skills

THE provision of modern health services require large amount of financial material and human resources and since no country has the means to provide for all the health needs of its people, it is incumbent on health administrators to develop strategies that will help reduce the cost of providing health services.

Dr (Mrs) Mary S. Grant, Under-Secretary for Health, made this remark during the opening of the 13th Regional Course in Health Administration and Management for senior health personnel at the Ghana Institute of Management and Public Administration (GIMPA), Greenhill on October 5.

The Under-Secretary urged the participants to acquire good book-keeping skills as this would enable them to have at hand information on stock levels and their movements. A knowledge of this, she went on, would put them in a position to place, on time, fresh orders to prevent frequent shortages within the system. It would also help to avoid the situation where excessive stock of some items were maintained—a practice which locked up considerable proportion of the country's finances, contributed to temptation on the staff to pilfer or divert and placed perishable items at risk of deterioration in their qualities.

Dr Grant also called on the participants to familiarize themselves with basic principles of accounting and financial control to be able to check misappropriation of funds.

The eight-week residential course was attended among others by doctors, pharmacists, nurses and hospital secretaries from countries that make up the West African Health Community (WAHC) that is Ghana, Nigeria, Sierra Leone, Liberia and the Gambia.

HEALTHCARE

Gov't Hospitals Vrs Private Clinics

THE government has directed in July that henceforth all public servants should seek medical attention from public health institutions and not from private clinics.

According to official sources, the measure is aimed at bringing in more revenue to public hospitals and clinics so that these could be used to make possible the provision of better medical care for the general public.

Hitherto, most public organizations had engaged the services of private medical practitioners to avoid their employees having to wait for long hours at government hospitals before they are attended to.

The directive is being adhered to and this has placed heavy pressure on government hospitals with regard to the number of patients reporting sick vis-a-vis the number of doctors at post.

The picture is different in the case of private clinics where the number of patients have dwindled considerably.

ASHANTI

Hostel for UST Student Doctors

THE Asantehene, Otumfuo Opoku Ware II has commissioned a 65 million Valco Fund Hostel for clinical students of the School of Medical Sciences (SMS) at the University of Science and Technology (UST) in Kumasi on October 31.

The Hostel, the first out of five to be built near the Komfo Anokye Teaching Hospital, contains 29 rooms for 58 students, two self-contained guest lecturer's room, a lecture room and an all-purpose lounge named after Mr Modjaben Dowuona, an educationist and former chairman of the Valco Fund Managing Trustees.

Cutting the tape to open the hostel, Otumfuo Opoku Ware called on the students who would use it to be dedicated and honest to the nation to ensure that funds used to build it achieved its purpose.

Others who attended the ceremony were: Mrs Aanaa Enin, a PNDC member; Air-Commodore F.W.K. Klutse, Secretary for Health; Dr Moses Adibo, Director of Medical Services; Members of the UST Council and Members of the Managing Trustees of the Valco Fund.

VOLTA

Importation by Churches

AIR Commodore F.W.K. Klutse, Secretary for Health, has announced on October 6 that the 25% tax on drugs and medical equipment imported into the country by churches has been waived.

According to the Secretary, who said this at Ho, the move is aimed at reducing hospital fees.

CORRECTION

UNDER *Product Review* in the last edition of the Journal (GPJ Vol. 10, Nos 1,2) AMBILHAR was attributed to Pfizer, this was a mistake and any inconvenience caused is highly regretted. AMBILHAR is by CIBA whose local agents are REISS & Co. (Ghana) Ltd., P. O. Box 3074, Accra.

RENDEZVOUS

GREATER ACCRA branch meetings on February 18, April 21 and June 16.

Sixth Scientific Seminar of the West African Pharmaceutical Federation in Freetown, Sierra Leone from February 22–26.

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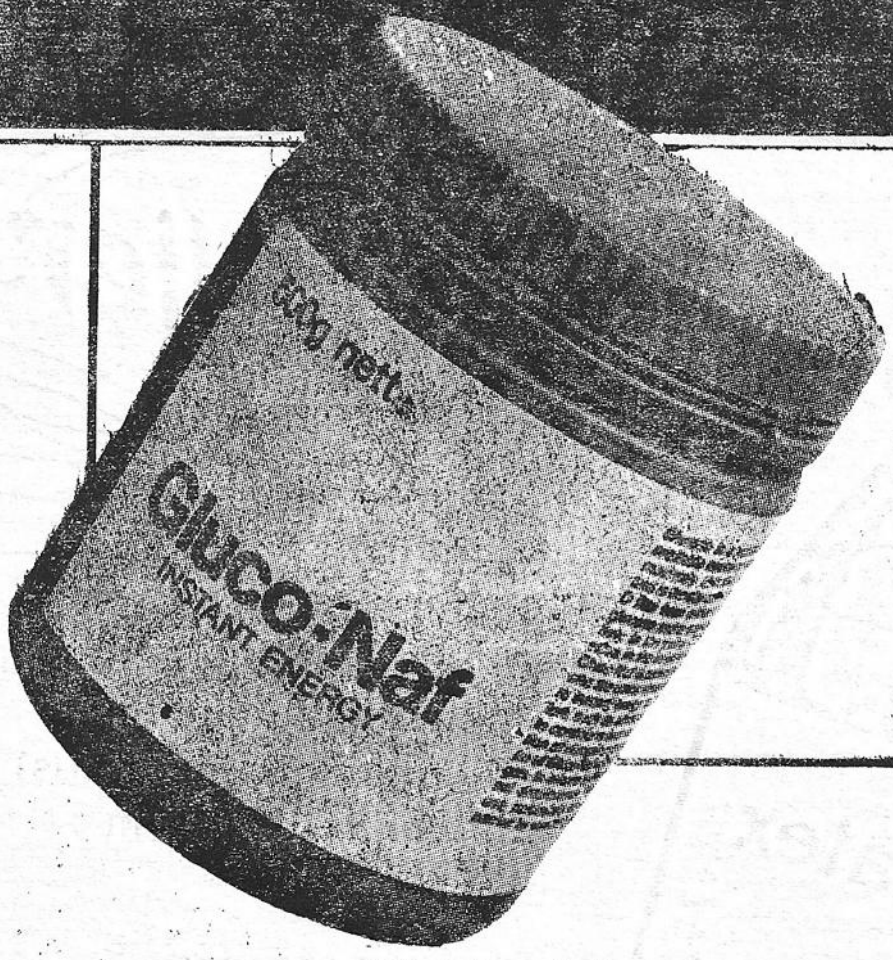

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Clinical Pharmacy— Scope, Prospects and Problems

by Reginald Ansa-Asamoah, Ph. D., M.P.S. GH.

Department of Pharmacology
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U.S.T., Kumasi.

PHARMACY is that profession involved with the preparation, compounding, storage, maintenance of quality, and dispensing of pharmacologically active substances for the treatment of disease to alleviate human suffering. The traditional subjects of pharmacognosy, pharmaceutics, pharmaceutical chemistry and pharmacology which prepared the pharmacy graduate for hospital, industrial, community and research practice have changed in content so much (in some case beyond recognition) over the years. The reason for this rapid change in the curriculum which should be reflected in the practice of pharmacy is two-fold.

An examination of the content of the current editions of the British and the US Pharmacopoeias reveals an index of an alarmingly large number of official drugs. The pharmacist is expected to be conversant with not only the relative selectivity of each drug in treating a particular disease but also the possible interactions between them, their pharmacokinetic profiles as well as relative cost and other relevant information. If the patient is to benefit from the drug and if the physician is to benefit fully from current trends in pharmaceutical services then the information on drugs should be readily available and provided by the pharmacist.

This paper was first presented at the first Clinical Pharmacy workshop held at the University of Science and Technology, Kumasi.

The second factor is the patient. Since the major objective of the pharmaceutical service is to improve the health status of its people, the profession has to adjust to society needs.

It is common knowledge in Ghana that majority of our people do not like going to hospitals. Those who do not go to hospitals may be consulting herbalists. There is nothing wrong with this practice because the use of natural or herbal preparations is common in Ghana, India and Japan and it is now on the ascendancy in the US and Europe.

What is required by the pharmacist is the information on these. Most patients who find their way into hospitals prefer an injectable or a capsule to the liquid preparations. I think the pharmacist must understand these social behaviour during his training so that he can analyse and synthesize them in practice. I wonder how many of us after all our pharmacognosy training can recognise a live Indian hemp plant? I believe none.

In this part of the world, I wonder what happens to the liver after years of repeated malaria infection. Do the microsomal enzymes undergo any changes in the African with age? Has malaria therefore anything to do with the "jaundice explosion"?

For these reasons in addition to the traditional pharmacy subjects, we at UST have introduced subjects such as Chemical pathology, drug analysis, pharmacokinetics, social pharmacy and management as well as traditional medicine. In other developed countries such as US, Europe and Australia emphasis may be on either pharmaceutical technology or clinical pharmacy.

Scope

I believe since the decision was taken to organise this workshop, this topic has generated a lot of discussion and controversy among pharmacists even in the Faculty where the course will soon be introduced as well as among physicians, nurses and other members of the health care delivery team. The fact that you are all here today proves the importance of clinical pharmacy in the health care delivery system and vindicates the National Council for choosing this topic for its continuing education programme. What is Clinical pharmacy? When drugs are dispensed by pharmacists in hospitals and community/retail pharmacies, the responsibility of the pharmacist appears to have ended. But you see, the patient may come back with the same ailment without the pharmacists knowledge to see the doctor. He may even go to another hospital altogether without their knowledge of previous diagnosis and treatment. Clinical pharmacy therefore is a current trend in hospital pharmacy practice that is patient-oriented involving an understanding of the clinicians objectives so as to provide the most appropriate therapy, supply available information to both clinician and patient for effective drug therapy and compliance and the monitoring of the clinical fate of the drugs particularly where such information is not available. It is therefore a natural evolutionary progression of hospital and community pharmacy practice which concerns itself with the concept of an individual patient's drug titrations involving consideration of pharmacokinetics, medical history, metabolic and disposition-

ary profile together with any envisaged or suspected deviations in the course of therapy.

