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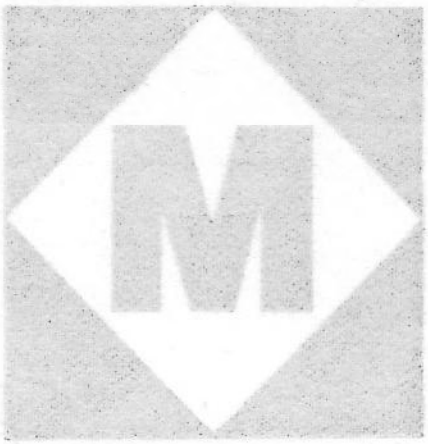

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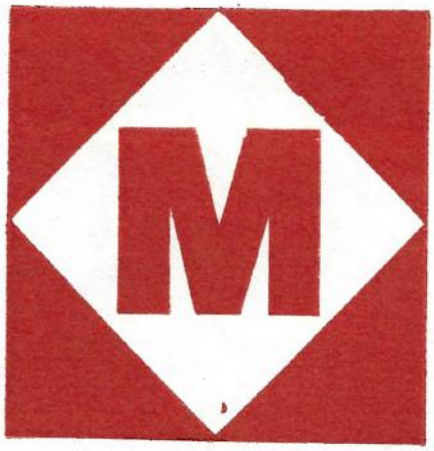

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EDITORIAL

SEARCHLIGHT ON PHARMACY PROFESSION

We are glad to be back in circulation again. Our long absence was due to lack of articles. The members of the Editorial Committee felt that we will rather be out of circulation than to put into circulation a shoddy journal—all or none rule! We sincerely hope that more articles on different subjects of interest will now flow from our members and readers so that we can keep the journal and the profession moving and growing from strength to strength.

To help us grow we need to take stock and examine each step that we take so that we do not follow and fall or lower standards. Our editorials will therefore focus attention on our different branches, namely General Practice Pharmacy (Retail), Hospital Pharmacy, Research and Teaching and Industrial Pharmacy.

This Issue's searchlight is on General Practice Pharmacy. We all know the state of affairs in this country at the moment. Economic activity is stagnant, however, the General Practice Pharmacy sector is the strongest sector of our profession. It is also our show-piece because being in direct contact with the general public our image is marred or improved depending upon the activities that go on in this Sector.

It is needless to go through the catalogue of things that go on in this Sector which tend to mar the image of the profession. Since we cannot sit down and look on for things to grow from bad to worse, we want our members in this Sector to sit up and re-examine themselves. It is high time that all pharmacy premises looked clean both inside and outside to reflect the professional services they are expected to provide. The display of drugs, the furniture, the equipment, the attendants and the pharmacist must all be seen to show the professional touch which differentiates the Pharmacy Premises from a general goods shop.

It is the Supervising Pharmacist's responsibility to ensure that these things are done to uphold the good name of the profession.

Our tropical Climate leads to the possibility of greater and quicker deterioration of drugs and we should accordingly take greater care over storage of the pharmaceutical, Medical and Biological products we handle. It might not be extravagant or be a mere luxury to have air-conditioned premises under our circumstances, since apart from keeping the inside temperature cool as required for drug stability, dust is also prevented from entering and settling on the drugs and the counters. All attendants and the pharmacist must wear white coats with the pharmacist identified from the rest with his crest on his coat pocket. There should be no compromise on the sale of dangerous drugs to the public. Class A and B drugs should only be sold on valid prescription from authorised prescribers.

For a profession to advance, it is necessary for its members to learn and to transmit learning to others so that the gaining of knowledge and its application can progress. Pharmacy profession in Ghana must progress and the General Practice Sector must take active part in this progress because of their greater contact with the public.

TOXIC EFFECTS OF CHLOROQUINE ON THE ULTRASTRUCTURE OF THE KIDNEY OF THE RAT

By E. Ayitey-Smith, B.Pharm. (K'si); M.Sc., (McGill), Ph.D. (Ottawa) and (A. J. K. Gbewonyo), Department of Pharmacology, University of Ghana Medical School, P.O. Box 4236, Accra.

SUMMARY

EFFECT of prolonged chloroquine administration on the ultrastructure of the kidney was studied in albino rats given the drug orally (30-40mg/kg/day) or subcutaneously (20mg/kg/day) for two to four weeks. It produced marked degeneration of the mitochondria and microtubules in the renal tubular cells. These abnormalities were reversed on stopping drug administration for four weeks. It has been suggested that the impairment of the ultrastructure of the kidney may interfere with its regulatory functions.

Introduction

The kidney and the liver are known to accumulate high concentration of chloroquine from the plasma. It has been observed that chronic treatment of rats with chloroquine caused severe damage to the cell organelles of the liver and the heart (Ayitey-Smith and Gbewonyo 1975). Other workers have also reported marked degenerative changes in fibres of the skeletal muscle due to prolonged administration of chloroquine to humans and animals (Macdonald and Engle, 1970 and Hughes et al., 1971). However, there is virtually no information on the toxic effects of chloroquine on the kidney. Hence, this study was undertaken to find out if chloroquine is toxic to the kidney.

Materials & Methods

Thirty albino rats of either sex weighing 200-250g were used for the study. The animals were divided into three groups of which one group was given chloroquine sulphate in the drinking water (a solution of 1mg/ml chloroquine sulphate) and daily consumption of drug was estimated (to be 30-40mg/kg/day). The second group was injected subcutaneously with 20mg/kg/day chloroquine sulphate. Two and four weeks after drug administration some of the rats from either group were sacrificed and heart tissue removed for electron-microscopic studies (details described below). Four weeks after administering chloroquine, treatment was stopped and the remaining animals were sacrificed for the study, two to four weeks later. Control animals, in the third group, were kept for the same period and received the same experimental maneuvers as those in groups one and two, but did not receive chloroquine.

Control and treated animlas were anesthetised with pentobarbital sodium (40mg/kg i.p.), the chest was cut open and the heart was perfused in situ with Tyrode solution followed by three per cent glutaraldehyde (Gordon's fixative) through the left ventricle as described by Pease (1964). Then, slices of kidney tissue were taken and trimmed with a razor blade into blocks of 1.0mm cubes in a drop of the fixative, followed by three hours pre-fixation in fresh three per cent gluraldehyde. Tissues were washed overnight in 0.08M sodium cacodylate buffer and post-fixed for two hours in one per cent Palade's osmium fixative. Pre-staining was done in two per cent aqueous uranyl acetate after dehydration 35 per cent through 100 per cent ethanol. Tissues were then infused with 1:1 propylene oxide and Epon mixture overnight before finally embedding in 100 per cent Epon. Ultra-thin sections (60-90 mu) were obtained with "Porter Blum" ultra-microtome (MTI) and post-stained in uranyl acetate and lead citrate. Sections were then examined with Hitachi HU-11E-1 electron microscope.

RESULTS

Untreated Animals (Controls)

Figs 1:1, low magnification (mag.) and 2:1, high mag. show kidney from untreated animals with numerous mitochondria among which were microtubules in the renal tubular cells. The mitochondria with numerous cristae can be seen in dense cytoplasmic matrix in which ribosomes can also be found.

Treated Animals

Chloroquine caused degeneration of mitochondria and microtubules in the renal tubular cells during two weeks of administration of the drug either orally (Each animal received a total dose of 240-560mg/kg) or subcutaneously (each animal received

* At Election Miscroscope Unit of the Microbiology Department

a total dose of 280mg/kg), Figs. 1:2, low mag. and 2:2 high mag.

At the end of the fourth week of chloroquine administration when a total dose of 840-1120mg/kg had been given orally or 560mg/kg subcutaneously the cell organelles showed further marked degeneration (Figs. 1:3, low mag. and 2:3 and 2:4 high mag.). The mitochondria were swollen and membranes of some were ruptured thus losing mitochondrial cristae and matrix. These presented "ghost-like" appearnace. Furthermore, the microtubules degenerated markedly. Vacuoles were found scattered in the cytoplasmic matrix which had also decreased in density.

However, when the administration of the drug was stopped, cell organelles regenerated and the cytoplasmic and mitochondria matrix became dense again (Figs. 1:4 and 1:5, low mag. and 2:5 and 2:6 high mag.).

Discussion

Chloroquine has been observed to produce cytotoxic effection the skeletal muscle of humans and animals and on the liver and cardiac muscle of animals (Macdonald and Engle, 1970, Hughes et al., 1971 and Ayittey-Smith and Gbewonyo, 1975). The present studies show that this effect is not confined to these organs but can also be observed in the kidney of rats after prolonged administration of chloroquine. It appears that the organs which are mostly affected are those which accumulate the drug and the effect has been related to the total accumulated dose (Ayitey-Smith and Gbewonyo, 1975).

Chloroquine caused marked degeneration of mitochondria and microtubules in the renal tubular cells. Mitochondria of the kidney cells, like those of the liver and cardiac cells, were the most severely damaged. They are the sites of production of high energy compounds, like ATP, hence availability and utilization of energy by the kidney may be defective. In support of this suggestion, Stell and Thomas (1972) observed that chloroquine inhibited oxidation at mitochondrial level. Futhermore, the marked degeneration of the microtubules in the renal tubular cells may possibly interfere with the efficiency of the regulatory functions of the kidney.

It can be concluded from these findings that prolonged chloroquine administration to rats impaired the ultrastructure of the kidney and this may possibly interfere with its normal regulatory functions.

References

Ayitey-Smith, E. & Gbewonyo, A. J. K. (1975). Ultrastructural changes in the heart of rats treated with chloroquine. Abstracts: Sixth International Congress of Pharmacology, Helsinki, Finland, p. 240, No. 557.

Ayitey-Smith, E. & Gbewonyo, A. J. K. (1975). Chloroquine-induced ultrastructural changes in the liver of rats. Proc. 9th Biennial conf. Ghana Sci. Assoc. 1975.

Hughes, J. T., Esiri, M., Oxbury, J. M. & Whitty, C. W. M. (1971). J. Quart.Med. **157,** 85-93.

MacDonald R. D. & Engle, A. G. (1970). J. Neuropathol. Expt. Neurol **292,** 479–499.

Pease, D. C. (1964). Histological techniques for electron microscope. Second edition pp. 23-28. New York & London, Academic Press.

Stell, J. G. P. & Thomas, S. E. (1972). J. Pharma. Pharmacol, 24, Suppl. 163p.

