

PN-AEI-617

ISN 72576

Health and socioeconomic development.

614 Wilenski, F.

W676 Health and socioeconomic development. 1971(?)

94 p.

Bibliography: p. 87-94.

1. Health. 2. Public health - international cooperation.
3. Medical care. 4. Medicine, preventive. I. Title.

P. Wilenski

Government 284

A.I.D.
Reference Center
Room 1656 NS

UNITED STATES AID MISSION TO LIBERIA

c/o American Embassy
Monrovia, Liberia



April 21, 1971

Mr. Charles P. Edwards
Principal Advisor in Public and
Development Administration
Technical Assistance Coordination
Bureau for Africa
Agency for International Development
Washington, D. C. 20523

Dear Mr. Edwards:

Responding to yours of 15 April, I am pleased to be able to comply with your request. The pre-publication "bootleg" copy of Dr. Wilenski's paper is being pouched herewith as requested.

Since this is the only copy I have and I find it continuously useful, I would appreciate it if you could arrange to have it reproduced and a xerox copy sent back to me by return mail.

In the event you may wish to invite Dr. Wilenski to Washington to discuss his paper, the last address I have for him is care of the Ministry of External Affairs, Canberra, Australia. Dr. Wilenski was also considering accepting a teaching appointment at a university in the UK.

Sincerely,


David Levintow
Acting Associate Director
for Development Services

Encl
as

| | Page |
|---|------|
| INTRODUCTION | 1 |
| SECTION I: THE TRANSFER OF WESTERN MODELS OF MEDICINE | 3 |
| SECTION II: HEALTH AND ECONOMIC DEVELOPMENT | 17 |
| SECTION III: ADAPTATION AND INNOVATION IN HEALTH CARE DELIVERY SYSTEMS | 34 |
| Decision-making in the Health Sector | 36 |
| Health Worker Roles | 59 |
| Medical Institutions | 75 |
| SOME IMPLICATIONS FOR INTERNATIONAL ASSISTANCE PROGRAMMES | 82 |
| REFERENCES | 87 |

Introduction

The relationship between health care and socioeconomic development is a complex one. Standards of health directly and indirectly affect the rate of development; at the same time good health care itself is a major objective of the development process.

It is a commonplace today to say that what the developing countries need is a greater emphasis on preventive as opposed to curative medicine. But the problem is more difficult than that. For a start the relationship between even preventive measures and socioeconomic change has been little researched. Then, curative services cannot be ignored - a demand for such services has been created and there is now no returning to earlier stages of medical development. And the existing delivery system for both curative and preventive services is little adapted to the needs of poor countries. It is to the examination and reform of these systems and their relationship to economic development that this paper is primarily addressed.

(There are of course factors affecting health apart from medical services. These are not ignored, but the primary attention of this paper is on medical services - on which government in developing countries spend, on average, 8 to 15% of their budgets [W.H.O. 1968, p. 93]. To keep the paper to a manageable length also the question of medical measures for population control is not discussed as they are ~~only~~ an adjunct to more important

economic, social, and cultural measures in this area).

**SECTION 1: THE TRANSFER OF WESTERN MODELS OF
MEDICINE.**

For a long time, those concerned with health in developing countries regarded their major task as simply the application of the maximum amount of Western resources and personnel to tropical medical problems. Their aim was first to assist indigenous peoples, and eventually to educate numbers of them to carry out, on their own, the medical practices and techniques originally developed in the West. The more enlightened of the medical profession recognised that attitudes to health among indigenous people were an integral part of their life-style and beliefs: these were not "irrational" prejudices to be broken down but rather an effort had to be made to understand the recipient culture so that modern medical practices could be made acceptable to it.

[Spicer p. 3-10] It is only in very recent times, however, that sections of the Western medical profession have begun to realise how culture-bound is our own system of medicine and how ethnocentric are our own beliefs as to what constitutes "good" or "bad" medical practice. [Foster p. 166-170]

The Western model of medical care developed in response to particular social, economic, technological and epidemiological factors in Western societies. Not only has medical research been directed to problems and areas most relevant to the needs of industrialized countries, but the new techniques which medical research has provided are geared to a society with levels of consumption, degrees of literacy, capital-labour ratios, and cultural norms very different from those in developing countries. The health delivery system is based on the

15

individual doctor-patient relationship and has filled a particular need for sections of our own society, but has often been found wanting for the poor and disadvantaged, even in industrialised countries-which raises immediate doubts as to its relevance elsewhere. Decision-making structures on medical care are often of an informal nature. Again, these were sufficient when the health sector used up only a small fraction of the national resources; but in recent years, even Western countries have had to re-examine both the division of resources between the health sector and other sectors and the methods by which resources are allocated within the health sector itself. Developing countries can afford waste even less than can industrial ones. The lack of "fit" of the Western model of medicine into the cultures of developing countries is accentuated by the adoption, by most of those countries, of economic development as an overriding national goal - a goal which has had little role in the development of medical care systems outside the Communist countries.