Another area of involvement of Clinical pharmacy is the making available of drug information that is data-based (adverse interaction and toxicological data from literature as well as interviews of patients under particular therapy) with quick information retrieval facility such as ordinary card filing or computer systems. Perhaps the most observable aspect of clinical pharmacy to the public which is the facet of clinical pharmacy practice is patient counselling—an area where we in this country need to place emphasis in order to achieve proper drug compliance for effective drug therapy and educate our people about the proper use of drugs to avoid misuse and abuse.

I think I will take this opportunity to dilate on the need for hospital and community or retail pharmacists to attempt to be patient conscious rather than drug conscious as a first step to improving the pharmacy practice which will pave the way for the introduction of clinical pharmacy into our health care delivery system, and an improvement of the health status of our people. The reason for this is that these pharmacists are or should be the last to see the patient even if he is an in-patient and as the custodian of the mystery inherent in the healing powers of the drugs supplied. I do not think the normal t.d.s without the former p.c or a.n is good enough. The patient is entitled to the full treatment. There may be some hospitals in the country which do not have the services of a registered pharmacist and in most hospitals the pharmacist may be in the stores or may be a supervisor who is saddled with so much administration that he is never in the dispensary which means that patients who send their prescription to the premise he supervises do not benefit from his professional competence. I have already mentioned the need to understand the social behaviour of our people. You are known and easily identified in the community as the pharmacist and your presence and counselling of the patient gives him absolute faith in the prescription which improves the therapy (at least it satisfies the psychological aspects). On the other hand a complete absence from the scene creates in the patient's mind some doubts which may impinge on the competence of the pharmacist. The delegation of patient-counselling role to a Technician is not only dangerous but professionally unacceptable.

The situation equally applies to community or retail pharmacy practice. In community pharmacy practice the need for patient-oriented approach or counselling to the service provided need not be overemphasised. Infact it may even be more impotant in our context than in other countries since in addition to being the last professional the patient sees when he is sick, the bulk of registered pharmacists in community practice may represent more than 80% of our membership which is indicative of the large number of clientele who patronise community pharmacies.

With the community pharmacies in the rural areas or even in some urban community pharmacies, most of the prescriptions could be from Clinics or Health Centres manned by non-medically qualified personnel. As a respectable community pharmacist, a counselling role will not only be appreciated but will be an ethical duty expected of him.

From the above emerges a picture of the Clinical pharmacist. He is a completely new type of pharmacist. To enable him relate his specialisation to the diseased state, understand the patient and be in a position to advice the physician, and counsel the patient, he must understand the physician's language. The objective of the clinical pharmacy course is to ensure that at the end of the course students are able to

1. Communicate effectively with and advice medical practitioners, nurses and patients on appropriate drug usage and use of drug combinations. Design and maintain adequate methods of recording the drug history of patients.
2. Recognise the signs and symptoms of common diseases and design dosage regimens and select the most effective drugs for the treatment of such diseases.
3. Detect and describe drug interaction mechanisms and advice on prevention of such adverse interactions.
4. Recognise the signs and symptoms of drug toxicity and recommend appropriate treatment.
5. Appraise the absorption and distribution characteristics of drugs under normal physiological and pathophysiological conditions and develop an adequate understanding of metabolism and excretion of drugs under similar conditions.
6. Identify the *pharmacokinetic profile* and the effect of biological half life and rate constants of drugs on effective therapy.
7. Formulate appropriate dosage regimens for drugs based on the pharmacokinetic characteristics.
8. Advice the Statutory National Body on selection, procurement storage and distribution of drugs for hospitals under the Ministry of Health.

Course Structure: In addition to the traditional core courses in pharmacy degree programmes over the world, emphasis is laid on the following additional subjects to achieve the above objectives.

1. Biopharmaceutics
2. Pharmacokinetics
3. General Therapeutics
4. Chemical Pathology and Toxicology
5. Hospital Pharmacy Management and Drug Information
6. Biostatistics

Lecture on these courses are reinforced with objective clinical practicals involving interviewing techniques required for counselling and drug information services of retrieval and analysis. Simple bioavailability tests and pharmacokinetic profile of drugs in hospitalised patients for a clearer understanding of therapeutic efficacy of these drugs are also undertaken.

General Therapeutics, Chemical Pathology and Toxicology compliment the clinical pharmacist's basic knowledge of physiology, biochemistry, microbiology and pharmacology which enables him to appreciate considerations of diagnostic and therapeutic measures employed in the clinical management of com-

mon diseases and helps him understand and advice on special prescriptions for some children and the elderly as well as in renal and hepatic impairment and in pregnancy.

Biopharmaceutics is usually taught in the general pharmacy course and it involves good knowledge of cell biology and the cell membrane as well as physiological barrier (blood-brain and placental barrier) systems and how physiochemical properties and formulation factors affect the passage of drugs across membranes and how such drugs are absorbed, distributed metabolised and excreted. (see fig 1)

This simple scheme demonstrates biopharmaceutical principles which enables one to determine the dose of a formulation required to produce a desired therapeutic effect. It can also discriminate on pharmaceutical formulation from another using bioavailability data responsible for pharmacological availability of the drug in the biophase resulting therefore in the desired therapeutic effect.

Pharmacokinetics: This is a mathematical analysis of the time courses of absorption, distribution and elimination which determines the therapeutic efficacy of a drug. The previous scheme showed that the pharmaceutically available portion of the drug administered is redistributed in the various body compartments after it has been absorbed.

How long does it take the drug to be completely eliminated. Does it accumulate in body fluids and therefore likely to produce toxic effects? The rate at which the drug is either eliminated or accumulates which is the pharmacokinetic profile determines how often the drug is to be administered to maintain the effective plasma concentration required for maximum therapeutic efficacy. The clinical pharmacist therefore collects plasma and urine samples of patients who may have problems of handling certain medicaments. The active drugs are extracted from the biological fluids and their nature as well as concentrations determined usually using spectrophotometric or sensitive chromatograph methods such as GLC or HPLC.

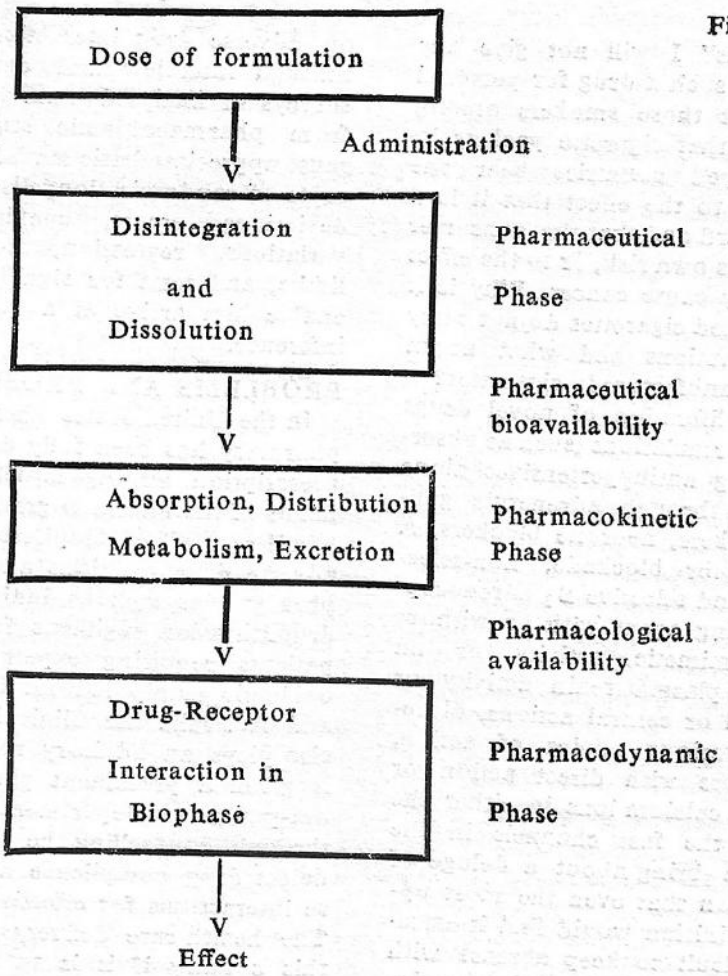


Fig 1

Hospital Management and Drug Information: As an expert on drugs the pharmacist is usually consulted on problems involving drug usage. In addition to the general hospital pharmacy management practice, the clinical pharmacist is expected to counsel patients and provide information on choice of drugs to clinicians. In both cases if he is to be competent, he must have at his disposal two types of information:

i) Information on the efficacy of the drug, pharmacodynamic and pharmacokinetic profile as well as possible interactions.
ii) Information of personal nature such as observation made by him or a colleague in the same environment about a particular drug.

The second is important since some of the drugs used in this country were not developed for use in the tropics and as such the possibility of an unsuitable formulation creating a problem in a critically ill patient cannot be overuled. Again as you all know, the older clinicians and pharmacists in this country prescribe and dispense drugs that have expired. They claim there is some activity still left, but this is a very dangerous practice because there will not be enough chemical biologically available in the expired drug for any biological activity.

In fact some expired drugs might have been converted by some environmental conditions such as temperature (due to poor storage) light or air or moisture to a very toxic compound which will be detrimental to the patient's state of health.

Pharmacist and clinicians who may not have access to international journals are of the opinion that the information leaflet insert of most retail packs of drugs contains all the information required for their prescribing it. However, when one examines the information inserts of one medical preparation made by the same manufacturer but marketed in the United States, Europe and the Third World countries one finds that although the preparation is essentially the same, for both regulatory, ethical and commercial considerations, these inserts are not identical in their "indications" and

"precautions" I will not give any example of such a drug for personal reasons but those smokers among you know that cigarette packets in all developed countries bear the inscription to the effect that it is a health hazard and that the consumer uses it at his own risk, or to the effect that it may cause cancer. Why is it that imported cigarettes do not carry such precautions and what about locally manufactured cigarettes?

