that it is not considered here. The distinction between these methods usually has to be made from the history of the outbreak and from comparison of attack rates on different groups of people who had various degrees of association with one another, or were exposed to various possible sources of infection.

Food-borne outbreaks are commonly, though not always, abrupt in onset; accurate history-taking often leads to a clear indication of the source of the infection. The enteric diseases and food-poisoning are always spread by infected or toxic food, and in the investigation of such outbreaks collection of samples of foodstuffs is important; these should be sent to the laboratory immediately, because, if kept, the pathogenic organisms may be overgrown by saprophytes. With diseases like typhoid fever, however, which have an incubation period of 10 days, it is quite likely that contamination of food or water with the typhoid bacillus has ceased by the time that investigations are begun. Some help may still be given by laboratory investigations, which may reveal, for example, faecal contamination of water supplies, faulty food-handling habits, or inadequate heat treatment of milk or ice-cream, and so indicate methods for the prevention of further outbreaks.

In both "dropping-case" and "spreading" outbreaks in hospitals hopes of prevention lie in investigation and the closing of the routes of infection, especially by improvements in the aseptic routine. For this it is often necessary to spend a great deal of time in the affected department, quietly observing the routine as it is followed; it will often be found to differ from that prescribed by authority.

In investigating outbreaks in hospitals and schools it is often possible to obtain evidence of widespread dissemination of the epidemic microbe on bed-clothes, in floor dust, on surfaces, and in the air; and bacteriological investigations of fomites may suggest the route of transmission. It is well to remember, however, that the finding of, for instance, large numbers of streptococci in the floor dust of a school suffering an epidemic of scarlet fever does not necessarily imply that the victims were infected by dust-borne streptococci; it may be that the streptococci in the dust are no more than a by-product of dispersal from carrier to new host by much more direct means.

In one special case the method of transmission of infection may be discovered, but not the person from which the infection is derived. This is the syringe-transmission of infective hepatitis: the causative virus may be carried in the blood of apparently healthy persons and be transferred to others by inadequately sterilized hypodermic syringes or needles; the infecting dose of virus is so small that it may be contained in an almost imperceptible amount of blood.

Conclusion

Clearly, methods for the investigation of all epidemics cannot be prescribed in a short article; all that can be done is to indicate some of the broad lines of approach, and the part that the laboratory can play in the investigations. The medical officer of health, on the epidemiological side, and the laboratory, on the microbiological side, can give guidance to the practitioner on the specimens that should be examined and the investigations that may profitably be made in any particular outbreak. The part played by the Public Health Laboratory Service, which was constituted to give assistance in the investigation of epidemics, was described by Dr. M. T. Parker in a previous article in this series (October 10, 1953, p. 823).

The investigation of outbreaks of infection has often consisted solely in the analysis of numbers of cases and of attack rates on the various sex and age groups of a population that are readily accessible in the, often inadequate, written records. Analyses of attack rates are essential, but to show their real value they have to be done in the first few hours of the investigation, for their first purpose should be to guide the field and laboratory investigations. The source of any but the simplest of epidemics can rarely be found unless the investigations are started as soon as there is

reasonable suspicion of the existence of an epidemic, and it will certainly not be found without a concerted clinical and laboratory investigation on the spot. With information gained from such full investigations, retrospective analysis may be expected to indicate the way in which further outbreaks may be prevented.

Next article on Clinical Pathology.—"Examination of Faeces for Infection and Infestation," by Dr. K. B. Rogers.

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MEDICAL AND SOCIAL PROBLEMS OF THE AFRICAN IN INDUSTRY

BY

J. H. JACKSON, M.B., B.S.

The industrial and mining development of the greater part of the African continent is still in its infancy. Full development will result in its attaining a position of great economic and strategic importance in the world, but cannot be carried out without native African labour. The future prosperity of Africa rests upon this, unless some equally suitable type of labour can be found. No true thought or consideration has been given to this fact by those in whose hands the existing development of the continent up to the present has lain. This seems to have been due to ignorance of the economic and social hazards of a policy of *laissez faire*, combined with the fact that labour supply has exceeded demand and the sources have been primitive peoples with a high reproductive rate whose mental horizons and economic needs were until recently of the lowest possible order.

Social Conditions

To-day in a large part of the African continent the industrial and mining development which has taken place has created terrible social conditions associated with poverty, malnutrition, disease, and crime. The terrifying proportions of these social evils appal the mind when viewed in the nakedness of their true facts. The social burden of the corrective measures necessary to deal with the situation now in existence is likely to be extremely heavy if the measures required are to prove effective. Indications are that such measures are beyond the means of the community as at present constituted. The social unrest which must inevitably spring from the continued existence of these conditions is likely to lead to economic and political disaster.