The remainder of this section will explore in greater detail the relevance of Western patterns of medicine to developing countries, especially as regards a) biomedical technology, b) the organisation of health delivery systems, and c) techniques for the allocation of resources to different health activities. The ~~second~~^{third} section of the paper will return to this theme and discuss models and institutions better fitted to strengthen the links between medical care and economic development, and some attempts in newly independent countries to introduce new

6

institutions and some obstacles to their acceptance.

a) Biomedical Technology

It is widely believed that there are at our disposal the medical means to cure the world's ills, and that all that is lacking is the will and the money to apply them. McDermott [1966] has pointed out that this is not so. For many of the most important diseases occurring in developing countries we have no specific decisive preventive or curative measures.

Some diseases have never been major problems in the West. Medical technology does not yet exist for the elimination of hookworm, or liver fluke from South East Asia, or schistosomiasis endemic in the Middle East and elsewhere.

Equally important are the diseases which were eliminated or greatly reduced in industrialised societies without a full understanding of their aetiology or therapy - what McDermott terms an "historic bypass" [1964 p. 664]. This applies in particular to the pneumonia-diarrhoea complex of early childhood. This is the major killer of infants in developing countries, and, at the beginning of this century, was the major cause of infant mortality in such industrialised cities as New York. The pneumonia is caused usually by a virus; in the case of the diarrhoea no particular organism can be identified as the major or single cause - thus in most cases, there is no decisive antibiotic therapy that can be applied. In Western societies, the incidence of infantile pneumonia and diarrhoea has fallen with higher

living standards, better nutrition and improved sanitation - but we do not know the specific reason for the decline, nor whether there is any method of transferring it without the general improvement in socioeconomic conditions. [McDermott 1966 p. 138-144].

However, even when there is no gap in biomedical technology, the techniques that have been developed are often too expensive to apply in developing countries. Medical research has not been as cost-conscious as industrial research. Medical services have been provided on a cost-plus basis and the attitude has been that no price is too high for good health - until the enormous increase in medical costs recently has caused questioning even in the United States. Research in the medical area often increases the demand for personnel and resources because in the words of the report of the Secretary Advisory Committee on Hospital Effectiveness "it keeps creating new things to do, instead of just new ways to do things." [cited by Field 1969].

Furthermore, the vast bulk of medical research has been directed into producing a technology which can be applied through the patient-doctor relationship by the individual practitioner. Research into forms of health care that can be applied cheaply to large numbers by non-^{professional}~~professional~~ personnel has been largely neglected.

As in other fields, what is needed is an "intermediate technology" appropriate to the economic level and resource structure of developing countries. Thus we have devised a

technology of detection, therapy, and prevention of tuberculosis which has virtually eliminated that disease in industrialised countries - but it is of little use in a country where the total sum available for medical care and administration is less than one dollar per head per annum. The systematic search for an intermediate technology in medicine has ~~hardly~~^{hardly} begun.

An advanced and complex medical technology has had as its concomitant a highly differentiated and specialised medical profession. In wealthy countries, both the technology and the specialisation have arisen in response to the demand for more sophisticated medical services (though there is obviously a lot of feedback - technology influences demand). In developing countries, there is a similar trend towards specialisation within the medical profession, for which technology provides a justification but which is divorced from the economic demands of the society in which the health system is embedded, and hampers the process of meeting these demands.

b) Health Delivery Systems

Modern medicine is firmly based on the individual doctor-patient relationship: on individual patient care by a physician or a small team under the direction of a physician. This system developed naturally from the traditional medical system ~~when~~^{in which} technology had little to offer, and the relief afforded the patient relied largely on his relationship with the doctor. As income levels rose and specific cures were found for many individual diseases this new technology was introduced into the

relationship.

It is important to note that this is a system which depends heavily not only on the individual practitioner, but also on the actions of the individual patient. It is the individual who decides when he is "sick." It is the individual who decides whether to try patent remedies or traditional cures, or to seek medical advice. Finally, it is the individual who decides whether to follow the physician's directions and consume his nostrums. Thus to work efficiently, the system requires a literate population with some sophistication about disease and some faith in the medical profession.

With increasingly complex technology, the doctor-patient relationship has been modified but even if the patient is now treated by a different specialist for each complaint, or is in a hospital, the basic pattern of the provision of clinically decisive medical services by the individual doctor (or by others under his personal supervision) in conformity to the specific needs of the individual patient, has been maintained. The World Health Organisation in 1964 classified current medical expenditures in a number of countries into three categories: training and research; environmental public health services (control of food and water supplies, vector control, sanitation); and personal health care. In both Sweden and the U.S., the percentage devoted to personal health care was a little over 96%. [Btsh p. 42].