The proliferation of novel drugs and new formulations (such as observed among antihypertensives alone has gone through adrenergic ganglion blockers, neurone blockers, A Adrenoceptor blockade, non-selective beta and selective B_1 adrenoceptor blocking agent with or without sympathomimetic activity or an effect of plasma renin activity or peripheral or central actions, diuretics of various modes of action, vasodilators with direct action or action on calcium ions in either the slow or the fast channels in the sarcolema bring about a deluge of information that even the most up-to-date clinician would find it extremely difficult to keep abreast with A well managed information service coupled with the services of a clinical pharmacist would place at the disposal of the clinician the most up-to-date inventory for the benefit of the patients. This will result also in a more rational utilisation of drugs. Apart from this, one of the most difficult data to obtain in Africa is that pertaining to adverse drug interactions, this is because there are no trained personnel except the two clinical pharmacologists at UGMS and as a result this important data upon which other clinicians would base their judgement has been left uncollected and uncollated for so many years. Recently there has been the emergence of the clinical pharmacists and their gradual assimilation in our health situation. When given the necessary regulatory back-up, the clinical pharmacist is most suited in his day-to-day contact with patients to monitor this aspect effectively and through documentation provide the necessary data for periodic evaluation.

Biostatistics: If the clinical pharmacist is to compile data including those on adverse drug interactions either through interview and counselling surveys or analysed data obtained from pharmacokinetic studies, he must appreciate basic statistical concepts of randomisation, distribution deviations, errors, coefficient of variations, regression, confidence limits, and tests for significance to enable him arrive at a meaningful inference.

PROBLEMS AND PROSPECTS

In the United States where clinical pharmacy has been fully developed, prescription writing is left in the hands of the Pharm D graduate who handles all biopharmaceutical adverse drug reactions and toxicity problems as well as individualised drug titration regimens for special patients requiring expert pharmacokinetic manipulations. In Europe and Australia the Clinical Pharmacist plays an advisory role but he is given a prominent place in the out-patient department where through counselling he is able to detect drug complience and adverse interactions for effective therapy. The health-care delivery system in this country if it is to make any headway should recognise the significant impact clinical pharmacy can make to reduce cost of the service in terms of proper diagnosis, and appropriate therapy which will save the physician's time, prevent over prescription, improve general health and thereby increase productivity. This is more important in our context where the institutional structure and hierachy of the health care delivery system is ill-defined and confusing to both the policy makers and the users. What is the state of pharmacy practice in our maternity homes, mushroom clinics, private hospitals and even in our teaching hospitals. Lack of diagnostic aids in our health care delivery system has led to the practice of therapeutic diagnosis which has not helped reducing the problem of self-medication and probably misuse.

A curious situation in our health care system is that we have highly trained medical personnel working or being asked to work with grossly inadequate tools and facilities. If the disparity between the level of competence of the personnel and the level of practice dictated by available resources and facilities is wide why then are you worsening it by introducing clinical pharmacy, one may ask? The state of hospital pharmacy practice in this country is not something to be proud of. Hospital pharmacies in this country have witnessed a very high rate of turnover of pharmacists who leave because of comparatively poor renumerational and lack of job satisfaction arising out of not being sufficiently challenged by their jobs. What one sees of hospital pharmacy can be described as stock management and dispensing of drugs—a job so monotonous as it is uninteresting. The introduction of a patient oriented pharmacy practice would decrease the challenge that the job would offer. If facilities for clinical pharmacy practice and those for manufacturing of simple medicaments and quality control are provided, hospital pharmacy in this country would have a new lease of life to the benefit of the other members of the health team and the patients as well. It will increase the efficiency of drug utilization and help improve the hospital pharmacy practice.

In the Ghanaian situation it appears that the clinical pharmacy course should be introduced into the undergraduate course to improve the quality of the professional training bias for hospital pharmacy practice. The Faculty of Pharmacy has set into motion the mechanics for the approval and implementation of this.

It is my view that a post-graduate clinical pharmacy programme could be envisaged to provide for the mandatory further training of practising hospital pharmacists. I believe if the Ministry requests for and it is prepared to sponsor the programme, the Academic Board of the University will certainly welcome the prospect. There is no doubt in my mind that the clinical pharmacist will have little intergration problems and will be a useful member of the health care delivery team and that his arrival will leave no doubt in the minds of his countrymen of the professional calibre of the 20th century pharmacist.

Clinical Pharmacy Practice Vrs Ward Pharmacy Practice

by Esther Osei (Mrs) ,B. Pharm., M. Clin., Pharm., M.P.S.GH.
Ghana Police Hospital, Accra.

Introduction

TRADITIONAL pharmacy practice places the pharmacist's interest in only distributive or simply supply function and she becomes seemingly unconcerned to provide some semblance of professional services.

In the Hospital setting for example she distributes those prescribed drugs which are available to patients or to wards in which the patient resides. She also waits in the pharmacy for advice to be sought by prescribers without a knowledge of the patient's medication history, medical history and the clinical condition presented. His potential as a drug expert cannot be realized because the traditional course and training in pharmacy do not equip him to fully assume this contributory role as an active member of the health care delivery team (HCDT). As such he is passive and unable to communicate with the other health professionals.

Over the past decade or two, pharmacists in various parts of the world have gradually but noticeably increased their contribution towards patient care in the ward as it applies to drug therapy. However this now seems to have plateaued and to advance further, a clearer definition of what is seen as the role of clinical pharmacist as opposed to ward pharmacist, is required. Clinical pharmacy is patient orientated pharmacy whereas ward pharmacy is a prescription orientated pharmacy with predominance of dosage interventions. The unique role of a clinical pharmacist as distinct from a ward pharmacist must be backed up by a training programme in order to fulfil the role of a drug expert.

This area of expertise must be exploited not only in the realm of scientific knowledge of drugs but also in the realm of their use or misuse in patients.

Aim of Clinical Pharmacy Practice (CPP)

In order to appreciate the aims of CPP we must identify the major actor or disciplines in a Health Care Delivery System (HCDS) and super-impose this new role of the pharmacist in the system. (*See Fig. overleaf*).

Doctors - Consultation and advisory services. Pool of information from each other Audit services

Nurses - Teaching, Advising and exchange of professional ideas

Drug Manufacturers - Information services

Parameds - Advisory role

Health Care (Patients, Beneficiaries etc.)—Advisory, monitoring services, direct and indirect provision of information.

The Clinical Pharmacist seeks not just to provide advice on drugs to doctors when sought for, or dish out drugs to nurses in wards or at dispensary window to patients or concern himself with drug and equipment collection and storage. The CP now finds himself as an active partner in HCDS with a common objective of attaintment of patient's maximum health benefits.

Evolving and achieving the right type of relationship and communication with other members of the health care team is the essential step to reaching the main goal of assuring Rational Drugs therapy in clinical pharmacy. In order to realize this objective, the clinical pharmacists should understand the following:-

- The background to the patients clinical condition;
- Drug treatment choices for such conditions;
- Drug induced adverse reaction -their aetiology and presenting symptons;
- Drug interaction with disease, other drugs, or foods and possible interference with laboratory tests.
- In the event of side effects, interactions, inefficacy or treatment failures, be able to suggest alternative measures.

Hence the need for a back up training programme if pharmacist is to effectively exhibit his new role.

3. Training in Clinical Pharmacy Practice

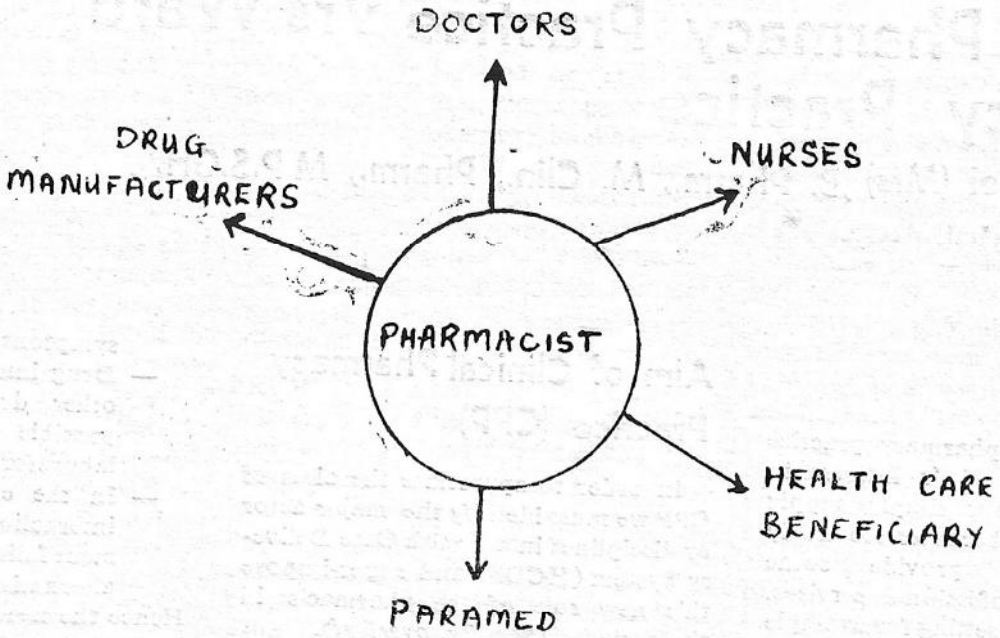
3.1 Academic Issues

Academic qualification in Clinical pharmacy is currently achieved as a post graduate (M.Sc.) after B. Pharm or first degree in Pharmacy. In the U.S.A., Pharm D courses are run in clinical pharmacy and also fellowship in some speciality of clinical pharmacy. In some countries (e.g. Zimbabwe), the B. Pharm curriculum has been enriched by the introduction of basic clinical pharmacy training in the final year. The pharmacy Faculty of the University of Science and Technology is at an embryonic stage of following suit. It should also be possible to organise short courses in clinical pharmacy for practicing pharmacist for the award of say, a certificate.