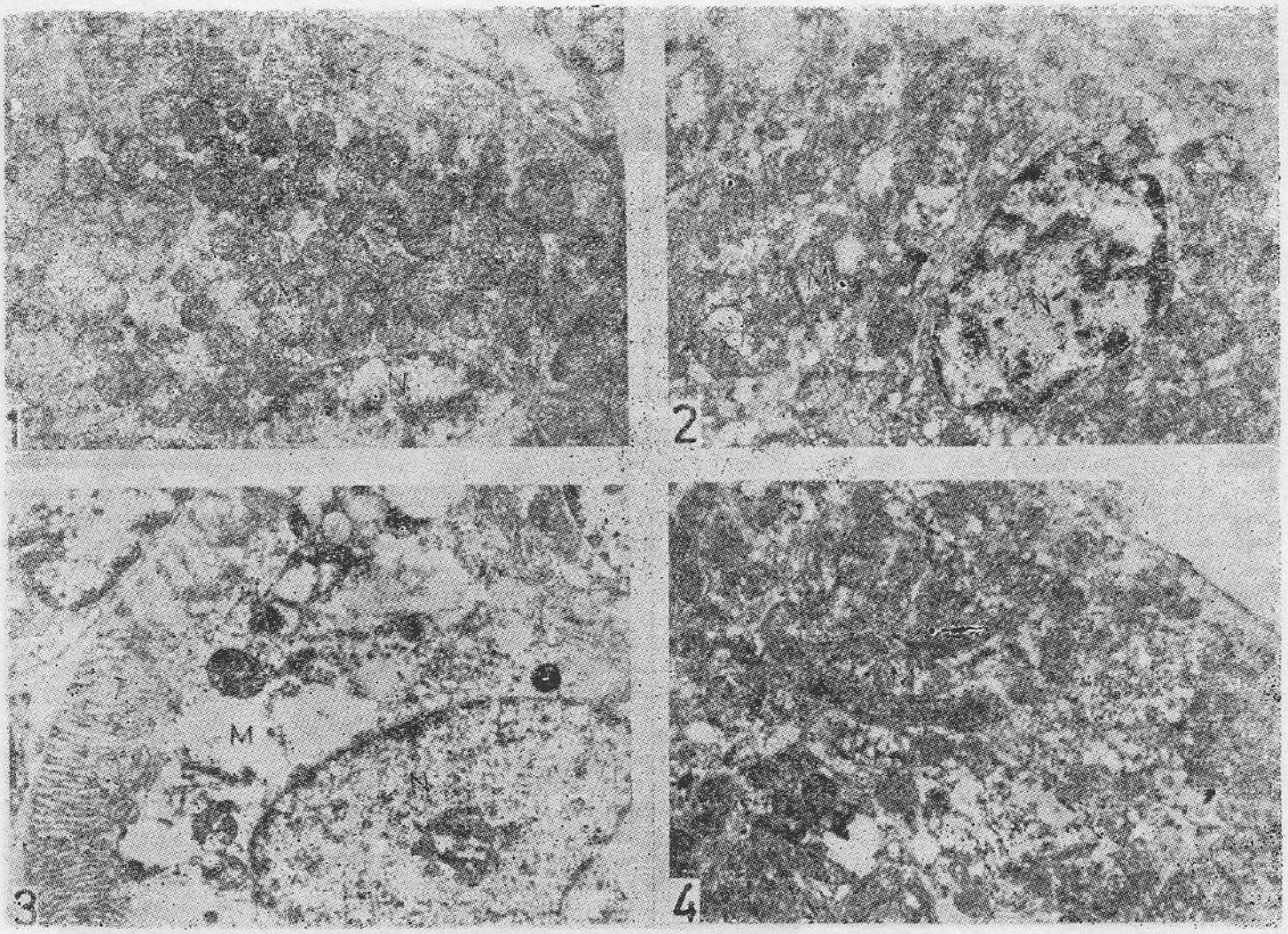

FIGURE 1

Effect of chloroquine on rat kidney. Micrographs, at low magnification (X4,800), show mitochondria (M), Microtubules (T) and nucleus (N) in the renal tubular cell. No. 1 is control (untreated) kidney; No. 2, kidney after two weeks medication; No. 3 after four weeks medication; and No. 4 two weeks after terminating medication with chloroquine

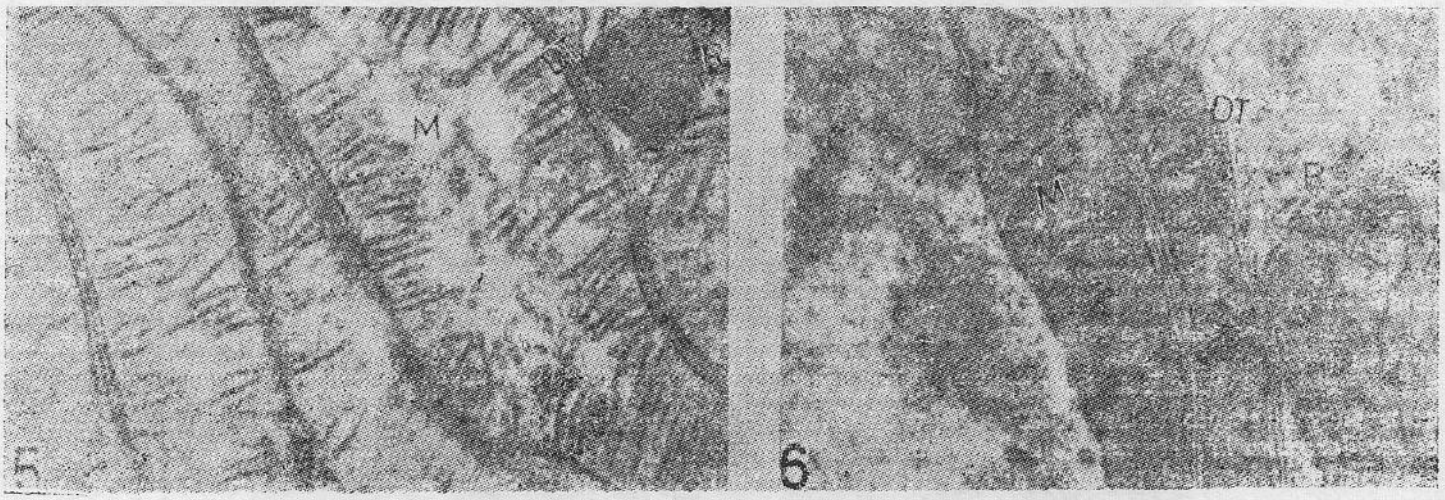

Fig. 2. Nos. 5 and 6. Effect of chloroquine on rat kidney. Micrographs of kidney at high magnification (X21,120) showing mitochondria (M), microtubules (DT) and ribosomes in the renal tubular cell. No. 5, two weeks after terminating medication and No. 6, four weeks after terminating medication with chloroquine.

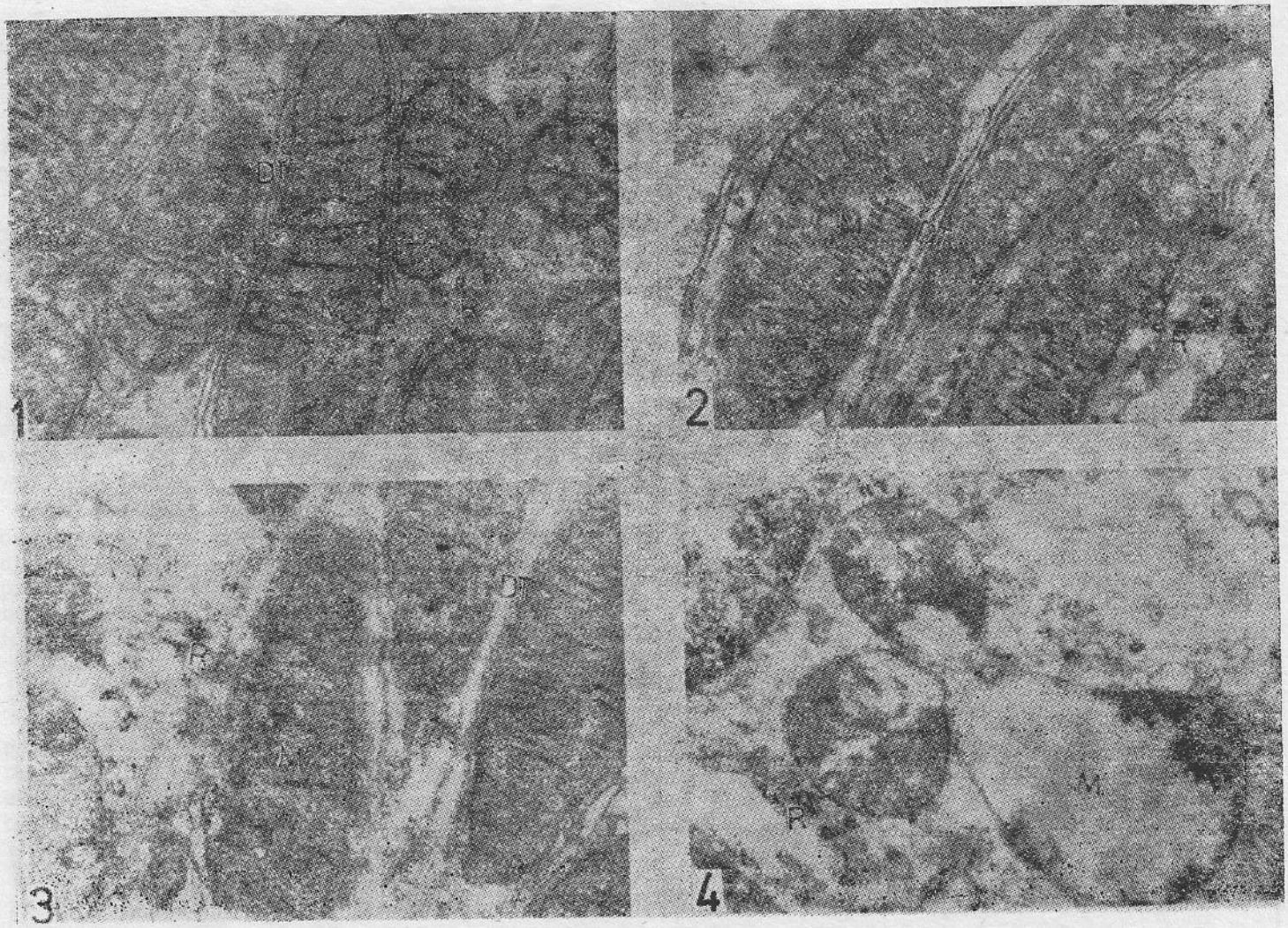

Fig. 2. Effect of chloroquine on rat kidney. Micrographs at high magnification (X21,120), show mitochondria (M), microtubules (DT) and ribosomes (R) in the renal tubular cell. No. 1 is control (untreated) kidney; No. 2, kidney after two weeks medication; and Nos. 3 and 4, after four weeks medication with chloroquine.

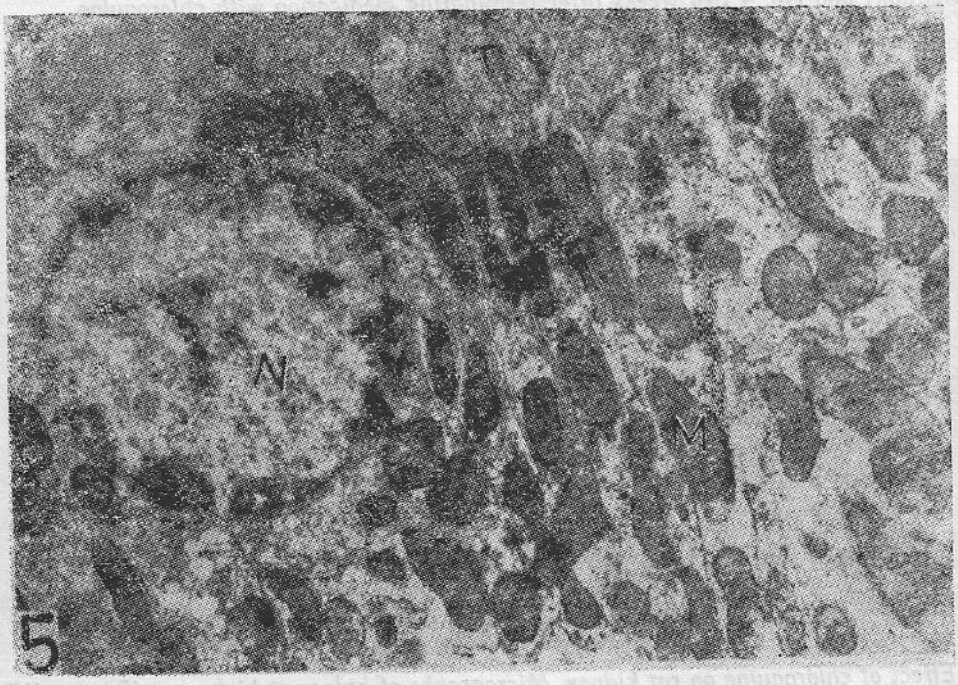

Fig. 1 No. 5 Micrograph of kidney at low magnification (X4,800) showing mitochondria (M), microtubules (T) and nucleus (N) in the renal tubular cell, four weeks after terminating medication with chloroquine.