This same pattern of medical care - though often delivered

by a medical assistant or other subprofessional in a health centre - is the dominant one in developing countries. Figures, from the same survey, for Chile and Ceylon show 90% and 94.4% respectively of health expenditure allotted to personal health care. There has of course for centuries been a traditional relationship between the villager and the indigenous healer, but the new system is not developing from this one but is being set down side by side with it, and is often undermining it. This does not mean that all delivery systems throughout the developing world are the same as those in the West, or even that all Western ones are the same [see Abel-Smith¹⁹⁶⁴]. But the central one-to-one doctor-patient relationship has been retained as the means of delivery, even when, as in the L d c's, it has been largely separated from its original rationale of providing comfort and psychological support. Further, it has been retained even though it is clear that the medical and economic environments are ill-suited to the system. As outlined above, for many of the diseases in developing countries, there are no clinically decisive treatments available, there is an urgent need for preventive as opposed to curative medicine, numerous communicable diseases require primary emphasis to be placed on environmental control, the population is for the most part rural and poorly educated, and economic considerations mean that a system of individual patient care cannot provide high standards of care to more than a small proportion of the people.

What has been said here about the doctor-patient.

relationship applies also to the institutions that have grown around it. The hospital, as it developed, accommodated its practices partly to meet the needs of physicians and specialists associated with it, and partly to provide the best possible care to the individual patient once he had been admitted to it. It concentrated on the productive rather than on the distributive aspects of health care, and was not primarily concerned with the overall health pattern of the community around it. "Most hospitals today have no knowledge of community-based health indices, no particular concern for how well the community is doing. No one is assigned responsibility for knowing; no one seems to care. It is almost as if hospital officials expect the people to serve the hospitals (by creating a flow of patients) rather than the hospitals to serve the people; only their worthy motives keep hospitals above suspicion." [Sigmond, p. 101].

It is perhaps as well to insist at this stage that it is not suggested that individual patient care has no place in developing countries - peoples' expectations have been awakened and cannot be neglected, and some services such as surgery can only be met on an individual basis. Furthermore, experts in industrialised societies must be careful not to suggest a system of second rate medicine for the peoples of developing ones. Some economics-oriented writers skirt dangerously near to the attitude which a pre-Revolution Russian doctor, Mitskevich, attributed to the Russian nobility and gentry whom (he said) thought that "the peasant Muzhik is not accustomed to, and

does not need scientific medical assistance, his diseases are "simple" and for this a feldsher (medical assistant) is enough - a physician treats the masters, and a peasant is treated by a feldsher." [Field, 1967 p.48].

What is suggested here, on the otherhand, is that the application of Western models has too often resulted in a system where a small proportion of the population receives first-rate medical care by specialists in the diseases of the urban rich, and the rest of the population receives fourth-rate medical care or none at all. The application of medical technology in different ways could result in a delivery system geared to the problems of the country, its economic resources, and the goal of economic development.

A technologic "misfit" in health delivery systems implies of course a misfit in other portions of the health sector which are geared to the inappropriate system, and in particular, a misfit in medical education and medical research. We shall discuss these in the following sections as well as alternative formulations of the physician's role. But it might be mentioned here that there is perhaps also a "misfit" in medical morality. Medical morality has always emphasised the doctor's responsibility to do his utmost for the individual patient. Doctors will acquiese to new patterns of medical care only when they acknowledge that they have an equal responsibility for lowering infant mortality rates and similar indices of the ill-health of communities as a whole. This new ethical code has been termed by

Waddington, "statistical morality." The realisation that the medical good of the bulk of mankind can best be furthered by concentration on influencing such statistical parameters as infant mortality, and not on personal relationships may be the necessary moral basis for effective medicine in the "Third World."

c) Structures for Decision-Making in the Health Sector

There are in industrialised countries (outside Eastern Europe) at least two patterns of decision-making in the health sector. One thing they have in common is their relative uselessness as a model for developing countries.

In the United States, rugged individualism has been the underlying philosophy - each small unit has made its own decisions in accord with its own goals, and rarely have there been coordinating bodies with overall responsibility for community health - though this overall pattern is beginning to change. In Europe, there has been much greater public control of health services and public ownership of health facilities dating back to the philosophy that the community was responsible for the medical care of the poor. Public ownership has necessitated more centralised decision-making in some health areas (and of course in some countries grew into a National Health Service) but the decision-making processes have not been integrated into the overall economy, except occasionally as politics demanded. Nor have they been much influenced until very recently by systems analysis or cost-benefit analysis - no price is too high for good health.