3.2 Specific Knowledge

The target of training in clinical pharmacy is the acquisition of some basic knowledge i.e. Disease states, medical terminologies; Drug treatment and interpretation of laboratory tests and results; pharmacokinetics and their relevance in drug treatment; pharmacology, biopharmaceutics and drug information system.

The acquisition of these essential knowledge is easily related to the



achievement of successful clinical pharmacy practice; for example knowledge of pharmacokinetics is necessary if the pharmacist is to recommend dosage schedules for many drugs particularly in patients with renal problems. Drug information will help with evaluation of drugs and choice of therapy and therapy monitoring.

3.3 Practical Aspects

The practical diet of clinical pharmacy training may be enumerated as follows:-

Ward visits or rounding with or without physicians; Case notes review;
Drug treatment sheet review;
Clinical meetings;
Presentation of case studies;
Adverse drug reaction monitoring; and
Patient interaction through counselling.

It must be emphasised that clinical visits assist the pharmacist to communicate confidently with doctors, patients and nurses.

4. Applications

4.1 Hospital Practice

Pharmacists are involved in the distributive functions of ensuring that the *right dose* of the *right medication* reaches the *right patient* at the right time. He also provides drug intelligence to other health professionals within the unit and contributes to the full drug therapy of a particular patient. The result is that pharmacists are more involved in clinical and ward situation and:

1. Provide consultation services to a prescriber based upon his current diagnosis;
2. Take drug history or medication history
3. Select appropriate drugs, dosage forms, doses and dosing schedules;
4. Decide on methods of administration;
5. Continually monitor initiated therapy for efficacy;
6. Monitor for adverse effect;
7. Monitor for blood levels;
8. Make sure patient complies with drug treatment;
9. Counsel patients on discharge.

4.1.I Medication History

This is a complete history of medication used by a patient and this must be accurate. It must include prescribed and self/non prescribed medications and unpleasant side effects.

Often medication histories are taken by physicians and surgeons and these are not without inadequacies, only prescribed medications are recorded leaving self prescribed medicines.

The pharmacist with his workin knowledge of prescription and no prescription products is well qual fied to obtain information on med cations being taken regularly an intermittently. Studies have prove that pharmacists take better med cation histories than clinician (Dodds, personal communicatio 1977).

4.1.2 How to take Medicatio Histories

— The CP in ward acquaint himself with the patient' charts in order to be familia with the present status an background details of th patient.
— He then introduces himsel and explains the purpose o the interview;
— He groups questions around main subject areas e.g.
  a) prescribed medications which should be current and recurrent (previous 1 to 2 months)
  b) over the counter (OTC) or self medication
  c) allegies; sonsitivities; untoward effects of drugs;
  d) smoking, drinking and eating habits;

  All these act as prompts to the patient's memory.
— He suggests conditions which patients may associate with

medicine e.g. headache, colds, other aches.
- — Terminologies used must be simple and familiar to the patient, e.g. indigestion, constipation, cough, tummy upset.
- — The interviewer should find out preparations commonly taken by patients e.g. vitamins, tonics, eye drops;
- — Prescribed drugs must be asked for and identified. Suggest commonly used types of medication to patient e.g. injection, vaccinations, contraceptives, suggest common complaints e.g. infection, sleeplessness etc.
- — When the interviewer has patient's confidence, ascertain patient's compliance pattern. This is a valuable information which will help to treat the patient.

dvantages

- — Valuable to physicians and surgeons in making decisions on current therapy and thus beneficial to patient.
- — Alerts to previous SE, and potential adverse reactions and interactions and validates laboratory tests.
- — Valuable tool for exchanging information between professional staff.

1.3 Medication Selection

The pharmacist's role as a drug ecialist is fully utilized in the area medication selection especially hen the pharmacist is present on nsultant ward round and at the oint of diagnosis and decision aking.

Advantage of CP being present the time of decision making is at:

Advice given is easier to put into effect if received at the time which involves a change in written order with resulting overtones or correcting a wrong decision on the part of clinician Pharmacist can make positive suggestions in areas with which physician/surgeon is unfamiliar or not conscious and therefore need to ask for advice.

The selection is based on his detaid knowledge of all aspects of medication. This is necessary in order to facilitate rationale medication selection. He is able to make contributions on formulation, dosage schedules, drug absorption, distribution and elimination, side effect SE, contra-indication CI, alternate dosage forms prediction, relative cost, case of administration, storage and stability. A good patient medication history will have important bearing on selection of medication. For example, a previous medication with SE will be avoided.

4.1.4 Monitoring for Medication Efficacy

It is important after selection of medication that pharmacist/physician/nurse co-operate in monitoring the patients response to that medication. This is aimed at maximising benefits and either prevent medication problems arising or help their early recognition and correction if they do arise.

Steps to be followed for Monitoring: by all health professionals (Jost, 1977).

1. Collection of patient data.
2. Statement of therapeutic goals.
3. Selection of medication.
4. Establishment of monitoring Parameters
5. Identification and resolution of problems.

The pharmacist role in collection of data has been discussed under medication history. For step (2), direct contact with physician is necessary. Therapy is normally aimed at specific end point i.e. to treat infection or minimise symptoms e.g. pain so that quality of life is improved. Understanding goals makes for effective medication monitoring and also gives hope for benefits of each item of therapy. The CP then chooses therapeutic parameters to indicate when desired objectives have been achieved.

Pharmacist role in monitoring for efficacy will be contributing towards assessment of pharmacological responses of patient to various medication.

4.1.5 Monitoring for Adverse Effects

Multiple drug treatment is virtually the rule in hospital medicines thus the risks of adverse drug effects and drug interactions are often large. Treatment failures and adverse effects of medication are the most likely situations where a pharmacist's monitoring activities will benefit the patient.

The pharmacist here notes certain problems that may develop in a certain percentage of patients and design parameters to detect them. Parameters to be used may include the following: skin rash, nausea, vomiting, diarrhoea, alopecia, itching, fever, headache, blurred vision, tinnitus, difficult breathing, depression changes in BP, pulse rate and effects on laboratory test values. The pharmacist then records all medication reactions.

Patients at Risk

Those on multiple/several medications
Severely ill
Those on toxic medications

4.1.6 Recognition of Drug-Drug, Medication-Medication and Drug-Disease Interactions

The CP must be aware of drug and medications most likely to have significant interaction. He must also be aware of patients most likely at risk:

Alcoholics
Those with renal impairment (Gentamycin-frusemide)
phenytoin+sulphonamide
Those receiving chronic medication
phenytoin+alcohol
Those with metabolic abnormalities e.g. sulphonamide with G-6PO4 deficient neonates or chloramphenicol and patients whose condition would enable the pharmacist predict potentially serious medication-medication and drug-drug interactions.

The above information made available through medication history and the patient's medical history together with his present condition will enable the pharmacist to make his full contribution in this area.

Awareness of interaction between oral medication+food e.g. Erythromycin+food with resultant decrease in absorption.

Awareness of interactions that can occur between medications added to intravenous fluids before administration. Although these interactions are physico-chemical in nature, serious consequences could result

as the patient receives this mixture.

The CP is therefore to monitor prescription for IV infusion and drug therapy to ensure that medical and nursing staff are alerted to:

(*a*) Specific problems concerning the safety, stability (temp, time, light, absorption) and compatibility of drugs with IV fluids.

(*b*) Provide advice and information to doctors and nurses on all pharmaceutical aspects of addition of drugs to IV fluids.

Drugs often added this way are: KCL, antibiotics corticosteroids, heparin, lignocaine, vitamins, and oxytocin—all by continuous infusion. The pharmacist must inform them not only of the risk of microbial contamination but also of the following factors:

(*a*) Effect of inadequate mixing. Drugs solution added to infusions have specific gravity different from that of the infusion fluids and must therefore be adequately mixed, otherwise drug solution will layer with the result that the patient will receive bolus of drug which could be life threatening e.g. KCL (Patrick et al. 1977) instead of continuous drip.

(*b*) Ability of drug to interact with or degrade the infusion fluid. The stability of intravenous lipid emulsion depends on a delicate balance of physical forces. Addition of drugs may crack the emulsion but aggregation and enlargement of lipid globules may occur without macroscopic change. Administration of such admixtures can cause embolism.

IV mannitol 20% or more can crystallize when drugs are added.

Parenteral amino acids +B lactam antibiotics form potentially immunogenic and allergenic conjugates.

(*c*) Effect of infusion fluid on the stability of the drug. Solubility and stability of many drugs are critically dependent upon pH and instability and incompability problems in IV fluid admixtures are often due to changes in hydrogenion concentration.

Many drugs used for iv administration are water soluble salts of sparingly soluble acids and bases whose injections are either buffered or adjusted to pH compliance with optimal solubility and stability. Any addition of solution to iv fluid with widely varied pH from the original can lead to precipitation of free acid or base.

Again precipitation can also occur by interacting with a component of the drug.

ILLUSTRATION

Effect of sodium ampicillin (2g) on pH infusion fluids Ashwin and Lynn, 1975.

Infusion fluid (500ml)	pH Fluid before admixture	After admixture
5% dextrose	4.1	8.6
0.9% NaCl	5.3	8.7

This and all others make it imperative for all admixtures of drug or drug preparation to IV fluids to undergo prior investigation. Variable formulation and bioavailability despite the fact that they contain the same quantity of active principle e.g. slow release preparations of iron and iron tablets. Satisfactory response achieved in most patients on iron tablets in salt form. Slow release preparations have unreliable absorption. Therefore, optimum bioavailability may not be achieved.