Whether sufficient knowledge or foresight could have been expected from those responsible for the creation of the present conditions one cannot say. Nevertheless I am of the opinion that a repetition of the mistakes elsewhere can be avoided by a knowledge of those of the past. It is the intention of this paper to discuss the medical and social impact of certain procedures which have been adopted to obtain native industrial labour, and the ultimate effect which they are likely to have if imposed upon primitive native peoples. It is based upon five years of general practice in an area where some of the conditions described exist. If it prevents similar conditions arising during the future development of the relatively untouched African territories then its purpose will have been well served.

Migratory Labour

In a large part of Southern Africa a system of migratory labour for the mines, industry, sugar plantations, etc., has been in existence from the outset. It will serve no purpose here to describe and discuss the factors which have resulted in the creation of native reserves where a large proportion of the population is crowded, where the land is eroded and exhausted, and, with present methods of cultivation, incapable of supporting agriculturally the population on it, and where no industries whatsoever exist capable of contributing to the local economy. Suffice it to say that they exist to-day in their stark reality. From these reserves 30 to 40% of the able-bodied males go annually to work elsewhere, leaving their women to till the land. These men depart for a period of six to nine months, sometimes for one to two years, to labour for the means necessary to give them and their distant families the barest of livings. No modern nation, even in the face of the direct military necessity, could maintain such numbers in the field. Certainly it would not be willing to maintain such a force outside its borders in peacetime. The social, medical, economic, and moral results of this migratory labour are catastrophic, and the system cannot be condemned too strongly.

The incidence of venereal disease is high amongst Africans in those areas where European civilization and industry have become firmly established. The published figures are in fact staggering when compared with those from other areas. It is undoubted that the introduction, spread, and high incidence of syphilis amongst the native peoples of Southern Africa is directly related to contact with the European and his industry, served by migratory labour. Apparent also is the lack of attention paid to the warnings of those medical men whose writings provide the evidence of this (Kark, 1949; Sax, 1952). The excellent survey of the social pathology of syphilis in Africans by Kark (1949) presents the facts admirably. To combat the amount of venereal disease now in existence in certain areas demands an extensive organization of social, medical, and educational workers. Moreover, the essential features of migratory labour among backward peoples are such as to prevent any effective control by such measures. Effective legislative measures to prevent the spread of disease can be placed on the statutes, and exist, but to put such measures into effect would result in social, economic, and legal chaos.

Malnutrition

The increasing dependence of the native in the reserves upon migratory labour, his ignorance of proper farming methods, and its sequelae—neglect, overstocking, and soil erosion and exhaustion—combined with a natural increase in population, have produced an intense and increasing problem of malnutrition. Unless checked this of itself is likely to have far-reaching effects, and it is already taking its toll. The selective action of malnutrition on the native female of the reserves has been noted (Jackson, 1952). That a process of racial degeneration due to malnutrition may be taking place can be supported by reasoning alone, and has been suspected (Gillman and Gillman, 1951; Jackson, 1952; Jones, 1952). Two processes are probably involved.

(a) The fertilized ovum is to some extent independent of the mother, even while *in utero*, and makes every effort to satisfy its own biological demands for development and growth. The high incidence of miscarriage and premature birth among malnourished African women is known (Gillman and Gillman, 1951; Ross, 1952). That the high abortion rate can be solely attributed to venereal disease is doubtful. It is conceivable and highly probable that the genetically larger foetus with a greater biological demand will be unable to satisfy its needs from a malnourished mother and consequently will undergo foetal death and be lost through abortion. This process, if operative, is likely to be highly selective under intensive malnutrition and will be a potent factor in racial degeneration.

(b) The summation from generation to generation of the environmental influence of diet in man where there is a long

gestational period must also play a part in general somatic deterioration. It must be remembered that the predominant part played by carbohydrate, and particularly by maize in certain areas, is conducive to degenerative changes in the mother and possibly in her infant.

Malnutrition in the native results in a high incidence of preventable disease. This includes premature ageing, tuberculosis, skin infections, general inefficiency, and backwardness. The most important single factor contributing to the high incidence of tuberculosis in the African is malnutrition. The incidence of tuberculosis in the native of Southern Africa is the highest in the world. In areas where maize is the staple article of diet insanity is a sequel to the malnutrition, and the insidious mental degeneration consequent upon such a diet must contribute to general mental backwardness of the people.