European colonisers introduced the European system of

salaried physicians in hospitals and dispensaries into their dependencies, at first for the benefit of the colonists themselves and later for the indigenous peoples. "The physicians were paid by salary. These services were supplemented in some countries (e.g. India) by indigenous charitable effort and in all countries by medical missionaries. Thus the low income countries have developed a high proportion of publicly owned hospitals and salaried physicians." [Abel-Smith, ¹⁹⁶⁴ p. 34]. However, although there was public control, Western countries had little to offer in the technology of decision-making. Centralised control is not sufficient for the formulation of rational policy and indeed a high degree of control may be unnecessary (or a hindrance) if the right structures exist at a regional level. Decision making is discussed at length in Section III but it is of interest to note here that, with the recent upsurge of interest in, and education for, health planning in the U.S., many educators have had to turn for direction to the work done for developing countries.

A Preliminary Model

This outline of problems suggests a model which might assist consideration of changes in the health sector. The medical care system is a sub-system of society as a whole - a sub-system which is essential to the maintenance of society and which can play an important role in its evolution. Society provides certain inputs into the system - economic resources, personnel, and "political" support. (By political support, we ...

mean that society acknowledges that actors in the health sub-system legitimately may make the decisions on questions of sickness and health.) It also obviously makes demands on the health sub-system for service. The output of the sub-system are these services and demands for resources. These inputs and outputs are of course interrelated e.g. it is becoming evident now that not only does a greater demand for services from the health sector result in a greater demand by the sector for resource inputs, but also that a greater supply of resource inputs into the sector, once society becomes aware of the extent of the drain on its resources-as happened in the United States in the past few years - results in demands for more services or a different form of services.

The sub-system has its own self-regulatory mechanism. The demand of society are interpreted and fed into the system by a decision-making structure that may be formal (as in the Soviet Union) or informal as in the United States. An informal decision making process may consist merely of the sum of decisions of a number of interconnecting elites with particular areas of responsibility and some ^{shared} basic values. This planning body or informal network is responsible also for decisions about the maintenance of the sub-system, i.e. about the structure and content of medical education and medical research, which in turn reinforce the pattern of the health delivery system.

It is suggested here that in many developing countries the actors in the decision-making structure of the medical sub-system

have, by their education and training, acquired values relevant to the societies in which they were trained (or in which their teachers were trained) but potentially harmful to the society served by the health system. these actors now control. Of course if there is to be change in a society, then key actors will have to hold different values to the bulk of the society's members - "perfect fit" would lead to stagnation. However, the lack of orientation of the majority of the medical elite towards the major goal of the nation - economic development - has meant that the changes effected in and by the health systems of developing countries have had at best a random relationship to that goal.

SECTION 11: HEALTH AND ECONOMIC DEVELOPMENT.

18

The link between health expenditures and economic development has a relatively new, and still very small, place in economic and development literature. The accumulation of capital has traditionally been regarded as the main engine of economic growth. However, the demonstration by Solow, Denison and others that the growth of G.N.P. in the industrialised countries could not be accounted for simply by increases in the quantity of capital and the size of the labour force re-focussed attention on technological progress and the "residual." More recently has come the suggestion that the traditional division between investment and consumption expenditures has confused rather than clarified understanding of the causes of long-term economic growth. The rise of the concept of "investment in man" has led to a changed economic approach to education and, in the last few years, to medical care.

Thus health measures are no longer regarded by most economists as merely services satisfying the consumption needs of the people. These consumption expenditures are now recognised as being of a special type (termed "development consumption" in the public health literature [W.H.O. 1967 p. 12]) which, like investment, leads to increased production in the future, and which must be integrated into national planning for economic development.

National economic planners in many countries, however, still implicitly or explicitly take the view that the health sector in the national budget can be cut down to the minimum consistent

with political pressures and humanitarian feelings. A widespread view persists that health expenditures hinder economic development. Improved health measures, according to this argument, lead to a higher rate of population growth which wipes out, in per capita terms, any growth in total G.N.P. to which they may contribute. In any case, the contribution of health measures to total G.N.P., the argument runs, is very small because even if they result in more and healthier workers the existing work force is already underemployed with a marginal productivity of labour of zero, or close to it.

It is not surprising that the above view persists, as the links between improved medical care and economic development (and population growth and economic development) are complex and poorly understood. The effects of any health measure depend on a variety of other factors which interact with it; the effects on economic development of a health programme depend at least in part on the extent to which the programme is planned with that end in view. I attempt to set out below the current state of knowledge on the economic effects of health expenditures in developing countries. Although this knowledge is still limited, it will at least be possible to demonstrate the deficiencies in the above attack on the health sector (an attack which is often heard). Hopefully, a basis will also be laid for the discussion in the rest of the paper of more rational health policies in the developing countries.