4.1.7 Monitoring of Blood Levels of Drug

Drugs with narrow therapeutic index are monitored for therapeutic and/or toxic levels. Those drugs which may have considerable inter-patient variation are also monitored. This way a useful information for effective treatment of a particular patient will be provided.

Advantages

Helps to access whether patient's symptoms are due to overdosage or disease state e.g. Digoxin therapy.

Access patient's medication compliance.

Helps in calculating dosage regimens in patients on dialysis procedures, or in patients with impaired metabolism or excretion and in bioavailability studies.

EXAMPLES of drugs in this category are:-

antiarrythmias — Lignocaine, Disopyramide, Procainamide

Antibiotics — Gentamycin and other aminoglycosides

Anticonvulsants — Phenytoin, Phenobarbitone, Ethosuximide, Garbamezepine sodium Valproate

Cytotoxics — Methotrexate

Others — Digoxin, Theophylline, Lithium

Method:

Sensitivity and accurate assay procedures are necessary and the enzyme immunoassay technique (EMIT) has been found useful in providing quick and simple method of determining levels of most drugs which are required to be measured.

4.1.8 Patient Counselling

This is defined as giving advice to the patient or the patient's relative relating to drugs therapy prescribed e.g. dose, method of use, dosage intervals, S.E. and precautions. The need for patient counselling has arisen because:

— The basic conventional labelling instructions are insufficient and supplementary information must be added.

— Pharmacist is faced with non compliance problems from patients.

The pharmacist having been train-

d to be an effective counsellor can gnificantly improve patient com-liance (*McDonald et al.* 1977).

Method

There is no ideal method for atient counselling and various me-hods have been employed by phar-macists in order to achieve their bjective.

The pharmacist will have to ask imself the following questions:

1. What type of advice to give
2. How much should they be told
3. In what form should it be presented.

gain it is not practicable to rout-ely counsel all patients. Priority as been given to cases where:-

— Prophylactic treatment is required e.g. TB.
— Drugs in use have low margin of safety e.g. warfarin, Phenytoin.
— Premature withdrawal from treatment will have serious consequences e.g. corticosteroids. Long term therapy is indicated for chronic condition e.g. epilepsy, hypertension, diabetics.

ischarge Counselling:

This is done on take home medi-ation and it is useful to allow atients to be accustomed to their edication routine prior to discharge from hospital. The aim of this ounselling is to help obtain maxi-um benefit from his/her medica-ent and a subsequent Patient edication compliance.

Counselling Procedures

a) Introduction and purpose of visit
b) Familiarization with patient name, title etc.
c) General chat to put patient at ease
d) Show medication and discuss following specific aspect.
— Dosage, method used, use of measures (if needed)
— Period of therapy
— Precautions to be observed
— Any special features e.g. SE of therapy, storage and disposal
— Rehearse main points discussed with the patient
e) Encourage patient to speak freely in course of interview.

Interview Techniques

Feedback—situation where interviewer repeats a few words which patient had spoken. Example:

P — When I have headache, I take two aspirin tablets
I — You take 2 Aspirin tabs.
P — Yes. I take 2 Aspirin tabs.

2. Facilitation—described as form of encouragement spoken/unspoken e.g. Oh?/a slight movement towards patient.
3. Sensitive silence—often helpful in encouraging patient to continue with something they are finding difficult to speak about, for fear of criticism from interviewer.
4. Confrontation—Brings something important to patients attention which he has been trying to disguise.
   Int.—You drink heavily
   P — I know but . . .
5. *Direct Question*—describes question directed at a particular topic in such a way as to be open—ended or close—ended.
   I — Why do you think it is necessary to go on taking your medicine even though you feel better.
   P —Necessary because, I may get ill again.

Close—ended

I — Do you take aspirin
P —Yes/No.

To be a successful interviewer be a good listener and don't stare hypnotically at patient but give impression to the patient that he is the sole object of concern. With very ill patients ask permission to interview a close relative.

Difficulties which exist in the practice of Clinical Pharmacy in Hospital

— Very few pharmacist are prepared to meet this new challenge and therefore show apathy in this new dimension of practice.
— Most clinicians regard pharmacist as an intruder and resent pharmacist's superior knowledge.

Clinical Pharmacy Practice in the Community

The community practice pharmacist is a member of the health care team most easily accessible to the general public. He is easily consulted by patients and customers on the purchase of OTC drugs and notably be said to apply his pharmaceutical knowledge directly to the care of the individual patient. This involves a range of advisory and practice activities including dispensing, counselling, response to symptoms presented by patients, medicine sales and the provision of general advice on health care. These professional activities have been undertaken traditionally by the Community Pharmacist. With the change over from traditional to clinical practice, the role of the pharmacist is not much altered but there is the need for him to accept, formalise and improve upon what has been his role.

Importance of Clinical Activities

A lot of factors have necessitated clinical activities in community practice and they include:

— The introduction of a wide range of effective medicines of high potency.
— Increase in unwanted actions of such medicines i.e. side effects and adverse drug reactions and of patients suffering from iatrogenic diseases.
— Recognition of the need for improved patient compliance.
— The growing awareness and expectation of patients about the effects and SE of medicines which they are taking.
— Increasing realization of the pharmacists role in symptomatic treatment of minor ailments.
— Increasing use of mechanical aids, reduction in number of calling for manipulative skills and the more effective use of pharmacy technicians/dispensing technicians and assistants

working under the supervision of pharmacists, thus freeing the pharmacist for more direct contact with the public.

Professional Clinical Pharmacy Activities

These are two fold—Direct and Indirect.

DIRECT

1. Dispensing of Prescriptions.
   Dispensing can be carried out under the direct supervision of the pharmacist. This frees the pharmacist from routine functions and allows him to fulfil professional obligations with regard to prescriptions.

Example:

- — Checking that prescriptions are correctly written, dose appropriate, medication not contra indicated and if necessary consulting with prescriber.
- — Counselling patient to encourage compliance and to ensure that appropriate information is given.

2. Sale of medicines:
   - — Can be at specific request of patient. This can be delegated to suitably qualified personnel or staff and supervised by pharmacist.
   - — In response to patients description of symptoms.
     This is undertaken directly by the pharmacist whether medicinal product is licenced or prepared specifically for patient upon description of symptoms.
3. Family Planning Services:
   Sale and supply of contraceptives should be undertaken directly by the pharmacist. He/She serves as the primary source of information on family planning.
4. Blood Pressure monitoring Service
5. Counter Prescribing:
   Provision of advice by pharmacist with or without the supply of medicine following description of symptoms by patient.
6. Provision of Drug Information Services
   Patient Medication Profile.

Ideally patients should be able to obtain drugs from *one* pharmacy so that the pharmacist will be able to offer medication monitoring services which would go a long way to ensure that there is maximum benefits with minimum risks of adverse effects from their medication.

The pharmacist must therefore keep the patient's medication profile in his pharmacy for patients medication to be monitored and also act as a data for both routine patient consultation and counselling on both prescription medication and on OTC medication. Card systems are normally used which contain these basic information about the patient. Patient's name, address, telephone number, if any, age, date of birth, allergy or sensitivity, special diet, chronic medical conditions, date prescription dispensed, prescription items, dosage instruction, quantity repeats if any, and prescriber's name.

How to obtain history

By interview or suitable questionnaire which the patient answers.

Advantages:

- — Reviews medical history and medication use of patients.
- — Cautions patient's to avoid certain food or medication.
- — Cautions physicians on drug interactions real or potential.

INDIRECT PATIENT SERVICES

The phamarcist provides support services to other health professionals. e.g. Provision of Drug Information Services.

Difficulties

There is lack of confidentiality involved in O.T.C. diagnosis which could lead to people being selective as to what they tell the pharmacist.

Most pharmacists in the community prefer to be drug trade experts rather than clinical drug experts.

GHANA PRACTICE

4.2.1 Activities

Attempts have been made to introduce clinical pharmacy practice in one of the countries hospital since 1984, the aim of which is to improve upon patient health care but this is only on experimental basis.

Major activities fostering this aim have been the following:-

- — Rounding with clinicians (mostly physicians) twice in the week and consulting and counselling clinicians through discussion and suggestions on choice of therapy.
- — Ward visits with aim of counselling patients on all medications being taken and on those about to be discharged, offering discharge counselling on their take home medicines.
  Exchanging professional ideas with other health professionals.
- — Deciding on methods of administration.
- — Monitoring for adverse effect.
  Done through verbal information given by patients on adverse reactions of drug they are taking.
- — Giving follow up to patients discharged from ward and liaising with doctors many problem patients encounter with their medicament and counselling them on any relevant pharmaceutical information.
- — Educating housemen pharmacists on ward situations and giving them opportunities to present interesting case studies in the form of seminars to other pharmacists in and outside the hospital.
- — Taking of medication histories.
  Records are not kept in wards but kept by pharmacists who communicate to doctors or clinicians and alert them to any problem and unusual reactions.

There is no drug information service but pharmacists try and disseminate information on any new drug given through medical representatives to clinicians or any other discoveries of interest.

4.2.2 Impact:

Pharmacists feel more confident than before and have gained a lot of recognition by the other health

rofessionals.

— Clinicians appreciate efforts of pharmacists and services being provided. Communication gap between clinicians and pharmacist have been narrowed.

n fact there exists great co-operaon between clinicians and the pharacists where drug therapy is conerned.

— There has been exchange of professional knowledge between clinicians and pharmacists by way of discussions.

— Clinicians have been complying with suggestions made by pharmacists.

— Pharmacists intervention have helped patients and greatly improved upon their health status.

— Patients have gained much confidence in pharmacist than previously, to the extent that all aspects of their social life are relayed to the pharmacists.

2.3 Problems and Difficulties

The major problem has been in the area of drug information services. To date there are no facilities in this direction. The few books at our disposal are limited in the information that can support the clinical pharmacists and clinicians.