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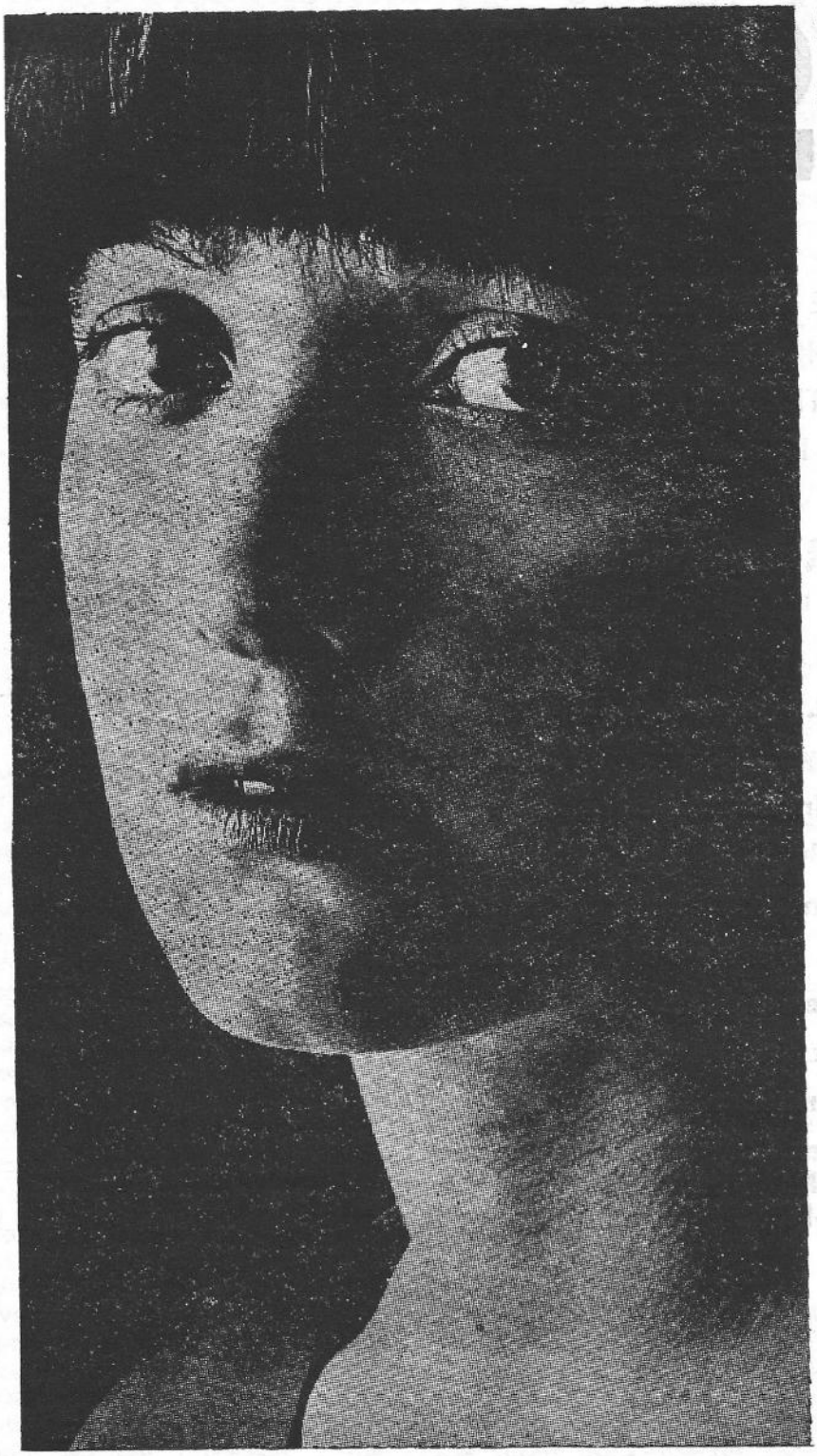

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EVALUATION OF THE MICROBIAL CONTAMINATION OF PHARMACEUTICALS IN GOVERNMENT HOSPITAL DISPENSARIES IN GHANA

III. Microbial Contamination of Tablets Dispensed at some Government Dispensaries

By K. Boakye-Yiadom and Y. D. Fokuo, Department of Pharmaceutics, Faculty of Pharmacy, University of Science and Technology, Kumasi

Summary

Several samples of various tablets with different medicinal properties, commonly dispensed in four government hospital dispensaries have been examined for the presence of various pathogens. The examination was mainly to detect the presence of *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, salmonellae, spore forming anaerobes, yeasts and moulds. Some of the samples were found to be contaminated with one or more of the pathogens listed above.

Introduction

Compressed tablets are now the most popular form of medication because they are relatively cheap, convenient to carry and administer, ensure accurate dosage, unpleasant tastes can be obscured and when properly stored most tablets remain stable for very long periods. Though tablets are not produced sterile, the presence of pathogenic organisms are obviously undesirable and may be dangerous. Kallings and his colleagues in 1966 traced an outbreak of salmonellosis in Sweden to the administration of infected thyroid tablets. Sykes (1966) also reported the presence of *Escherichia coli* in digitalis tablets. In Ghana the environmental conditions of high temperatures and humidity, and the sometimes low level of hygiene in some of the government dispensaries arising from lack of space, create favourable conditions for the contamination of medicaments dispensed in these dispensaries as evidenced by the reports of Boakye-Yiadom and Buadu (1974) and Boakye-Yiadom and Fokuo (1975). In the present work the authors have examined a total of 400 samples of various tablets for possible contamination with pathogens.

Materials and Methods

Samples of between 10 and 50 tablets in each group of medicines listed in Table I were collected from four of the government dispensaries in Kumasi. Dissolution of the tablets was made using quarter strength Ringer's solution. Each tablet sample was put in 10ml. of sterile quarter strength Ringer's solution and well shaken. 1ml. portions were then plated on enrichment and/or selective media; media used were the same as those employed by the working party of the British Pharmaceutical Society (Sykes et al. 1971). In determining the presence of spore forming anaerobes, yeasts and moulds the methods described by Boakye-Yiadom and Fokuo (1975) were used.

Results and Discussions

The results of the tests for specific pathogens are summarised in Table I. The results indicate that 2 out of the 14 groups of medicines examined did not show the presence of any of the specified pathogens for which they were examined and that no sample from any of the groups was contaminated with *Pseudomonas aeruginosa*. Moulds and yeasts were found to be the most common contaminants of the samples examined and salmonellae the least. *E. coli* contamination was observed in some samples in 7 groups and both coagulase positive and coagulase negative staphylococci were found in samples in 4 groups. On the whole the degree of contamination was rather low as compared with findings of Boakye-Yiadom and Buadu (1974). The authors have a

belief that improving the level of hygiene and the installation of air-conditioning equipment in the dispensaries will drastically reduce the present level of microbial contamination of pharmaceuticals in government hospital dispensaries.

REFERENCES

1. BOAKYE-YIADOM, K. and BUADU, C. YAW (1974). Ghana Pharm. J. **2**, 2, 12.
2. BOAKYE-YIADOM, K. and FOKUO Y. D. (1975). Ghana Pharm. J. **3**, 2, 57.
3. KALLINGS, L. O., RINGERTZ, O, and SILVERSTOLPE L. (1966). Acta Pharmaceutica Suecica, **3**, 219.
4. SYKES, G. (1969). Indian Journal of Pharmacy **31**, 33.
5. Microbial contamination in pharmaceuticals for oral and topical use. British Pharmaceutical Society's working party. Chairman Sykes, G. (1971) Pharm. J. 1971. **207** 400-402.

Table I

PRESENCE OF SPECIFIC PATHOGENS EXPRESSED AS A PERCENTAGE OF THE SAMPLES EXAMINED

Products	*No. of Samples*	*S. aureus coagulase* + Ve	*S. aureus coagulase* — Ve	*E. coli*	*Ps. aeruginosa*	*Salmonellae*	*Spore forming anaerobes*	*Moulds/ yeasts*
Analgesics	50	10%	20%	40%	—	8%	—	40%
Vitamines	50	—	4%	20%	—	2%	20%	40%
Antimalarials	50	24%	10%	—	—	—	10%	20%
Antacids	50	—	—	10%	—	—	40%	—
Antihistaminic	25	—	—	—	—	—	—	—
Tranquilizers	25	—	—	—	—	—	—	20%
Antihypertensives	30	—	—	16.6%	—	3.3%	—	20%
Antidiabetics	20	—	—	5%	—	—	—	40%
Antiemetics	10	—	—	10%	—	—	—	—
Antiasthmatics	10	10%	—	—	—	—	—	—
Anticholinergics	10	—	—	20%	—	—	—	50%
Cardiac glycosides	10	10%	30%	—	—	—	—	30%
Diuretics	50	—	—	—	—	—	—	—
Anthelminthics	10	—	—	—	—	—	10%	—

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2. Mr Thomas Edmund Colecraft Sagoe, Member of the Pharmaceutical Society of Ghana, Former Chief Pharmacist of the Ministry of Health of Ghana, and erstwhile Chairman of the Pharmacy Board.