The economic benefit of any individual activity which

20

which improves an individual's health is very simply measured as the value of the labour product which would otherwise have been lost as a result of the individual's illness or death. Unfortunately, to assess the economic benefits of an entire health programme, we cannot simply sum the effects of the individual measures. For there is a *ceteribus paribus* assumption involved, and if we wish to judge an entire programme we cannot assume that other things are equal, as the programme will have effects throughout the economy. As a first approximation, the effects of health measures are divided below into their "qualitative" and "quantitative" aspects. Qualitative effects include not only changes in morbidity but also changes in the outlooks and life-styles of the population and other miscellaneous effects. Quantitative effects are not only the changes in mortality from different diseases but also the indirect short and long-run effects on age-structure and population growth rates.

Qualitative Effects

Qualitative results of health measures may be seen primarily in their effect on the individual worker. The following changes in the labour force some obvious, some less obvious, have been noted:

- a) improved health increases the productivity of workers already on the job
- b) a decline in morbidity rates means a decrease in absenteeism. This means a decline in the total labour force needed for any

projects, a shortened period of training, and an increase in skills. Thus, the Rio Doce Valley Railroad Company in Brazil during the 1940's when malaria and diarrheal diseases were endemic had a payroll three times as large as it would "normally" require in order to ensure a sufficient turnout on any particular day. An anti-malaria campaign and the introduction of other health measures reduced requirements from 3 times to 1.6 times the minimum labour force. [Perlman p. 245] ^{Other cases} In the Phillipines, South Africa, and Southern Rhodesia, documents ~~show~~ sharp reductions in the rate of absenteeism and total labour requirements following anti-malarial campaigns [Winslow p. 22-25].

c) Health measures have a synergistic effect with other inputs, especially education. Education statistics in developing countries mask a high rate of absenteeism and of early drop outs. A child who attends school irregularly obviously gains little benefit and many "enrolled" children do not even acquire functional literacy. [Myrdal pp. 1722-9]. But even the child who attends fairly regularly gains very reduced benefit if he is ill and inattentive, or partially blind or deaf. The effect, for example, of impaired vision due to trachoma and conjunctivitis on education should not be underestimated. In a study of ^{Thai} 592 children between the ages of 10 and 14 (who, incidentally, were found to suffer from a total of 1,863 diseases, defects, or parasitic conditions) 67% were afflicted with trachoma [cited in Myrdal p. 1609]. Approximately 65% of a sample of 0-19 year olds

in four Ethiopian villages were found to be suffering from acute or subacute conjunctivitis (Spuyt et al. p. 36). Furthermore, it is being increasingly recognised that the malnourished child with diarrhoea (i.e. the average child in many parts of the world) can suffer brain damage which results in a permanent mental retardation and reduced educability. (Nelson) Obviously, an increase in health expenditures in some areas would greatly increase the returns from education.

Also a lengthening of life expectancy of an "educated" man, at whatever level, increases his productive years and thus the return on the education invested in him. To look at it another way, it "reduces the rate of depreciation of investment in education." [Mushkin 1962 p.131]

(A high probability of premature death or disabling illness also distorts optimal manpower planning because of the mathematics of ensuring that there is a good chance that sufficient trained men survive.

"Not only must more persons be trained than still survive to be employed but also the expected number of survivors must exceed the number required by the manpower plan for any desired probability level of obtaining the required number. The ratio of the expected number of survivors to the required number is higher when the required number is small and is an increasing function of the planners' desired probability level. Thus, high mortality rates make it desirable to train men who are expected to be redundant with the greatest expected redundancy in the most specialised skill." [Feldstein p.7]).

d) Improved health changes attitudes and motivations. A number of observers (Malenbaum, 7, Muskin 1963, p. 8) regard this as probably the most important causal mechanism : high mortality

and morbidity rates breed hopelessness while medical improvements demonstrate the possibility of change and present dramatic evidence of man's ability to control his environment. Unfortunately, this effect has been little studied specifically though many case studies have shown the impact of health services, once accepted, on community life [Paul]. Present experience at the Tufts-Delta Health Center in Mount Bayou Mississippi [Malenbaum p. 7] also provides evidence for the importance of this mechanism in economic progress.