CONCLUSION

The vacuum created by the lack of initiative on the part of the pharmacist have given way to other professions encroaching upon areas of pharmacy. The pharmacist's role as a drug expert will be in jeopardy if he does not stand up to meet this new challenge, more so when technical aids like computers, and help from technicians are taking on most of the routine daily work of the pharmacist. Will the pharmacist continue to lay waste his acquired knowledge when its usefulness will be appreciated by all if his contributions are worthy of acceptance?

Clinical pharmacy, the name given to a discipline which is enabling pharmacists to make a more direct contribution to patient care is not an encroachment upon the clinician's role but rather complementary to his role. Pharmacists have the potential and the expertise and a change in attitude will assist them play a more dynamic role in the active management of the patient.

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Pathophysiology and Drug Treatment of Asthma

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Introduction

IT is generally agreed amongst allergists that bronchial asthma is a disease which is rather difficult to define in precise terms. In 1971 the Ciba Foundation Symposium recognizing this difficulty settled for a working definition for bronchial asthma as, "A widespread airway obstruction which is reversible spontaneously or with treatment (1). This is a rather restrictive definition which may be expanded to reflect the characteristic symptoms of the disease as follows: "Bronchial asthma is a syndrome of recurrent periodic paroxysms or attacks of wheezing, i.e. noisy, distressful respiratory effort, frequently associated with dyspnoea, choking and coughing due to obstruction of or resistance to expiratory air flow. It is reversible spontaneously or with treatment", It is to be noted that in this disease the resistance to air flow occurs during the expiratory phase of respiration. These symptoms may be triggered by a variety of factors such as allergen exposure, exercise, bacterial, viral or fungal infection of the respiratory tract and inhalation of respiratory mucosal irritants. Anxiety and psychological factors also precipitate attacks but this should not be taken to indicate that asthma is a psychological disease. In asthma the airways smooth muscle is hyperresponsive to both specific and non-specific stimulation. Since bronchial hyper-reactivity is always a striking feature in asthma it is important that diagnostic and therapeutic approaches should not be too intimately based upon simple bronchospasm but rather upon the more fundamental pathophysiological abnormality which manifests as bronchial airway inflammation.

Pathophysiology of Bronchial Asthma

The main pathological features of bronchial asthma are hypersecretion of mucus with plugging of the airways, disruption of the pseudostratified respiratory epithelium with considerable infolding of the bronchial endothelium, peribronchial and perivascular oedema and infiltration of the airway lumen, mucosa and sub-mucosa with typical inflammatory cells such as eosinophils, neutrophils and monocytes. In asthma of established chronicity the basement membrane assumes a much thickened status and the bronchial smooth muscle becomes hypertrophied (2). These features closely resemble pulmonary histopathological effects induced with intravenous, anaphylatoxin in the guinea pig. The varied nature of the factors which precipitate attacks of asthma call for some comment upon the immunopathological status of the disease. Asthmatic patients may be classified into two main groups as follows:

1. **Extrinsic asthma:** This is asthma whose aetiology is traceable to identifiable specific allergens. It has an early onset in life. There are two sub-groups of patients in this category of asthmatics:
   - (*i*) Atopic (i.e. IgE or reaginic antibody mediated) asthma. This is described as an immediate reaction or Type I allergy (4).
   - (*ii*) Non-atopic (precipitin mediated) asthma. This is described as an Arthus reaction or Type III Allergy (4)

2. **Intrinsic asthma:** This is asthma in which there is no direct evidence of exogenous allergen involvement. It has a late onset in life. The immunological mechanisms in play are not precisely established, however there is some possibility of Local IgE sensitization as illustrated by high concentrations of the reaginic antibody in nasal secretions of patients with intrinsic rhinitis (5).

An atopic individual is one who gives a positive immediate skin-prick test to common allergens, irrespective of whether asthma is present or not. Type I allergy is responsible for immediate reactions and may be mediated by two different antibodies:

- *a*) reaginic antibody, characterized as IgE by Ishizaka and Ishizaka (6), which is present mainly but not exclusively in atopic individuals; and
- *b*) IgG antibody, found in non-antopic subjects (7)

In spite of these aetiologic differences the final pathologic onslaught is inflammation of lung tissue and consequent disturbances in physiologic function at anatomical sites outside the confines of the lungs. The sequence of events leading to the pathological state is as follows:

Reaginic antibody has affinity for the surface of cells such as tissue mast cells and blood basophils. Mast cells are found throughout the bronchial tree, particularly in the bronchial mucosa between the epithelium and basement membrane (8). The main characteristic feature of mast cell morphology is the presence of large numbers of secretory membrane-bound granules within the cytoplasm.

Each mast cell contains about 80-300 granules which are secreted by biochemical processes dependent upon calcium and phosphate energy (9). The secretion of mast cell granules is provoked by a reaction between the allergen and its specific reagin on the surface of the mast cell. This leads to the liberation of a host of pharmacologically active substances which are responsible for the smooth muscle effects and for the tissue changes characteristic of Type I allergy. There is also an increase in blood eosinophil count and infiltration of eosinophils in tissues.

In the non-atopic subject precipitating antibodies are produced in response to inhaled organic allergens. Under appropriate conditions these antibodies provoke the slowly developing Type III allergic reaction. Complexes of allergen and precipitating antibody are formed

o which the C3 and C5 components of complement (the anaphylatoxins) become fixed and become enzymatically activated. These aggregates are chemotactic for polymorphonuclear neutrophil leucocytes. The interaction between the PMN leucocytes and the allergen/antibody aggregates results in the libration of lysosomal enzymes which cause tissue damage (infammation) by digestion of the extracellular tissues.

In more chronic asthma, the major tissue damaging cells appear to be monocytes and eosinophils. The eosinophils damage the respiratory epithelium through the release of cationic proteins. This may promote the hyperreactivity by exposing afferent nerve endings which cause enhanced vagal-mediated bronchoconstriction and by reducing bronchodilator substances released by normal epithelial cells (10). Thus, the imposition of these pathologic effects confers a state of hyperreactivity on the airway smooth muscle and in addition a state of generalized congestion within the lungs. The enhanced vagal activity coupled with the reduction in bronchodilator function gives a characteristic impression of parasympathetic dominance or conversely sympathetic insufficiency. Pulmonary congestion may result in increased resistence to blood flow from the right ventricle to the lungs. This resistance spreads backwards to the venous return from the systemic circulation and consequently there may be distension of the right side of the heart and a reduction in left ventricular blood supply to the systemic circulation.

Pharmacological Rationale for Drug Treatment of Bronchial Asthma

To establish a pharmacological rationale for drug treatment of bronchial asthma a logical starting point must be a consideration of the immunological, pharmacological, biochemical and physiological consequences of allergenic challenge of the susceptible individual.

Immunological Consequences

In susceptible individuals the reaginic antibody is fixed on the surface of mast cells and possibly on other mediator-secreting cells as well. Upon specific allergenic challenge a series of events is set in motion which culminates in the release of a variety of mediators of inflammation. The mechanisms involved in the release of the mediators are complex. Essentially, the formation of antigen-antibody complexes on the cell surface alters the membrane characteristics of the target cells and by means of high energy phosphate and calcium ions the mediators of inflammation held within the cell are released. In theory, it would seem plausible therefore to imagine that by carefully removing the used antibodies from the surface of the target cells the affected individuals could be spared the clinical symptoms induced by the antigen-antibody complete formation at the cell surface. This approach, previously referred to as hyposensitization is now styled immunotherapy and defined as "an attempt to provide some protection from natural exposure to external allergens by the prophylactic administration of antigens which have been shown to induce allergic reactions" (11). There are arguments for (12) and against (11) the value, reliability, effectiveness and safety of immunotherapy in asthma. Investigative work is still in progress to ascertain the real value of this forms of treatment in asthma.