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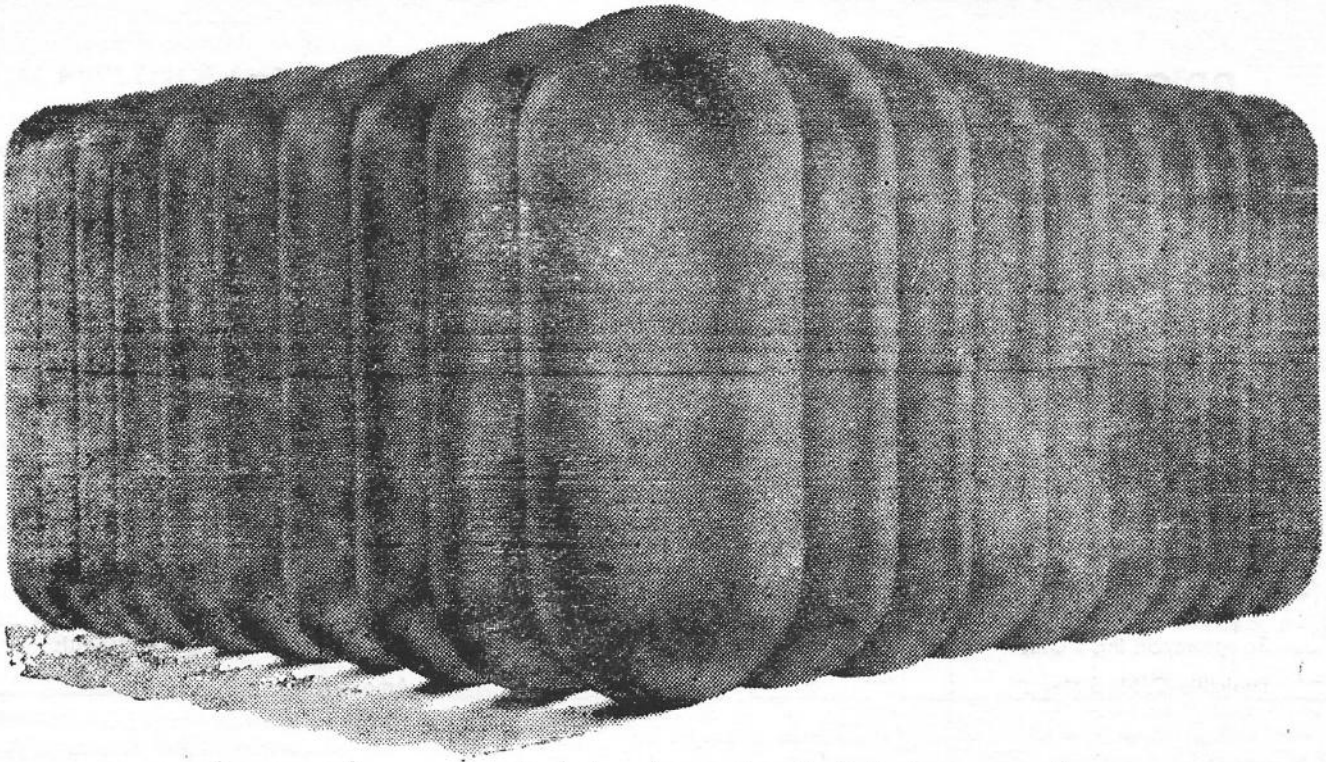

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STUDIES ON CLAY DEPOSITS IN THE KIBI DISTRICT OF GHANA

I. IDENTIFICATION AND CHARACTERISATION

John Ocran and J. M. K. Berdie, Department of Pharmaceutics, University of Science and Technology, Kumasi, Ghana

Abstract

Various methods have been used to identify clay deposits found in the Kibi district of Ghana; chemical x-ray and infra-red spectroscopy. The results confirm the presence of kaolin. Samples were analysed to determine extent of contamination by heavy metals and other possible impurities. The deposits were found to be very high grade of kaolin substantially free from contaminants exceptiron compounds which caused colouration of the samples from some areas.

Introduction

There have been reports of the presence of large deposits of white clay suspected to be kaolin in several parts of Ghana, one of these deposits being found in the Kibi mountains in the Eastern Region. Interest in the deposits is due to the use of kaolin as a component of some paints, medicinal and cosmetic preparations.

The first stage of the study which is reported in this paper was concerned with the identification and characterisation of the clay by chemical, dye absorption, infra-red spectroscopic and x-ray diffraction methods. The extent of contamination was also investigated. A detailed study of the size distribution of the clay particles will be reported in a subsequent paper.

Experimental

Purification and test for contaminants

Clays used internally must be substantially free from heavy metals and other substances that the body will not tolerate. Clays generally contain little or no lead, arsenic ,etc. However the occurrence of such elements is likely to be sporadic and unpredictable so continuous analysis is necessary to be certain that the specifications are met. To purify the sample a suspension (about 10% w/v) in purified water was prepared by trituration in a pestle and mortar and transferred into a separating funnel. After allowing the soil to settle the supernatant liquid was poured off. The washing was repeated three times each time rejecting the first 5cc of material drawn out from the lower end of the funnel two minutes after the suspension had been left to stand. (This contained sand, pebbles and other gritty matter). The purified clay was allowed to settle in a glass cylinder, the clear supernatant liquid decanted and the suspension filtered in a Buchner funnel. The cake was dried to constant weight at 105°C. The purified sample was tested for the presence of arsenic, lead, chloride and iron using the B.P. methods (1, 2).

Methods of Identification

Chemical

The chemical method of identification employed is that of the B.P. (1). which involves fusion with anhydrous sodium carbonate.

Dye Absorption

Dye-stuffs and other reagents exhibit characteristic colours when absorbed on clay minerals. The colours are generally believed to result from pleochroic effects and acid-base or oxidation-reduction reaction mechanisms. Certain aniline dyes, solutions of which vary in colour according to hydrogen iron content, may be used to indicate the relative acidity of the clay surfaces as well as to heighten the pleochroism of kaolin minerals. Kaolin stains blue with alcoholic methylene blue solution, very faint or not at all with sufranine and shines brightly as a dark field in polarized light when mounted in cresol.

Infra-Red Absorption

When electromagnetic radiation falls upon matter, certain energy changes occur resulting in preferential absorption of certain wavelengths. The internal energy of a molecule is the sum of its rotational energy, the energy of vibration of the atoms within the molecule and the electronic energy but only the first two of these are affected by I.R. radiation. The relevant region of the spectrum extends from 1u to 100u in wavelength, the shorter wavelengths producing mainly changes in vibrational

energy and the longer ones in rotational energy. The region of interest for clay minerals extends from 2.5u to 15u. Infra-red studies were carried out using the Unicam SP 200 spectrophotometer with Rock Salt plates and Heavy Liquid Paraffin as suspending liquid.

X-Ray Diffraction

X-rays are a form of electromagnetic radiation produced when matter is bombarded by a stream of fast-moving electrons. The wavelength of x-rays is generally much smaller than that of visible light and these radiations therefore have great penetrating power, are capable of ionizing gases and blackening a photographic plate. Just as visible light can be diffracted by a series of ruled lines on a glass plate (a diffraction grating) provided the distance between the lines are of the same order as the wavelength, x-rays can be diffracted by the atom-bearing planes of a crystal.

If a beam of x-rays falls at an angle on a series of atom-bearing planes separated by a distance d, it follows that for a sharp diffracted beam to be produced the relationship expressed by Bragg's Law must hold:

$n\lambda = 2.d \sin \theta$ ..... (Eq. 1)

where λ = wavelength of the x-rays (1.940 for Iron target)

n = positive integer which indicates order of reflection

d = distance between atom bearing crystal planes

θ = angle of reflection.

This is because a sharp beam is only produced when diffracted rays reenforce, that is, when their path lengths differ by an exact multiple of the wavelength.

In studying clays which consist of a large number of very fine crystals a specimen in the form of a thin wire is made from a small quantity of the powder and is rotated inside a special camera containing a strip of photographic film. A narrow beam of x-rays of definite wavelength is directed on to the specimen and the diffracted beam emerges as a series of cones which on striking the photographic film produce a series of arcs. The orientation of the minute crystals is of course random and many produce no diffracted beams at all but some will have planes in just the right orientation to fulfil the requirements of Bragg's Law. Each set of planes separated by distance d may produce a number of lines on the film for values of n from 1 to 3 or higher but as a rule the reflections become weaker as the order increases. From the dimensions of the camera and the positions of the arcs the value of θ can be obtained and from this, first order reflections d can be calculated. Values of spacings are often referred to a standard calcite crystal and are then expressed as kx units instead of Å. Several different sets of d spacing may be present in a given crystal. The d spacing for the (0, 0, 1) planes is known as the basal spacing which is often characteristic of a given mineral and may serve to identify it.

The camera used was the Derby-Scherrer type with a radius of 114.83 mm. The source of the x-ray was an iron tube of wavelength λ = 1.940. The KB part of the X-ray was filtered by Mn plate and the sample was run at 25kv and 25mA for 5 hours.

Results

The method of purification used, served to remove organic matter and large particles of gravel, fine sand particles, heavy metals and chloride but did not remove the colour from some of the samples which were deeply coloured. The B.P. method of identification did not give very convincing positive results and it was therefore necessary to carry out the other tests. I.R. spectra for two samples from the Kibi deposit and a commercial sample of light kaolin B.P. used as a reference substance are shown in Fig. 1, 2 & 3 respectively. X-ray pictures of the samples are also shown in Fig. 4. Values of angle of reflection and interplanar distance calculated from the x-ray diffraction pictures are compared in Table (i).

S (mm)						d (kx)		
Light Kaolin B.P.	*Kibi Kaolin Sample 90*	*Kibi Kaolin Sample 93*	*Light Kaolin B.P.*	*Kibi Kaolin Sample 90*	*Kibi Kaolin Sample 93*	*B.P.*	*Sample 90*	*Sample 93*
30.56	30.34	30.56	7.64	7.59	7.64	7.293	7.349	7.293
54.40	53.30	54.20	13.60	13.33	13.55	4.125	4.209	4.140
63.89	63.54	63.84	15.99	15.88	15.96	3.520	3.546	3.528
88.50	88.50	88.50	22.13	22.13	22.13	2.576	2.576	2.576
96.74	96.75	97.30	24.19	24.15	24.23	2.369	2.371	2.355
116.42	116.42	116.40	29.11	29.11	29.10	1.994	1.994	1.994
142.10	142.34	142.26	35.53	35.59	35.57	1.670	1.667	1.668

Table (i) Comparison of two typical samples from Kibi deposit with a commercial sample of light kaolin B.P. Angle of reflection, θ and interplanar distance, d, were calculated from data obtained from x-ray pictures (Fig. 4).