It has often been said that African labour is not cheap. This statement is true because the labour is inefficient and there is a high wastage, but it needs qualifying by an assessment of the medical and social handicaps which contribute to the inefficiency. Too much has been expected of the African. One is surprised, taking all circumstances into consideration, that he has accomplished, and continues to accomplish, as much as he does to-day.

Detribalization

There is growing up in Southern Africa a class of men often referred to as detribalized natives. They are most numerous in the towns, but their counterparts are beginning to appear in the reserves. The term is used frequently with an implication of regret and depreciation, as though they were social misfits. This is strange. In actual fact they are the natural products of civilization and industrialization and will appear wherever the natives are employed by industry. Upon them will turn the fate of Africa. The tragedy of Southern Africa to-day is that the logistics of their advent played no part in the development of the country. There is to-day an amorphous mass of human material living without tradition, social structure, or allegiance in slum conditions exhibiting the worst forms of human degradation, poverty, malnutrition, and disease. These masses have grown up around all the large European residential and industrial centres. There was no planning, and the problem is practically out of control. From these areas have radiated social diseases which have contaminated the most distant tribes (Kark, 1949; Sax, 1952).

The detribalized natives are in an unenviable and tragic position, for no place was made for them, and their natural heritage has been denied them. No attempt has been made to guarantee them a social structure and a feeling of belonging to a society within the natural order of their existence. As a group they are without a name or a home.

A Problem for the Future

From the foregoing and from the literature quoted an investigator will obtain the impression, and rightly so, that the progress of civilization in Africa has resulted, so far, in a progressive burden of social maladjustment, disease, poverty, and malnutrition for the African people. One might say that if the African is suspicious of the intentions of European civilization he is, judging by the results, justified from a medical point of view.

In any discussion of social medical problems, particularly concerning a continent of multiracial and multiracial inhabitants, it is difficult to avoid confusing politics and preventive medicine. I doubt, in actual fact, whether they can be dissociated, unless the discussion of the problems outlined be regarded as education of the races involved on the nature of the prospects before them. One thing is certain—that for the safety and economic prosperity of the African continent capital and labour from all races must combine to produce harmony and to avoid the potential dangers which lie ahead. For those territories which are yet undeveloped, planning will ensure a stability and prosperity which will exceed anything yet accomplished in the continent. The

prosperity of any section accomplished at the expense of the legitimate human needs of another, at the expense of the soil, or of any other resource, is exploitation and will finally result in chaos. There may or may not be a remedy. The economic drain of preventable disease, both social and secondary to ignorance, poverty, and malnutrition, will, unless checked, prove a burden eventually on any society. In a multiracial interdependent society its results in one section are likely to be disastrous for all. It is apparent from the literature quoted that members of the medical profession are concerned about the medical prospects in Africa. To adopt the attitude that everything will come right in the end in areas where such conditions exist is an admission of defeat. In areas where it does not exist but may arise such an approach would be tantamount to negligence.

The future of Africa is the heritage and the responsibility of all races within its bounds. The problems are theirs.

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MEDICAL NEW YEAR HONOURS

The names of the following members of the medical profession were included in the New Year Honours List published in the *London Gazette* on January 1.

G.C.V.O.

LORD WEBB-JOHNSON, K.C.V.O., C.B.E., D.S.O., T.D., M.B., Ch.B., F.R.C.S. President of the Royal College of Surgeons of England, 1941-9.

Knighthood

EDWARD CHARLES DODDS, M.V.O., M.D., Ph.D., D.Sc., F.R.C.P., F.R.S. Courtauld Professor of Biochemistry, University of London.

ERIC WILFRED FISH, C.B.E., M.D., D.Sc., F.D.S. Chairman of the Dental Board of the United Kingdom since 1944.

FREDERICK TAVINOR REES, C.B.E., M.C., T.D., M.R.C.S., L.R.C.P. Lately Director-General of Medical Services, Ministry of Pensions.

BRIAN HERBERT SWIFT, M.C., M.D., F.R.C.S.Ed., F.R.A.C.S., F.R.C.O.G. In recognition of his valuable services to public hospitals and to the University of Adelaide.

HARRY WYATT WUNDERLY, M.D., F.R.C.P., F.R.A.C.P. Director of Tuberculosis, Commonwealth Department of Health, Canberra.

C.B. (Military Division)

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C.B. (Civil Division)

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C.M.G.

HUGH WADDELL MULLIGAN, M.D. Colonel, late R.A.M.C. Director, West African Institute for Trypanosomiasis Research, Colonial Research Service.

WALTER GERALD WICKREMESINGHE, O.B.E., M.R.C.S., L.R.C.P. Lately Acting Director of Health Services, Ceylon.

C.V.O.