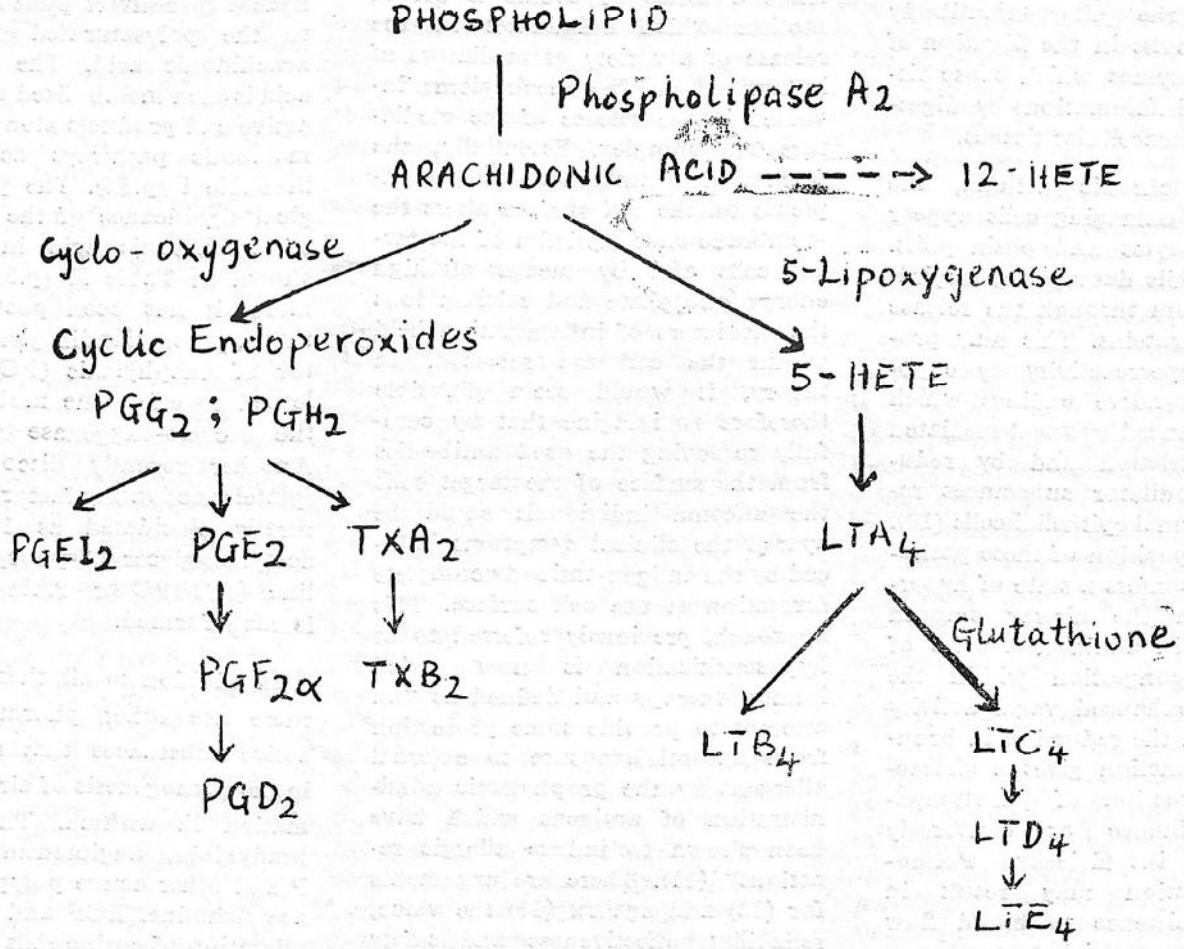
Pharmacological Consequences

Immunostimulation of mast cells within the bronchial wall is the most likely event leading to pharmacological mediator release, airways hyper-reactivity and the consequent respiratory embarassment in bronchial asthma. The pharmacological mediators released from activated human mast cells include histamine, heparin, various exoglycosidases (e.g. arylsulphatase B, B-hexosaminidase B, B-glucuronidase and B-galactosidase), proteases (e.g. Tryptase, Carboxypeptidase B, Elastase and Cathespin G), and chemotactic factors (e.g. eosinophil chemotactic factor (ECF) and neutorphil chemotactic factor (NCF). In addition to these preformed mediators other cellular membrane endogens are released. Thus, calcium-dependent activation involving IgE stimulates cell membrane phospholipases to convert phospholipids into the polysaturated fatty acid, arachidonic acid. The arachidonic acid is then metabolized to the highly active end products along two major metabolic pathways as illustrated in Table I (p.34). The pharmacological significance of the metabolites of arachidonic acid in asthma is shown in Table II (p.35). Furthermore, it has been postulated (13) that a prostaglandin generating factor of anaphylaxis (PGF-A) is released to effect the mobilization of the cyclo-oxygenase metabolites. Another recently discovered PAF (platelet activating factor) now structurally elucidated as 1-0-alkyl, 2-acetyl-sn-glyceryl,3-phosphoryl choline (AGEPC or PAF acether)(14) is also formed.

In addition to all these mediators there are other pharmacologically active substances that play a role in the pathogenesis of airway inflammation in asthma. These include bradykinin, angiotensin, substance P and other active polypeptides and acetylcholine. ECF and NCF cause migration of eosinophils and neutrophils into the inflammatory zone in airway tissue. Furthermore, these cells are activated to release pro-inflammatory mediators. For example, eosinophils release the major basic protein, the cationic protein and the neurotoxic protein (15). Eosinophils and neutrophils release lysosomal enzymes which are implicated in chronic inflammatory changes in asthma.

Some of the mediators already mentioned, e.g. histamine, the metabolites of arachidonic acid and bradykinin stimulate the chromaffin cells of the adrenal medulla to release adrenaline into the circulation. Other adrenergic mechanisms are also called into play to effect the release of noradrenaline from sympathetic nerve endings. The catecholamines so released produce effects that ameliorate the bronchial and cardiovascular effects of the earlier mediators.

TABLE 1



Biochemical Consequences

The formation of cyclic AMP c'AMP) from ATP and its conversion to 5'AMP are catalysed by adenylate cyclase and c'AMP phosphodiesterase respectively. It is now well established that an increase in the level of intracellular c'AMP inhibits antigen-induced release of the bronchoconstrictor mediators of bronchial asthma (16, 17). Stimulants of adenylate cyclase and inhibitors of c'AMP phosphodiesterase should theoretically be beneficial in asthma. Histamine, adrenaline and PGE2 are all stimulants of adenylate cyclase and adrenaline is certainly beneficial in asthma. The methylxanthines inhibit c'AMP phosphodiesterase and they are beneficial in bronchial asthma. However, it is now believed that on account of the very high concentrations of these substances required to inhibit c' AMP phosphodiesterase the more plausible mechanism of action for the methylxanthines in asthma lies rather with their ability, as exemplified by theophylline, to antagonise adenosine and also in sequestering intracellular calcium within smooth muscle (18).

Further Physiological Consequences

In addition to all these systemic changes, further physiological effects ensue consequent upon the initial antigenic stimulus. The catecholamines that are released stimulate the hypothalamopituitary function. These catecholamines excite the hypothalamus to release corticotrophin releasing factor (i.e. ACTH Releaser) which in turn acts upon the anterior pituitary gland causing it to release ACTH. The adrenocorticotrophic hormone so released stimulates the adrenal cortex to release the corticosteroids cortisol, corticosterone etc. These endogenous anti-inflammatory and anti-stress substances should have the capacity to protect the afflicted subject from the potentially severe inflammatory and stressful conditions imposed.

TABLE II

Pharmacological Significance of Arachidonic acid Metabolites

METABOLITE	BIOLOGICAL ACTIVITY
PGE_2	Vasodilator, bronchodilator
PGF_2—alpha	Bronchoconstrictor
PGD_2	Potent bronchoconstrictor 5x > PGF2; 30x > Hist $_2$—alpha
$PGEI_2$	Vasodilator; anti-bronchoconstrictor
TXA_2	Vasoconstrictor; possibly bronchoconstrictor
5—HETE	Chemotactic-factor for neutrophis and eosinophils
LTB_4	— do — (very potent)
LTC_4; LTD_4; LTE_4 (Formerly SRS.A)	Very potent bronchoconstrictor (proferential for peripheral airways), vasoconstriction and increased vascular permeability

ug Treatment of Asthma

From the foregoing description the actiology, pathophysiology d pharmacological characteris-s of the disease it should be ssible now to attempt a critical armacological analysis of the ug treatment of bronchial asthma. For case of presentation the ugs that may be used in the treat-ent of asthma will be discussed der the following headings:

1. Antigen vaccines (for immunotherapy).
2. Antimuscarinic agents (to counter parasympathetic dominance).
3. Sympathomimetic bronchodilators (to augment sympathetic or B-adrenergic insufficiency).

(*a*) A-and B-adrenocoptor stimulants

(*b*) Mixed B_1 and B_2 adrenoceptor stimulants.

(*c*) Specific B_2-adrenoceptor stimulants.

Pharmacological mediator antagonists:

(*a*) Antihistamines

(*b*) drugs acting on the phospholipid-arachidonic acid metabolic system

(i) Phospholipase A_2 inhibitors and related drugs

(ii) Cyclo-oxygenase inhibitors

(iii) 5-lipoxygenase inhibitors

(iv) Leukotriene-receptor antagonists

5. Mast cell stabilizers
6. Inhibitors of c'AMP phosphodiesterase
7. Corticosteroids
8. Antibiotics

Antigen vaccines (for immunotherapy)

Although hyposensitization is claimed to be effective in some atopic patients its real value in asthma therapy is in doubt.

A small proportion of patients may benefit from grass pollen antigen or the house dust mite (Dermatogoides pterenyssinus) antigen. However, treatment with mixed antigens may provoke unpredictable reactions which may be dangerous.

Antimuscarinic agents

The hyper-reactivity of airway smooth muscle in asthma is associated with enhanced vagal activity and a reduced bronchodilator function. This apparent parasympathetic dominance is treatable with antimuscarinic agents such as the belladonna alkaloids; atropine homatropine and hyoscine.

Sympathomimetic Broncheditators

These drugs are used primarily to provide prompt symptomatic relief to the immediate respiratory distress following intense bronchoconstriction. They may also augment the accompanying B-adrenergic insufficiency. The drugs may be classified as follows:

(*a*) Drugs stimulating A and B-adrenoceptors.

Adrenaline
Ephedrine

These drugs have the disadvantage of presenting undesired A and B_1 noceptor stimulant effects.

(*b*) Non-selective (B_1- and B_2-) stimulants.

Isoprenaline
Orciprenaline

These drugs have the disadvantage of presenting the undesired cardio-specific B_1- effects.

(*c*) Specific B_2-stimulants

Salbutamol
Isoetharine
Terbutaline

These drugs have the advantage of lacking or presenting considerably less B_1-effects and also of having the ability to inhibit the release of mast cell mediators.

4.Pharmacological Mediator Antagonist

(a) Antihistamine

These antagonize the actions of histamine at H_1- and H_2-receptors. The drugs in this group provide only a limited relief and when they are used separately they may precipitate exagerated effects of histamine at the unprotected receptor.

(*b*) Drugs acting on the phospholi pid-arachidonic acid metabolic system.

These eliminate the effects of such metabolites as the prostaglandins and leukotrienes. The drugs may be classified as follows:

(*i*) Phospholipase A_2 inhibitors and related drugs. *Corticosteroids* induce the synthesis and release of proteinacious substances (macrocortin and lipomodulin) which inhibit phospholipase A_2.

Antimalarial drugs e.g. chloroquine and mepacrine inhibit phospholipase A_2

(*ii*) Cyclo-oxygenase inhibitors; asnirin, indomethacin, phenylbutazope etc.

(iii] 5-lipoxygenase inhibitors. None yet in the clinics, but experimentally available potentials include: Quercertin, nafazatrom and Revlon 5901 all which are active only in vitro.

(*iv*) Leukotriene receptor antagonists FLP 55712-still under investigation.