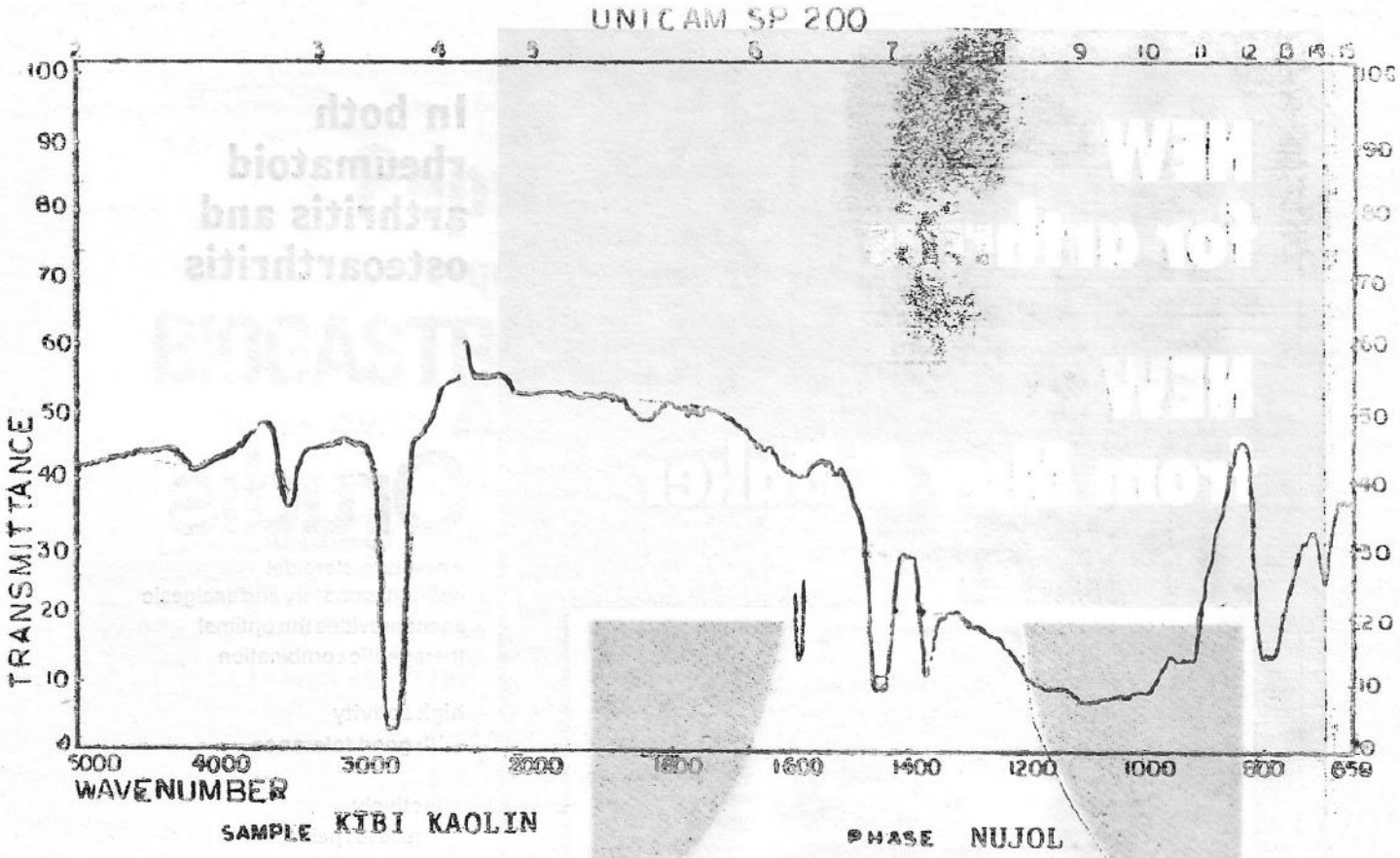

Figure 1 I. R. SPECTRUM OF TYPICAL SAMPLE FROM SWAMP 2

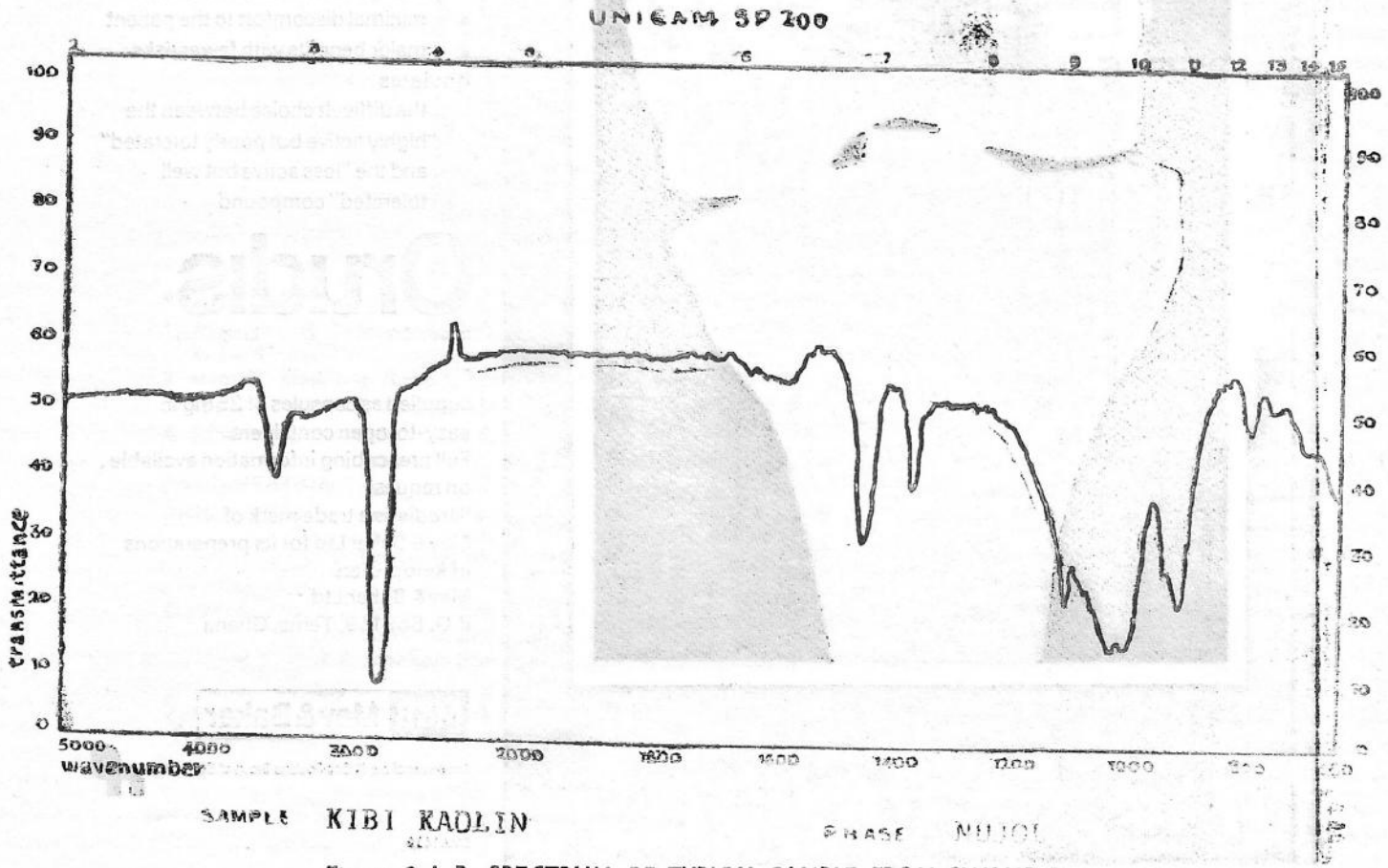

Figure 2 I. R. SPECTRUM OF TYPICAL SAMPLE FROM SWAMP 3

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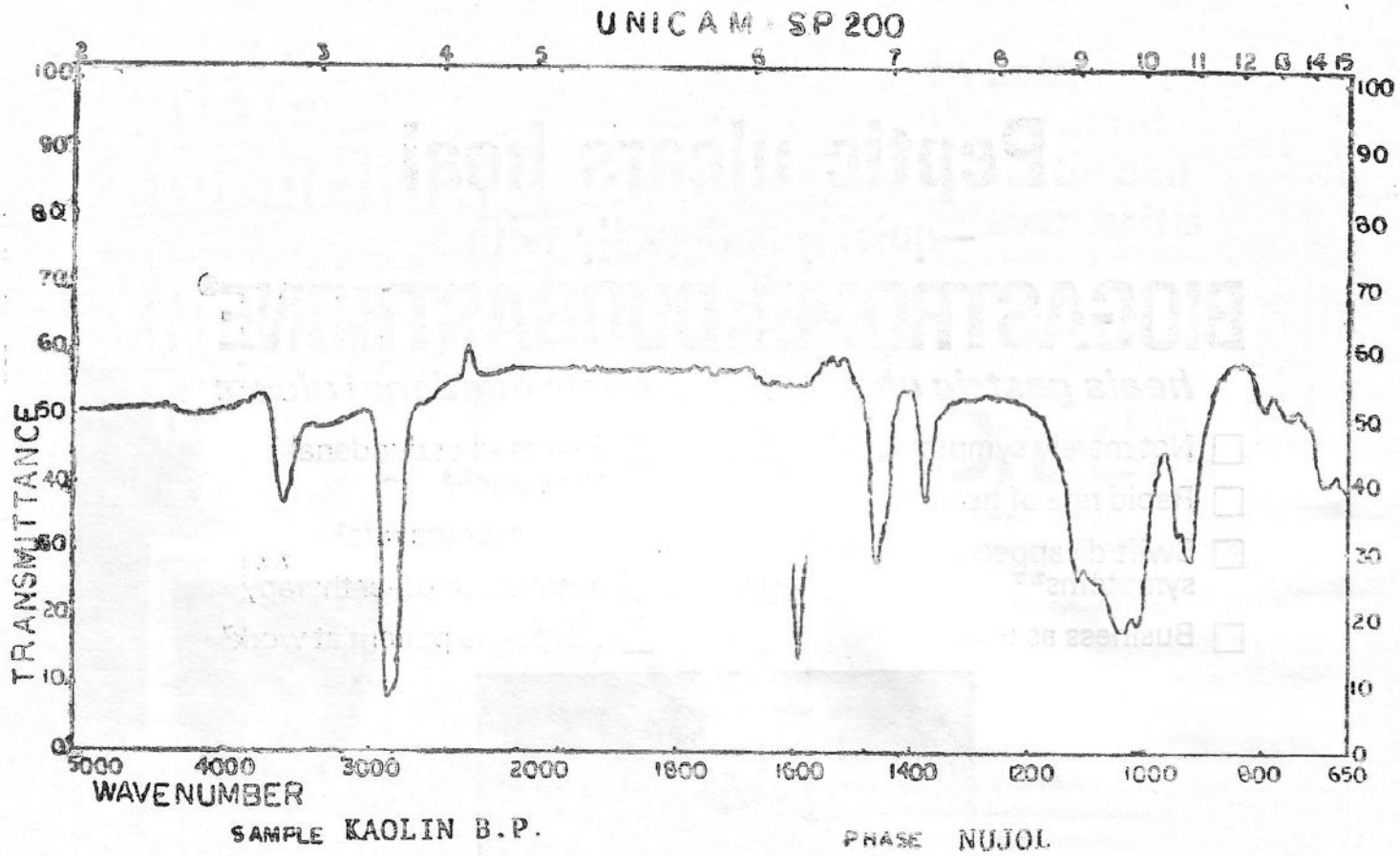

Figure 3 I. R. SPECTRUM OF COMMERCIAL SAMPLE OF LIGHT KAOLIN B. P.

Discussion

The coloured samples were probably contaminated with various oxides of iron such as hematite Fe $_2 0_2$ (red) and magnetite, $Fe_3 0_4$ (grey) 3) which are not freely soluble in water. The B.P. does not include a limit test for iron in kaolin so the quantities used were based on the specification for magnesium Trisilicate B.P. (2). This test was carried out because of the coloured nature of some of the samples which gave cause to suspect contamination with iron.

All the samples including the standard light kaolin B.P. failed the test for iron; that is, they contained more than 10 parts per million. The Kibi deposits appear to be free from heavy metal contamination since a simple washing procedure was able to give a product free from heavy metals. However the presence of large amounts of iron compounds which could not be easily removed may make some of the products, especially the coloured ones, unacceptable for pharmaceutical use.

Infra-Red Spectroscopy

Kaolinite produces a number of characteristic absorption peaks in infra-red spectrum and these are used for identification. From the spectra, Figs. 1, 2 & 3 Correcting for the shift in the instrument observed from the calibration, doublets occur at (10.68, 10.95u) and (9.6, 9.9u) indicating the presence of kaolinite established by Hunt, Wisherd and Boham (5). Characteristic peaks are also observed around 8.9u and 2.7u.

In common with other clay minerals, the chemical groups giving rise to the absorption peaks are silicate group, $Si0_4$, between 9u-10u (4). Absorption in ranges 2.7u to 3.2u and 6.0u to 6.2u are due to hydroxyl and hydrate respectively (5). According to Scholze and Dretzel (6), the peak at about 2.7u is a composite one, consisting of two adjacent peaks at 2.7u and 2.76u, the former being used by OH groups in the crystal.