Some authors drawing especially on the mood changes -in the direction of apathy and irritability- described by ^{Keys} ~~Joyce~~ et al in experimental subjects with reduced caloric intake, have gone so far as to suggest that the combined effects of illness and malnutrition amount to a "disease syndrome of underdevelopment". This is said to be a serious obstacle to modernisation. Thus Stauffer [1969] :

"Two politically significant clusters of attitudes, each directly associated with features of the disease syndrome of underdevelopment, have been identified. One falls under the general term "apathy". Deficient caloric intake has been found to produce changes in "normal" attitudes in the direction of "apathy," and a variety of parasitic diseases to enforce the pattern. Much of the lack of drive, the "laziness" and indolence, the propensity to sleep, the willingness passively to accept fate, and other similar attitudes attributed to the people of underdeveloped societies by observers from outside, can be largely explained by these biological conditions. In a similar fashion, a group of attitudes best described by the word "irritability" is produced by these same physical conditions. Certain behavior patterns frequently described as commonly prevalent among people living in underdeveloped societies may be related; examples include suspiciousness, quick temper, hostility, and possibly some of the behavior that is frequently subsumed

under the term "anomic". (p. 377)

If the effect on the life style of the individual is indeed the most important of links between health measures and economic development, then clearly the lack of precision in our understanding^{of} this effect is a serious obstacle to rational health planning.

The above are the major qualitative effects on the labour force that have been ascribed to health measures. One other special case -where health measures are complementary to new land use- may be briefly noted. The eradication of a particular disease (e.g. sleeping sickness, malaria) may open up a previously uninhabitable region and increase the amount of land or minerals available for production, as in Ceylon, Nepal, Mexico and elsewhere. The provision of a certain standard of health services may also in particular cases be required to attract experts and skilled workers, whether local or foreign, to a particular region.

Quantitative Aspects

There can be little doubt that measures designed to improve the health of a population cause a decline in mortality rates, and at least in the short and medium-term accelerate the rate of growth of population. They probably also increase birth rates through their effect on maternal health and parental fertility. Furthermore a high rate of growth of population implies a higher dependancy rate i.e. there is a higher proportion of the young who are pure consumers -an effect which is only slightly offset

by the increased participation rate in the workforce due to participation by individuals who would otherwise be disabled. These factors on the whole tend to increase consumption more than production and ~~thus~~ to lower per capita income.

This is the basic "population" argument against health measures and insofar as it goes it is correct but much more needs to be said. The argument is most seriously undermined by the body of evidence that social and economic factors other than improved medical care have been responsible for the major portion of the increase in world population and that modern medicine, and even sanitation, has played a relatively small role [Taylor and Hall]. (The overestimation of the effects of health measures on mortality rates has in part been due to the exaggerated claims of public health authorities themselves).

Mortality in Europe declined in the nineteenth century long before the introduction of specific disease control measures, (half of the decline was due to a decrease in TB mortality for which no treatment at all was available.) An increased standard of living and especially improved diet was the major cause [McKeown]. A reexamination of the causes of increased rates of population growth in developing countries is similarly displacing health care measures as a major determinant. Thus in Ceylon the post-war antimalarial campaign had long been "blamed" for increased population pressure but Fredericksen [1960] has shown that the sharp decline in mortality preceded the mass campaign (and was in fact part of a long term trend interrupted by the war

[Fredericksen 1961]). Furthermore he demonstrated that the decrease in mortality in the malarious areas where the campaign was conducted and in the unprotected nonmalarious areas has been almost the same. Country by country analysis in fact shows a strong statistical correlation simply between per capita income per se and decreased mortality ^{rates} (Taylor and Hall p. 651). Not just health programmes but any programme resulting in economic development stimulates population growth.

(The linkage in the other direction i.e. the impact of population growth on per capita income is too broad a subject to be fully discussed here, but it should be noted that statements such as "total GNP rose by 5% but a growth rate of population of 3% cut the increase in per capita income 2%" usually exaggerate the deleterious effects of population growth and oversimplify complex relationships. Not only do programs which create rises in per capita income also result in population increases but population increase itself in most cases contributes something to economic growth. The marginal productivity of labour is rarely, if ever, zero, and even where it is, this may be due to institutional factors which are changed by the same factors which lead population to increase. The population explosion is a major problem but as Liebenstein [1957] and others have pointed out, its ^{relationship to economic development is} ~~is~~ more complicated than is generally recognised in public discussion.)

Health programmes of course also ^{may} have an effect in the opposite direction i.e. in lowering population growth rates.