WILFRID PERCY HENRY SHELDON, M.D., F.R.C.P.

WILLIAM ELTON TUCKER, M.B.E., T.D., M.B., B.Chir., F.R.C.S.

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ERIC THOMAS SUTHERLAND RUDD, M.B., B.Ch., F.R.C.S.Ed. Surgeon Captain, R.N.

CAMPION AUBREY RUMBALL, O.B.E., F.R.C.P., D.T.M.&H., D.P.M., L.D.S. Air Commodore, R.A.F. Honorary Physician to the Queen.

C.B.E. (Civil Division)

CYRIL JOHN AUSTIN, O.B.E., M.B., Ch.B. Lately Medical Superintendent, Leprosy Hospital, Makogai, Fiji.

KATE ISABEL CAMPBELL, M.D. For services to medical science in Australia.

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JAMES THOMAS CURRAN, M.B., Ch.B. Group Physician Superintendent, Lennox Castle and associated institutions, Lennoxtown, Stirlingshire.

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THOMAS FERGUSON, M.D., D.Sc., F.R.C.P.Ed., F.R.F.P.S., D.P.H. Professor of Public Health, University of Glasgow.

CHARLES MONTAGUE FLETCHER, M.D., F.R.C.P. Physician and Senior Lecturer, Postgraduate Medical School of London.

MUSTAFAH BIN OSMAN, M.B. State Medical and Health Officer, Kedah, Federation of Malaya.

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EUSTACE ALWYNNE ROWLANDS, V.R.D., M.B., B.S., F.R.C.S., F.R.A.C.S. Surgeon Commander, Royal Australian Naval Reserve.

DAVID WRIGHT, D.S.O., M.B., Ch.B., F.R.C.S.Ed., Lieutenant-Colonel, R.A.M.C. In recognition of non-operational services in Japan in connexion with operations in Korea.

O.B.E. (Civil Division)

WILLIAM ARTHUR ANDERSON, M.B., Ch.B., J.P., of Queens-town, New Zealand. For services to the community.

GEOFFREY OSBORN BARBER, M.B., B.Chir. Lecturer in General Practice, St. Mary's Hospital Medical School.

LOUIS GERARD BLAZÉ, L.R.C.P.&S.Ed. Lately Acting Deputy Director of Health (Medical Services), Ceylon.

REGINALD MURRAY DUNSTONE, M.B., Ch.B., J.P. For public and social welfare services in the Commonwealth of Australia.

MACORMACK CHARLES FARRELL EASMON, M.D. Senior Medical Officer, Sierra Leone.

DENNIS HERBERT GEFFEN, M.D., D.P.H. Medical Officer of Health, St. Pancras and Hampstead.

JOHN THOMSON GUNTHER, M.B., B.S. Director of the Department of Public Health of the Territory of Papua and New Guinea.

GOPAL HARIDAS, M.D., M.R.C.P. For services to the St. John Ambulance Brigade and movement in Singapore.

SAMUEL HORTON OLUWOLÉ JONES, M.B., Ch.B., D.T.M.&H. Colonial Medical Service. Director of Medical Services, Gambia.

JOHN WILSON McCAGIE, L.R.C.P.&S.Ed., L.D.S. Lately Senior Medical Officer, Ministry of Pensions.

VATAPAKAT RAMANMENON NARAYANA MENON, M.B., B.S. Medical Officer, Dindings, Federation of Malaya.

The Reverend Sisier MARGARET MARY NOLAN, M.Ch., M.A.O., F.R.C.S.I., F.R.C.O.G., D.T.M.&H., D.P.H. For medical and missionary work in Nigeria.

BERTIE SOUTAR SIMPSON, M.B., Ch.B., F.R.C.S.Ed., J.P. Consultant Surgeon for the County of Sutherland.

JAMES ANDERSON SMILEY, M.D., D.I.H. Factory doctor for East Belfast. Special Lecturer in Occupational Health and Lecturer in Forensic Medicine, Queen's University, Belfast.

HENRY GEORGE TRIAY, M.D., D.C.H. For medical services in Gibraltar.

HUBERT CAREY TROWELL, M.D., F.R.C.P. Colonial Medical Service Specialist (Physician), Uganda.

WILLIAM HENDERSON WATSON, M.D. Medical Officer in Charge, Mental Hospital, Nyasaland.

M.B.E. (Military Division)

ANTHONY ST. CLAIR REX DE COSTA, M.B., B.S. Captain, Ceylon Volunteer Force.

CHRISTOPHER BERKELEY WYNN-PARRY, B.M., B.Ch., D.Phys.Med. Acting Squadron Leader, R.A.F.