Montmorillonite gives the Al-OH and Si-O-peaks referred to but unlike kaolinite it gives only one—OH peak at 2.7u. The absence of montmorillonite is therefore confirmed by the two peaks in all the spectra. The samples cannot be Holloysite or Dickite since the characteristic bands at 10.95u and 8.15u respectively are absent from the spectra. All the spectral evidence confirms that the clay is essentially kaolin but purity may vary from one spot to another as evidenced by differences in the intensity of the peaks in spectra for different samples. Comparison of Figs. 1 & 2 reveals that while Fig. 2 shows very prominent characteristic peaks, there is some overlaping of peaks between 9 and 11u in Fig. 1 due probably to impurities like sand particles which absorb close to kaolinite.

X-Ray Diffraction

Measurement of Angle of Reflection, 0 (Bragg's Angle) and calculation of interplanar spacing d. The distance between the lines of the film, Fig. 4 was measured using the film measuring device. The interplanar spacings, d, creating the observed lines were calculated from the radius of the camera as follows: If the distance between corresponding arcs of the same diffracted rays in S then:

$$\frac{S}{R} = 40 \quad \text{.....(Eq. 2)}$$

where R = radius of camera (114.83)

0 = angle of reflection (Bragg's angle) measured in radians

$$0 = \frac{S}{4R} \text{ radians or } \frac{S}{4R} \times 57.295 \text{ degrees . . .(Eq.3)}$$

The interplanar spacing d was calcuted from Bragg's Equation (Eq. I).

Worral (7) has reported that the kaolin group of minerals have prominent basal reflections at 7.14kx and 3.5kx which compare reasonably well with values obtained for the Kibi samples: 7.343kx, 3.546kx for sample 93. (Table i). Light kaolin B.P. gave prominent basal spacings at 7.293kx and 3.520kx. Factors which could account for the slight deviation of experimental values of basal reflection from the literature figures include the use of iron target x-ray tube in this work in place of the copper tube used for the published values and film shrinkage during development which in turn depends on a number of factors some of which are very difficult to compensate for. Table (i) clearly show that all the samples are kaolin. The sharp and high intensity lines in Fig. 4 also confirm that the clay is kaolin and not Halloylite which gives broad bands.

REFERENCES

1. British Pharmacopoeia (1973) London Her Majesty's Stationery Office. Page 259
2. British Pharmacopeia (1973) London Her Majesty's Stationary Office. Page 276
3. Blyth, F. G. H. & de Freitas, M. H. (1974) Geology for Engineers 6th Edition London: Edward Arnold Publishers Ltd.
4. Keller, W. D., Spotts, J. H., Biggs, D. L. (1955) California Department of Natural Resources, Division of mines Bulletin 169, 113
5. Hunt, J. M., Wisherd, M. P., Boham L. G. (1955) California Department of Natural Resources, Division of mines Bulletin 169, 213
6. Scholze, H., Dietzel, A. through Worrall W. E. (1968) Clays—Their Nature, Origin and General Properties, Page 115. London MacLaren & Sons Ltd.
7. Worral W. E. (1968) Clays—Their Nature, Origin and General Properties. Chapter 10. London. MacLaren & Sons Limited

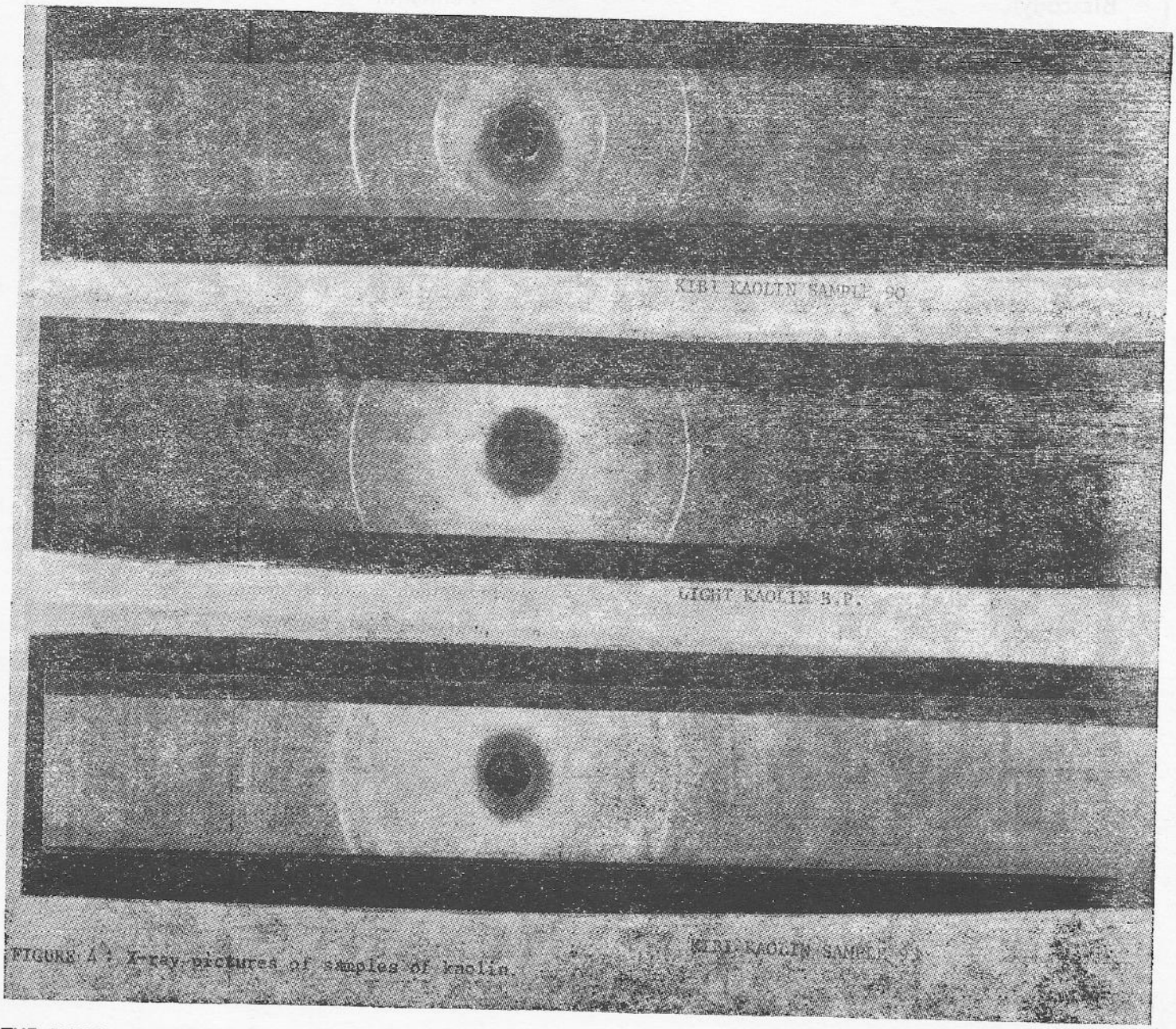

FIGURE 4: X-ray pictures of samples of kaolin.

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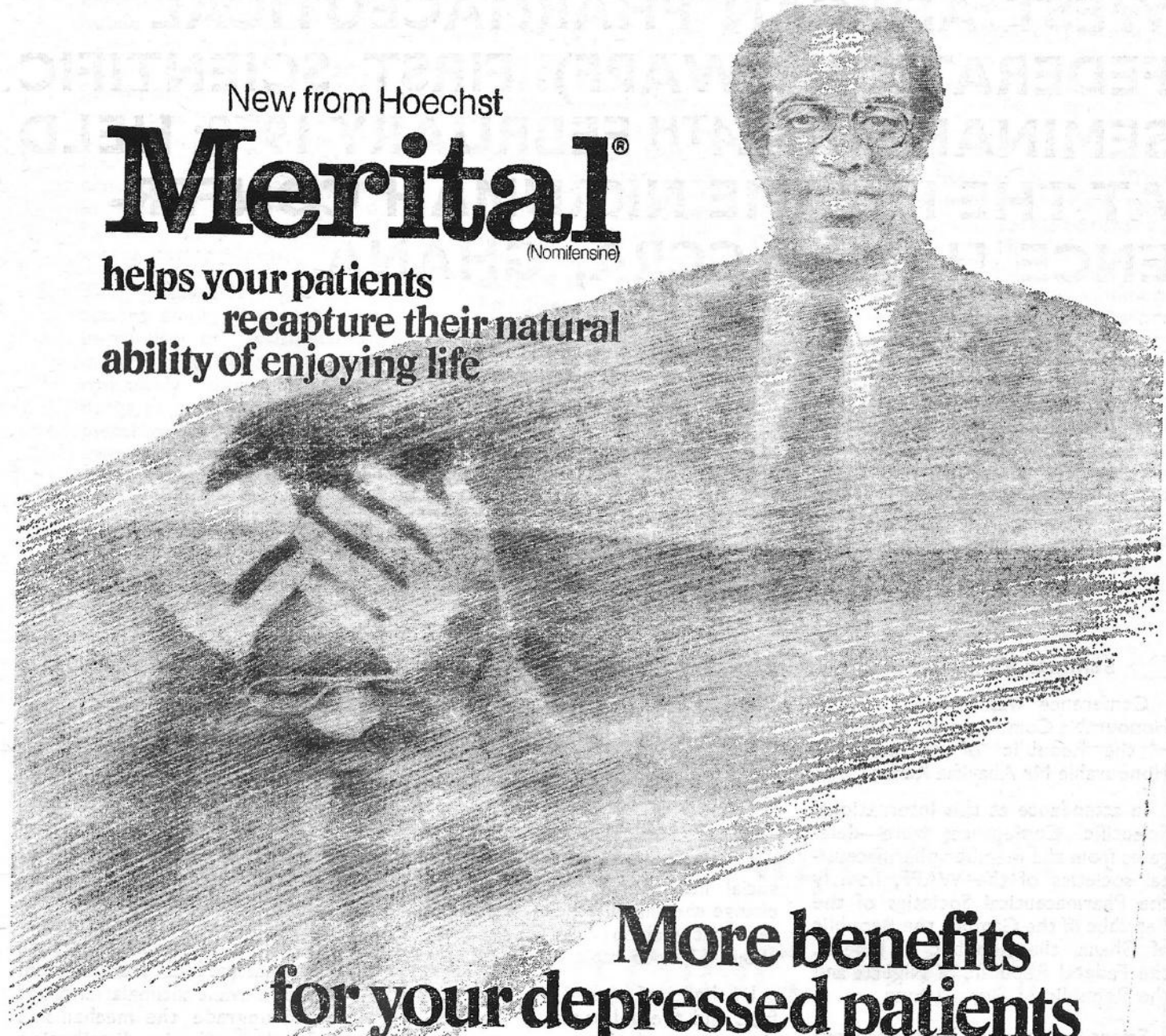

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WEST AFRICAN PHARMACEUTICAL FEDERATION (WAPF) FIRST SCIENTIFIC SEMINAR 19TH-24TH FEBRUARY 1978; HELD AT THE KWAME NKRUMAH CONFERENCE HALL, ACCRA, GHANA

Theme: **Malaria**

Seminar Communique

Conference was opened by the Honourable Commissioner for Health of the Republic of Ghana, the Honourable Mr Abayifaa Karbo.

In attendance at this International Scientific Conference were—delegates from the member pharmaceutical societies of the WAPF, namely the Pharmaceutical Societies of the Republic of the Gambia, the Republic of Ghana, the Republic of Liberia, the Federal Republic of Nigeria and the Republic of Sierra Leone.