Mast Cell Stabilizers

(*a*) Cromoglycate sodium
(*b*) Ketotifen
(*c*) Nedocromil

These three drugs are used clinically. Nedocromil may have greater activity on the mucosal type mast cell than cromoglycate. Other substances in this class which are of experimental interest only include isamoxole and lodoxamide.

Inhibitors of phosphodiesterase

These are the methylxanthines: theophylline, caffeine and theobromine. Aminophylline is the formulation most frequently used.

Corticosteroids

These inhibit the conversion of membrane phospholipid to arachidonic acid by causing the synthesis of macrocortin and lipmodulin-the phospholipase A_2 inhibitors. They also probably restore the proposed loss of B-adrenoceptor responsiveness of airway smooth muscle in asthma.

Antibiotics

These may be of value in those cases where bacterial infection of the respiratory tract exacerbates asthma.

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Neurosurgical Aspects of Malaria

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MALARIA was until comparatively recently a disease of the torrid zones of the globe. The practical annihilation of time and space by the progress of science and the ingenuity of man has now elevated malaria from an exclusively tropical disease to a global one.

Malaria has protein manifestations, not least in importance, are those referrable to the brain, spinal cord and peripheral nerves!

Experience with management of cases of malaria over the past 18 years has shown that the clinical presentation of malaria comprises manifestations (symptoms and signs) referrable to:

(1) The gastro-intestinal tract.
(2) The cardio-respiratory system.
(3) The musculo-skeletal system.
(4) The temperature regulating apparatus.
(5) The haemopoetic system.
(6) The immunological armamentorium of the body, and
(7) The central and peripheral nervous system (i.e. the brain, spinal cord and peripheral nerves).

By far an overwhelming majority of patients who present with malaria do so with the early symptoms and signs which are a concentrated blend of the manifestations above. These patients do well on therapeutic regimes which tackle in an effective manner the component parts of this early symptom-sign complex. Serendipity was mainly responsible for the genesis and evolution of the treatment which constitutes the mainstay of management of such patients, viz.,

(1) Nivaquine or chloroquine 5mls IMI stat.
(2) Cyanocobolamine (Vit. B12) 1000microgm IMI stat.
(3) Dexamethazone 20mgm IMI or Hydrocortisone 100mgm IMI stat.
(4) Vit. C 200mgm IMI stat.
(5) Novalgin, or Baralgin, or DOLO-ADAMON OR AVAFORTAN or PANALGIN etc, 5mls IMI stat.
(6) Phenergan 6.25mgm IMI stat.

Chloroquine or Nivaquine combats the gastro-intestinal and musculoskeletal manifestations. The deleterious effect of the destruction of the red cells of blood is abrogated by the administration of cyanocobalamine, while the allergic and inflammatory resultants and consequent brain and spinal cord and peripheral nerve swelling are extinguished by the administration of Dexamethazone or Hydrocortisone. Vitamin C is an antidote to roaring inflammatory processes while pain-killing injections alleviate the resultant and concomitant pain of the release of histamines 5HOT, Kalidins, Kinins, etc., in immunological reactions which necessarily result from malarial infections. Phenergan is an anti-pyretic, anti-allergic and sedative agent.

Burden

The modest burden of this paper is consideration and discussion of the symptoms and signs of malaria referrable to the brain, spinal cord and peripheral nerves.

Malaria causes headache, vomiting, disturbances of vision, hearing, speech, balance and behaviour, as also epileptic attacks, personality and memory disorder and hallucinations.

It gives rise to brain swelling, subdural effusions, intracerebral haematoma, as well as swelling of spinal cord, haematomyelia, haematorrhagia and arachnoiditis. Malaria causes swelling of the endoneural, perineural and epineural sheaths with consequent pressure on the fasciculi and the resultant clinical manifestations of pain in the joints and limbs, headaches, vomiting, restlessness, tremor. Furthermore, it causes swelling of the peripheral nerves with the clinical manifestations of loss of sense of smell, blindness, diplopia and strabismus, facia, paralysis, loss of sense of hearingl difficulty with swallowing and/or regurgitation of food through the nose, aphonia and other disturbances of speech; weakness of both upper and lower limbs with consequent inability for intricate movements of the hands and fingers resulting in dysgraphia, hypergraphia, micrographia and agraphia and difficulty with gait. It may also interfere with the executive functions of the basal ganglia with consequent choreo-athetoid movements hemiballismus, ballismus, dysmetria, and parkinsonism.

Malaria has been responsible for some of the cases of ataxia, nystagmus, disdiadochonkinesia, intention tremor that have been encountered by the writer in the last eighteen years!

Affections of the limbic system are very rare in malaria, but it is noteworthy that numerous cases (more than twenty in the last decade) have been encountered who have refused to eat for days even though they are conscious, and whose amorous cravings, excitations, hopefulness and apparent experiences have hit chimerical and fantastic heights in the telling.

The cranial nerve nuclei may also be affected, as witness the rather distressing continuous vomiting and drinking of water in many cases of such affections. The hypothalamus and its neighbouring structures are no doubt affected by malaria for most of the patients display bouts of pyrexia, sweating, disturbances of heart rate and blood pressure so difficult to control most of the time. A further extension of this, as it were, is affection of the medial and lateral reticular formations.

It is also true from the writer's

experience that malaria also gives rise to frequent or occasional tachyapsychic attacks, which thus invariably mimick the manifestation of a space-taking lesion in the brain.

Accurate diagnosis of these cases is based on the obvious awareness of the geographical situation of the presentation—torrid zone—a high index of suspicion, the relevant tests for malaria, clinical observation and acumen, and by processes of elimination and reduction ab absurdum.

Affections of the spinal cord and nerve roots manifest themselves mainly by weakness of the upper and lower limbs, neckache, backache, abdominal distension, girdle pain, weakness of the lower limbs, sensory ataxia of the upper and lower limbs, retention of urine, constipation, and very low premium of the nervi crigentes, with consequent impairment or abrogation of ability for sexual congress!

Cases

Some illustrative cases are given hereunder:

(1) A.Y. female aet 26 presented at the Neurosurgical Unit on 24/7/76 with history of four episodes of feverish attacks in $1^1/_2$ years, bitter taste in the mouth, dark-yellow urine and weakness of lower limbs. Examination revealed flaccid weakness of both lower limbs and sensory level at T6. She was pyrexial, her temperature being 39°c and she was developing swelling of and blisters on the lower limbs. There was thus no need for myelographic studies. Late that day she had laminectomy of T5-T8 inclusive. The operative findings were those of hick arachnoiditis in which the appropriate nerve root were "bathed." The arachnoiditis was cleared and the cord and nerve roots thus decompressed. Her postoperative course was rather stormy being punctuated by incontinence of urine and faeces, wasting of muscles of the lower limbs, necrotic changes in the musculature of the lower limbs, with consequent temporary exposure of the constituent bones of the hip joints; septicaemic manifestations, temporary sideropaenic dysphagia; global hallucinations and contracture flexure at the hip and knee levels and bilateral foot-drop. She subsequently made good progress and although now wheelchair bound she is able to execute major and minor seamstressly businesses with dithyrhambic gaiety.

(2) Madam A-B aet 37 had a bout of malaria fever for which she was given anti-malaria injections, following which she developed signs of cerebellar and cerebello-ponline angle lesions—she had titubation of the head; she had vertical and horizontal nystagmus; she was alternately dysarthric and aphonic; she displayed dysdiadocholunesia; hypermetria and hypometria were among her clinical signs; and she had trunkal ataxia. Lumbar AEG appearances were those of non-filling of the cisterna magna and posterior CSF pathways. She had, two years before, with similar clinical signs, discharged herself from the medical block against medical advice.

Posterior-fossa exploration carried out on her on 2/2/77 revealed post-inflammatory bands and adhesions between the meninges and the cortical surfaces of the cerebellar hemispheres, and also at the cerebello-pontine angles. These were removed and the cerebellar hemispheres and pons relieved of pulling from band and adhesions. Her post-operative period was marked by much symptomatic relief. She is alive and well.

(3) A.G., female aged 32, was on 29/6/81 referred to the Neurosurgical Clinic because on that day she had generalized fits with neck stiffness, following feverish attacks four days before. While waiting for neurosurgical consultation on 29/6/81 she had a classical major fit with gnashing of the teeth and foaming at the mouth, and loss of consciousness. She became fully conscious a few hours later, after intravenous valium (10mgms) and adjuvant therapy. Examination showed that she was slightly weak on the left side of the face and body. BRAIN SCAN done on her on 30/6/81 showed increased activity in the right anterior fossa, thus suggesting a space-taking lesion there.

On 19/9/81 routine right transfrontal craniotomy was done on her. Dura was tense and bulging and pulsation of brain was not transmitted through it. A hole was made through the dura by diathermy and much subdural effusion under great pressure gushed out like from a fountain. Dural flaps were turned and the remaining prefrontal and subfrontal subdural effusion evacuated. No tumour was seen in the right anterior fossa. Haemostasis was secured and wound closed up in layers. Her postoperative course was smooth. She is alive and well and has not had any fit since operation.

(4) J.B., female aet 5+ presented in February 1987 with about $3^1/_2$ months' history (from mother) of involuntary movements of the body, restlessness, loss of hearing and of speech and inability to recognize people. Four months before, she had very bad malaria fever in which she had a series of generalized fits, and stiffness of the body. She was given anti-malaria treatment for two weeks in a regional hospital. It was after this that her mother noticed the above symptom-sign complex about her.

Examination today revealed choreo-athetoid movements mainly of the upper limbs and trunks wih consequent frequent falls as she attempts to walk unaided. She is deaf and speechless. She has been put on neurotropic drugs and artane. Her future neurological performances, now six years after therapy was instituted, are gratifying-she walks, she hears and talks.

The above case histories illustrate in a vivid manner some of the neurosurgical complications of malaria. A plea is made for a high index of suspicion in patient who present with untoward neurological symptoms and signs, following an attack of fever, however mild the attack may have been.