In the short run, it seems that family planning techniques have the best chance of acceptance when they are integrated in a larger health plan [Taylor and Hall p. 655-6]. In the long run a decline in infant mortality rates may be a necessary precondition for lowered birth rates. Parents in developing countries are concerned about the number of children still alive when they reach old age, want to have a son to carry on the line and so forth; they have to have many children to insure that one or two will survive. Thus the "survival" effect is very important [Liebenstein Ch. 10]. Once again the laws of probability (as learnt by experience) accentuate the fall in the birth rate with better chances of survival

"If 'desired family size' is interpreted as a target number of children surviving to adulthood, the number of births must increase as the probability of survival through childhood decreases. If the number of births were increased just enough to make the expected number of surviving children equal to the desired family size, a lower survival probability would increase the actual population size and the proportion of children but would not affect the rate of population growth. It is therefore more important that a lower survival probability increases the parents' uncertainty about how many of their children will reach adulthood. If parents want some minimum probability of achieving their desired family size, then the ratio of the expected family size to the desired family size must increase as the probability of survival decreases towards one-half. Thus, even with a constant desired family size, the rate of population growth will be higher as the probability of survival falls". [A. Feldstein p.6]

In sum one can admit that health measures in the short and medium term will increase population growth, but the same charge can be made legitimately against most other measures promoting economic development, and the effect of health measures in the past

has been greatly exaggerated.

Qualitative and Quantitative Effects Combined

It is clear from the discussion above that while health measures can have an overall favourable effect on economic development, the relationship is a complex one for the economy as a whole. Moreover the planner will have fewer empirical studies or theoretical models to guide him.

Malenbaum [op. cit.] has attempted to correlate variations in agricultural output with health inputs. He examined differences in agricultural output as between different developing countries, different provinces in Thailand, different blocks in India, and different points in time in Mexico, and in each of the four cases attempted to correlate the variation with changes in such variables as participation rate of the work force, use of fertilizer, irrigation, and health and education inputs. In three of the four cases health inputs "explained" a sizeable proportion of the variation in output. However the basic statistics used in this study were very crude and the results are at best suggestive and say nothing of the direction of causal linkages.

Enterline and Stewart have devised a simplified economic model with which they measure changes in per capita GNP resulting from increases in population growth and related changes in age composition of the population. Their findings suggested that the changes associated with an increase of life expectancy at birth

from 30 to 32.5 years require an increase of 0.8% in ^{annual?} output per worker in order to maintain per capita income. An increase to 40 years would require a productivity increase of 5.2% by the time the changes had worked themselves out. Using this model Mushkin [1963 pp. 12-16] calculated that it would be quite reasonable to expect increases in productivity of these magnitudes from health programmes which increased life expectancy by the relevant amounts.

Various other simplified models have been devised [e.g. see U.N.R.I.S.D. [p. 26] for a model which includes social variables but neglects the impact on population growth) but there has been only one attempt to apply the approach empirically. Barlow [1967] developed a model of the economy of Ceylon through which he attempted to show (taking into account both productivity and population effects) the probable change over time that would have occurred in Ceylon's per capita income had malaria eradication not been introduced after World War II. He calculated that in the late 40's actual per capita income exceeded the hypothetical figure by 10% but by 1955 because of differences between the hypothetical and actual population growth rates the hypothetical (no eradication) figure for per capita income was overtaking the actual. His model has however been criticised both as to its assumptions and on the grounds that he underestimated the impact of malaria eradication on productivity e.g. on maintaining exports. Certainly the model ignored all but the immediate economic effects of decreased morbidity and took no account of

the social changes produced by an effective mass campaign of this nature.

Some Implications

The most pessimistic implications of both the inter-relatedness of the effects of health measures with other factors, and of the present deficiencies in our knowledge of their impact, are drawn by Myrdall [1968 p. 1618] as follows:

"From the planning point of view the effect of any particular policy measure in the health field depends on all other policy measures and is, by itself, indeterminate. This means that it is impossible to impute to any single measure or set of measures a definite return in terms of improved health conditions."

But this is a counsel of despair. A significant proportion of government expenditures will continue to go to the health sector; These expenditures can at the least be spent more efficiently than they are at present, and at best can positively promote economic development. ^{*Their favourable qualitative effects, if well planned, can outweigh any unfavourable impact on population rates.*} Even if a full social cost-benefit analysis of each health project cannot be undertaken, the discussion to this point has already drawn attention to a number of guidelines at present neglected. These issues are returned to repeatedly in the remainder of the paper, but one or two of the implicit lessons in the above analysis may be briefly spelt out here.

First, in addition to attempting to meet the felt needs of the people the planning of health programmes demands attention to their qualitative and quantitative effects on each of

the populations concerned -even if very often no precise numbers can be placed on these effects. The consideration of the economic impact of health measures is not a traditional concern of health planners nor one to which primary attention need be devoted in Western countries. As a result, techniques and practices of health planning (such as they are) in the West are not necessarily those appropriate to developing countries. Nevertheless even the most basic assesment of their economic considerations would result in drastic alterations in many existing programmes.

While the assesment of the primary effects of health programmes in terms of diseases prevented or cured, rather than hospitals built is a first step, it seems that much more systematic attention must also be given to the changes induced in the attitudes and outlooks of the client population. Health programmes are instruments of change; health workers are agents of change. If this change is to be directed and purposive much research needs to be done.