Scientific papers and lectures were delivered by renowned scientists and scholars from West Africa and the United Kingdom.

MALARIA poses a serious Socio-economic problem in our subcontinent. It is responsible for over 12 per cent of all deaths in our children below the age of five years. This means frequent loss and agony to many families throughout the year.

To the-economy, this implies loss of potential human resources and productive years. The child's education is retarded by frequent ill-health and absenteeism from school.

Malaria continues to sap the energy of adult populations, reducing productivity by about 20 per cent. This has a very undesirable impact on a labour-intensive agricultural economy like ours. It is also directly responsible for the loss of 28,000 man hours per 1000 working population per year on the average.

Malaria defreezes tourist trade and robs us of valuable international social intercourse and foreign exchange earnings. It has been estimated that malaria costs our nations about $20 per capita per year.

IN light of the afore-mentioned facts and the deliberations and decisions reached about the relevant issues at this SEMINAR, CONFERENCE RECOMMENDS:

1. That the Governments of the West African Region initiate a regional antimalarial programme through the framework of the West African Health Community, in close association with the World Health Organisation.

   Such a programme should embrace international joint efforts towards (*a*), integrated vector control, (*b*), environmental count through public health measures and (*c*), rational use of drugs in mass therapy.

2. That the individual Governments in the region give priority to the provision of adequate quantities of necessary antimalarial drugs, so that these drugs will be available and accessible to the general populace and, in particular, be freely obtainable by the most vulnerable groups, namely—infants, children, and expectant mothers.

   In this respect, the Federation advises that, as a matter of urgency, our nations arrange for massive local production of the relevant antimalarial drugs and upgrade the mechanisms for their effective distribution to the general public.

3. That in order to sustain achievement in this field of malaria control, our Governments embark on a realistic technical strategy to combat the disease in this region.

   The World Health Organisation should be called upon to intensify its training programme on Malaria Control technology and assist national training and research programmes to effectively assume regional or subregional roles.

4. That the pharmaceutical Societies of member nations, in collaboration with other health professions and phar-

maceutical firms, embark on public health education campaigns to highlight a) the seriousness of malaria as a Socio-economic problem b) the necessity and approaches to environmental improvement at the domestic and community levels, and c) the importance of seeking and following proper professional advise during illness.

5. That, because of proven interactions among drugs and the possibility of resistance of malaria parasites to the most commonly used antimalarial durgs, pharmacists and medical practitioners be advised to exercise great caution in drug selection and drug administration, so that their decisions do not suffer from, or aggravate, these drug problems.

6. That our Scientists, professionals and governments give more impetus to studying and elucidating our local herbs traditionally used for the treatment of malaria, with a view to improving the efficacy and safety of these herbal preparatons, upgrading their applicability to widespread therapy.

7. That, because of the important role which pharmacists often play as the first professional contacts to the general public for advise and service in illness, member organisations of the WAPF and all pharmacists throughout the region be advised to spearhead the campaign against malaria by making their pharmacies and Chemist shops the publicity centres for malaria education and treatment advise. The Federation recommends that these campaigns concentrate on the most vulnerable groups, namely infants, children and expectant mothers and be carried out as the profession of pharmacy's contribution to alleviating the problem of malaria in this region.

Conference noted the fraternal hospitality extended to the West African Pharmaceutical Federation and to participants at this Seminar by His Excellency the Head of State and the Government and people of the Republic of Ghana, and the commendable efforts of members and friends of the Pharmaceutical Society of Ghana.

Conference unanimously extends its profound gratitude to the Head of State, General Ignatius Kutu Acheampong, the Commissioner for Health, Honourable Mr Abayifaa Karbo, members and friends of the Pharmaceutical Society of Ghana and the august lecturers and all concerned, for their efforts in ensuring the success of this Conference.

OPENING ADDRESS

By Mr Abayifa Karbo, Commissioner for Health

Madam President, Your Excellencies, Distinguished Guests, Ladies and Gentlemen.

It is with a sense of pride and pleasure that I join you today to open formally the First Seminar of the West African Pharmaceutical Federation.

This august gathering has brought together members of the pharmaceutical profession and industry of West Africa and marks a further important milestone in the progress towards international co-operation in health particularly among the countries of the African sub-region. I wish on my own behalf and on behalf of the Government and people of Ghana to welcome you to Ghana. In the true Ghanaian traditional hospitality, we shall do our best to make your brief stay in Ghana a most pleasant and memorable one. I also wish to congratulate the Federation on its ability to organise such an important meeting during its rather brief existence.

I also wish the Federation every success and earnestly hope that it will grow from strength to strength and organise many more such meetings not only at inter-country level but also at country level in order to promote better understanding and mutual co-operation among our peoples. I am confident that such meetings will also promote the development of universally acceptable codes of professional practice and the highest possible standards in the manufacture, distribution, marketing and usage of the formidable array of pharmaceutical products that are available today and continue to appear on the market.

Madam President, Ladies and Gentlemen, there can be no doubt that malaria was selected as the theme of this seminar because of its importance as the largest single cause of morbidity and mortality in all the countries represented here as well as many more not represented here. The irony of the malaria situation in Africa today is that the disease remains highly endemic and therefore continues to be a major public health problem and a scourge in spite of all the recent and dramatic advances in biomedical science and technology. A resurgence of the disease is also currently taking place in certain countries where it was successfully eradicated or brought under control.

Throughout the world its estimates suggest that there are approximately 150 million clinical cases of malaria annually. Here in West Africa, crude estimates suggest that about 20 per cent of children die before they attain the age of five years from the direct or indirect effects of malaria. Indeed, conservative estimates indicate that something like 12.5 per cent of all patients attending clinics are malaria cases. Obviously this is a very serious situation and a major hindrance to socio-economic progress especially in the rural areas where the disease, because of its chronic impediment to health, leads to increased morbidity and mortality and causes impairment of physical and mental activity.

Although the tools available for control are perse seemingly adequate their application is invariably and indeed always beset with a combination of complex constraints due largely to administrative, technical operational, political and financial problems which I need not go into here. Suffice it to say that huge sums of money have been spent and continue to be spent by our Governments on the control and eradication of malaria but all to little or no avail at all. Ladies and Gentlemen, the question is why should such an unhappy and most unpleasant situation be allowed to persist in our modern societies in spite of the considerable knowledge about the disease and the availability of tools for its control?

One common problem facing us all in West Africa is how to ensure the safe and proper use of drugs. In particular we are all aware of the widespread abuse of antimalarials and the common aspirin. I believe that it is the duty of your profession and organisation to protect the public by educating and informing them on drug utilization particularly at this time when self-medication is becoming increasingly popular. I hope that you give serious consideration to this problem and perhaps develop a suitable programme in collaboration with the medical and other relevant health professions for educating the general public.

Let us consider another aspect which is of relevance to your profession and organisation. Several drugs are available for the effective treatment and prophylaxis of malaria. Of these, chloroquine is among the cheapest and most effective except in areas where there is resistance to them. When one goes through the history and records of malaria chemotherapy, one finds that these drugs have been developed a long time ago and that nothing really new has been developed in recent times. In view of these drugs, the need for an intensive search for

new antimalarials and research into the causation of resistance and the development of preventive measures has now become really pressing.

It is common knowledge that drug development is a very complex and expensive undertaking. But I sincerely believe that there must be some contribution, however small it may be, towards drug research and development particularly in connection with the endemic parasitic diseases like malaria and schistossomiasis. The question that really arises is how your profession and the West African Pharmaceutical Federation percieves the situation and consequently what you consider to be your roles and responsibilities.

Madam President, Ladies and Gentlemen, for quite a long time we have depended entirely on the mercy of external agents in the field of drug research and development. Should we perpetuate this over-dependency? Now that we are beginning to appreciate and are indeed promoting and encouraging co-operation amongst ourselves for our mutual benefit, I think the time has come when we must also begin to identify areas where we can pool our resources together for the purpose of promoting among many other things, research activities aimed at finding suitable and lasting solutions to our common problems. There is no doubt that apart from malaria and antimalarials, we have a number of common problems that constitute major public health problems in our countries. We cannot expect to get outsiders to continue to provide us all the time the solutions to our problems. We need therefore to continue to foster the spirit of co-operation among ourselves to enable us find solutions to our problems.

There are, of course, many other areas where your organisation can make extremely useful contribution towards the achievement of the goal of health for all by the turn of the century. You may wish to consider the development of appropriate mechanisms at the sub-regional and country levels for ensuring the safety, efficacy and quality of drugs imported and produced locally; for harmonisation of pharmaceutical legislation to promote uniform drug policies and drug control measures and for ensuring the availability of essential drugs at reasonable prices to the consumer.

I have posed a few questions and raised some pertinent issues and left them at that. The reason is that I expect you to define them as you go along. I am sure that, with the choice of participants of this Seminar and with the programme of work planned for you, all points of view will be represented among you. I doubt if there has ever been such an opportunity before for these questions and issues to be thrashed out with such a widespread wealth of experience. I hope you will be able to see the problems that have arisen, why they have arisen, and how they have or have not been met. If you can also come to some conclusions about the effective measures of malaria control and practical approaches towards forging closer links and ensuring practical co-operation among the peoples of West Africa, then I think you will have achieved something quite unique.

Malaria is a very serious health problem. The situation in West Africa and in all malarious countries is rapidly deteriorating. Our resources, material, financial, human and technical, are inadequate to cope with the problem. There is therefore a very urgent need now for all Governments of West Africa as well as other countries where malaria constitutes a major health problem to take a firm decision to pursue with determination antimalaria activities based on a realistic assessment of the situation and to give the highest possible appropriate national priority to these activities on a continuing basis. There is an urgent need for all West African States to intensify their co-operative efforts to control and eradicate this scourge. I hope that this first Seminar of the West African Pharmaceutical Federation will provide the required momentum to enable us achieve our goal. You can count on the fullest support of the Government and people of Ghana. We have every confidence that from these small beginnings of international co-operation and scientific meetings, there will be major contributions towards our common goal of the enjoyment of the best possible level of health by all.

Madam President, Ladies and Gentlemen, I now have the pleasure and the honour in declaring this Seminar formally open. May I again welcome all of you to Ghana and wish you a very pleasant stay and successful deliberations.

CLOSING SPEECH BY DR E. G. BEAUSOLEIL, DIRECTOR OF MEDICAL SERVICES MINISTRY OF HEALTH, GHANA

Madam President, Distingusished Guests, Ladies and Gentlemen, it has been a source of satisfaction, honour and encouragement to the Ghana Pharmaceutical Society and the Ministry of Health that Ghana has played host for this Society the first scientific meeting of the West African Pharmaceutical Federation especially at such an early stage in its growth and development.

The holding of this is viewed by many of us here, if not all in this country as a highly significant and important milestone in the progress being made in international co-operation in the field of health in the world in general and this African sub-region in particular.

For us, this meeting has been a source of profound professional accomplishment and a highly rewarding experience.

The Ghana Pharmaceutical Society has made every effort to prepare a pleasant and efficient setting for the work.

No doubt, there have been a few flaws here and there. These, if they occurred, were purely accidental and not by design.

Indeed, I can assure you that the attitude of the local organisers who were entrusted with the formidable task of organising the meeting has been guided at all times by a general desire and determination to fulfil their mission and obligations as regards the physical and social arrangements as well as the required facilities. As this has been their first attempt at organising such an international meeting, it is to be expected that there will be a few lapses here and there and so I trust that if there have been any disappointments in your expectations, they will be forgiven and any such incidents forgotten.

I trust that this will not be a one-day glory but that as was mentioned by my Commissioner in his opening address, this meeting marks the beginning of many more such meeting at not only the inter-country level but also more important still at the country level.

In this respect I am certain that the experiences gained here will be used to guide the organisers of future meetings.

Indeed it is our firm belief that meetings such as this, when properly organised are powerful instruments by which the ultimate goal that each individual regardless of his or her status in life shall have ready and easy access to drugs of proven safety, efficacy and quality at reasonable price will be realised.

Some people claim that such meetings are held too frequently and are often fruitless and a waste of time.

This may be so and indeed there may be a possible overuse of such meetings with the result that they lose their utility and good standing.

What is perhaps important is the subject matter, the orientation followed, the objectives sought and the action taken after a meeting.

In addition such meetings tend to forge bonds between peoples, institutions and nations and then help to perpetuate a sense of international solidarity.

This is the first meeting and we cannot therefore make comparisons and indeed it is dangerous to make comparisons between meetings since each meeting has its own characteristic and is distinct from others.

It is also not the pomp that surrounds a meeting that makes it successful but the spirit in which it is held, the conclusions and follow-up.

In this regard I think I can confidently say that this meeting has been successful in spite of any possible shortcoming in the physical and social arrangements.

I sincerely hope that you will make every effort to translate the decisions taken into realities and that at the next meeting you can say with all confidence that this meeting has contributed to advancement in the achievement of the ideals of the Federation.

I trust that our visitors from abroad and outside Accra have enjoyed their stay here and will come back again when invited or even perhaps without invitation.

On this note I wish to thank the organisers for the honour done me by inviting me to close this meeting.

Thank you one and all for your patience. I wish you all bon voyage.

Thank you.

ETHICAL PRACTICE OF PHARMACY PROFESSION

By H. K. Abutiate, Hon. General Secretary, Pharmaceutical Society of Ghana

Mr President, Fellow Pharmacists, Ladies and Gentlemen:

It gives me great pleasure to be here with you today. It also gives me even greater satisfaction to say a few words about our profession — Pharmacy. The topic I chose for my speech today is "ETHICAL PRACTICE OF PHARMACY PROFESSION." I chose this topic because if you read through the objects of the Pharmaceutical Society you will find that the 3rd Objective is "to maintain the honour and ethical standards at all levels of the profession and to support a high professional conduct."

This objective pre-supposes that it is possible for some pharmacists to practice the profession unethically and thus, lower both the image and professional standard of pharmacy. For these reasons, I think the speech is most appropriate. For those who have not wavered from this objective despite the many temptations that have come their way, I say Bravo — keep it up! We as members of a profession can, however, not sit down for a few people to drag our image in the mud. It is because of this that we have code of ethics. The primary obligation of pharmacy is the service it can render to the public in safe-guarding the preparation, compounding, dispensing, supplying and storage of medical products. To meet such obligations, principles of professional conduct for pharmacists must of necessity be established.

Every pharmacist should not only be willing to play his part in giving such a service, but should also avoid any act which would prejudice the giving of the service or impair confidence and respect for pharmacists in general. The practice of pharmacy requires knowledge, skill and integrity — therefore the laws of this country restrict the practice to persons with special training and registrable qualifications. You pharmacists are trained professionals and unless you show that in the way you do your job, you will be giving cause to those who have not had the same amount of professional training to question the necessity of your training.

The areas of our code of ethics which are mostly abused are:—

a. **Appearance of the Premises and our Person:—**There is no doubt that a few pharmacy shops look like pharmacy shops. Others which are in the majority however are not neat, the equipment are only fit for the archives, there are no reference books or measuring devices which will help the pharmacist to perform his professional duties. My first advice therefore is to clean up our pharmacies. Remember— Cleanliness is next to Godliness. Our personal appearance as pharmacists should not be forgotten. If you go to a fetish groove, you will not be in doubt who the fetish priest is. Pharmacists must dress as pharmacists. The Secretariat has recommended a white coat with the Society's crest on the left hand pocket. If all pharmacists on duty wear this coat I am sure it should improve our image as professionals.

b. **Keeping the Laws of the Profession and the Nation:—** The pharmacist is a good citizen and upholds and defends the laws of the nation—he keeps himself informed on pharmacy and drug laws and co-operates with the enforcement authorities.

The Pharmacy and Drug Act 1961 (Act 64) states that a Second Schedule Drug should not be sold by a pharmacist or licensed company to the public except under a valid prescription by a medical practitioner, dentist or veterinary surgeon. You, as a pharmacist know why this is so, but there are some pharmacists who sell these drugs without valid prescriptions. If we have to improve our profession we have to obey the rules and regulations. At this juncture, I would like to say that there are a number of authorised prescribers, ie; medical practitioners, dentists and veterinary surgeons who do not give valid prescriptions to their patients to purchase drugs from pharmacy shops. For their benefit, I would like to remind them of the definition of a valid prescription. "A prescription is valid under Section 22 (2) of the Act if it is written in INDELLIBLE INK with the following particulars:—

i. the signature of the prescriber

ii. the date on which the prescription is given

iii. the name, qualification and address of the prescriber

iv. the name and address of the patient, or if for veterinary treatment, the name and address of the person to whom the drug prescribed is to be delivered,

v. if given by a dentist, the words, 'For dental treatment only

This was an address delivered at a Meeting of Doctors, Nurses and Pharmacists organised by the Brong Ahafo Regional Branch of the Pharmaceutical Society of Ghana at Sunyani on 19th March, 1978.

or if given by a veterinary surgeon, the words 'For animal treatment only.

vi. the prescription must not have been previously dispensed fully."

Fellow Pharmacists how many times have we dispensed or sold drugs which should have been on prescription without a valid prescription? Let us start turning out people and let us see if the situation would not improve with our image. I am sure the doctors will also start giving valid prescriptions to their patients and in this way slowly but surely the improvements will come.

So far, we have talked about appearance of our premises and person as well as keeping the laws of the nation and the profession. We would now consider the pharmacist's responsibility to his customer. If a pharmacist receives a valid prescription from a patient, he must give the patient what is required, label it properly and explain the dosage instructions required. If the pharmacist notices an error in the dosage, he should contact the prescriber, hence one of the needs for a valid prescription. The pharmacist should in no case make enquiries of the customer regarding the nature of his ailment or express surprise or doubt about the medicine or dosage prescribed. If the pharmacist has no stock of the drug prescribed, he should endeavour to get it for his customer or direct him to a pharmacy shop where it could be obtained. Substitution for other brands should also be with the approval of the prescriber. The pharmacist should not take upon himself the duties of a doctor and try to treat any and every kind of ailment for which he may have medicines in stock. He should honestly and earnestly advise his customer to seek expert medical care when careful medical attention is required. For common simple ailments, however, the act allows the pharmacist to give first aid and advice. In giving this aid the pharmacist should think of simplicity, efficacy, economy and sufficiency of the drugs supplied. Help the man or woman who is in need of our help, but do not do that at an undue expense to their pocket or risk to their health by selling other things unconnected to the simple ailment whose advise he/she sought from you. Finally, I would like to touch on the subject of registration of premises and practice within these premises. This has been discussed at our conferences and many people think that it is an attempt to remove the sources of their extra income from them. The Act states that in any premises where Dangerous Drugs Class A or B are dispensed, the business should be under the PERSONAL control of a pharmacist. In other words, if the pharmacist is not personally present, then no Class A or B drugs could be dispensed! Since there is a temptation for whoever is left in the shop in the absence of the pharmacist to sell a Class A or B drug, it is better to close the shop in the absence of a pharmacist. Both the pharmacist and the patient are then protected from any misuse of these classes of drugs.

The Council's opposition to the registration of Chemical Sellers' Shops, by part-time Pharmacists who are not owners of such shops, to turn them into Pharmacies is in the absolute interest of the profession and its members that is why the Society has recently recommended to the Pharmacy Board that if a pharmacist wants to open his own shop he can do so provided it is not against his job contract and also that he opens the shop when he is present in the premises. If we continue registering shops for people we cannot control or uphold professional conduct and practice, the result is that we shall be undoing our own profession. If a Chemical Seller or a businessman damages the image of pharmacy, he can do some other jobs, but if you, a pharmacist, damage the image of pharmacy, you disgrace yourself and your profession. I am sure I have said a lot about what you know or what you should know. We all love our profession and that is why we are in it for life. Let us make our choice a good one and let us be ethical about it so that we can truly say "AMICUS HUMANI GENERIS!"—we are friends of all mankind! I thank your energetic executive for making it possible for me to be here and I thank you all for listening so attentively to me.

H. K. ABUTIATE
Hon. General Secretary, P.S.G.

SOCIETY NEWS

1977 CONFERENCE: The Conference which should have taken place in August was postponed indefinitely because of the national crisis involving the professional bodies and the Government. Since the Council felt that election of officers should be held, an Emergency General Meeting was agreed upon to be held and consequently, members were informed through the news media. As usual, the President delivered his address followed by that of the Hon. General Secretary for the period 1975 to 1977. A number of issues from the report were discussed namely:—West African Pharmaceutical Federation (WAPF); Commonwealth Pharmaceutical Association (CPA); 37th Congress of Federation Internationale Pharmaceutique (FIP); Pharmaceutical Society of Nigeria Silver Jubilee; Scientific Research into Plant Medicine; Standards Board Drug Technical Committee; Ghana National Procurement Agency; Retention fees; Building Fund, etc. The Treasurer's report was delivered, discussed and adopted. Resolutions were passed on the following issues:—

(*a*) **Cost and Shortage of Drugs:**

"That the Government should take immediate steps to improve the availability of drugs and other pharmaceutical products which are at the moment very scarce in the country, to ensure effective and reasonable health care delivery to the Ghanaian public."

(*b*) **Faculty of Pharmacy Building:** "That to improve the provision of adequate pharmaceutical services to the entire nation, there is an urgent need to train more pharmacists since the present-pharmacist: population ratio of 1 to 20,000 makes it almost impossible for effective delivery of qualified pharmaceutical services and has led to the handling of dangerous drugs by quacks thus endangering human life."

(*c*) **National:**

(*a*) To defreeze the Bank Accounts of the Pharmaceutical Society of Ghana and other professional associations;

(*b*) To ensure freedom of expression for every Ghanaian irrespective of the views he might hold for the proposals on the return to constitutional rule.

ELECTION OF OFFICERS

The Elections

The following members were elected into Office for the period 1977/79 and Dr Sydney Quartey, Director of Veterinary Services Department installed all the Officers.

Mr Ago Simmonds — President

Dr John Ocran — Vice President

Mr H. K. Abutiate — Hon General Secretary

Mr J. E. Akyirem — Asst. Hon. Gen. Secretary

Mr M. A. Dako — Hon. Treasurer

Mr K. A. Ohene-Manu — Editor

Mr T. Ofosu-Eck — Member of Council

Dr Charles Buadu — Member of Council

On the whole the Conference was a great success and very useful contributions were made. There is every hope that the atmosphere of unity and solidarity that prevailed will continue throughout the coming year.

SALE ! SALE !! SALE !!!

PHOTOGRAPHS taken during the 34th Annual Conference are ready for sale. A copy costs ₵9.00 only. There are also printed Society badges for use by dispensing pharmacists in retail and hospital at a cost of ₵1.00.

Please get all from the Society's Office or Telephone 23894/28341

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