A very simple ^{example} may be given as to how even without elaborate techniques or expensive research, more rational choices may still be made among health activities. Let us take the example of a foreign aid request for, say, the provision of a surgical unit.

The aid administrator faced with such a request, provided it comes within the scope of ^{his} its budget, will usually ask three types of question. First he will ask whether it will really "benefit" ~~benefit~~ the people in some readily demonstrable way

i.e. will it be fully utilised? Second he will ask (especially if he has been caught out before) whether there are available the local resources and personnel to run and maintain the unit -and whether the local government is committed to supplying them. Finally he will ask whether the facility is of a type that can be supplied by the country he represents.

Let us suppose that the answers to these questions are in the affirmative and examine the possible results. First we will find (hopefully) that the facility is working well and the number of surgical patients that have been effectively treated has markedly increased. Often this is as far as we look. But a more extensive search may reveal that the unit has drained resources from other parts of the hospital and that given that the vast majority of diseases in the area are communicable and non-surgical in nature the overall impact on the health level of the community is negligible. Certainly it is not as great as could have been achieved with the same expenditure in other directions. But the deleterious effects may be more far reaching -for the provision of the unit has diverted medical personnel from other areas and the glamour attached to it has further distorted medical values away from the fundamental problems of the country. [Stapleton 1968 p.3]. The demonstration effect has moreover stimulated the demand for similar facilities elsewhere. And once a project has been "successfully" carried out in one place, it is all too easy to accede to demands for it elsewhere.

These criticisms do not lead one to the conclusion that

there should be no modern surgical facilities in developing countries -only that their location and nature should be nationally planned and integrated into the medical system. Nor does this mean that the questions asked by the aid administrator are the wrong ones -they are simply not the only relevant ones. At the least one might ask how any proposed programme will affect the health pattern of the community, taking other diseases into account -and whether such a change might not be brought about more simply and cheaply with fewer undesired side-effects. Ideally one might also look at the impact of the programme on the work force taking into account the existing level of under-employment, the impact of the programme on the outlook of the people, its impact on the rest of the delivery system and on indigenous medicine, its impact on population rates and so forth -but it is clear that the "information cost" of such enquiries is far too great for all but the most massive projects. The point being made here is that a rational consideration of the probable immediate impact of any programme on community health and a brief search for alternatives would already be a great step forward. A basic awareness on the part of health planners of the links between health and economic development would similarly lead to an immediate increase in the rationality of health planning.

SECTION III

ADAPTATION AND INNOVATION IN HEALTH CARE
DELIVERY SYSTEMS

This paper has so far argued that while health measures can play an important role in socioeconomic development (Section II) the Western medical system is an inappropriate vehicle through which to achieve this end (Section I). This third section examines a number of medical processes and institutions in developing countries. The aim is both to see how Western models have been adapted to local conditions, and to examine alternatives suggested by the concept of technological "misfit" and the goal of economic development. Obviously no one comprehensive programme will match the different problems and resources of different areas and no attempt will be made here to set out detailed prescriptions. However one can indicate general approaches and innovations which ^{the} analysis suggests would result in major improvements in existing systems. Three areas, in particular, will be explored:

- a) Decision-making in the health sector;
- b) Health worker roles -especially the role of the doctor and the "auxiliary"
- c) Medical institutions -hospitals, health centres, research institutes, and medical and paramedical schools.

Decision Making in the Health Sector

This chapter first presents a general overview of some of the elements of present practices in health planning in developing countries and how these practices were established. It then examines a number of proposals for change and discusses their merits and deficiencies. Some suggestions are made as to the essential components of a framework for decision-making in this sector.

Health planning is perhaps the area in which Western medical experience has least relevance to the problems of developing countries. Health services in many Western countries, and in particular in the U.S., have grown like Topsy, responding to increased demand here, altering to meet the internal pressures of the medical system there. Their development in any area has been guided by loosely connected and sometimes competing decision-making institutions—hospitals, federal, state and local agencies, medical schools, medical associations, and individual doctors. As a result some areas are well supplied with vital facilities and services while others face critical shortages. Even in countries such as the United Kingdom where a National Health Service has resulted in a degree of rationalisation, changes have come slowly and usually in response to obvious breakdowns, political pressures, serious discontent on the part of some group of health sector personnel, or unguided technological change.

Obviously, Western practices are of little help, also, in

integrating the provision of health care services into planning for ^{economic} ~~social~~ development. Some have looked to the Soviet model for guidance: the Soviet Union recognised early the need to maintain the health of the labour force if industrialisation was to be attained and geared its medical programme to that end. Today the Russian system has less relevance as it is based on what is probably the highest ratio of doctors to population in the world; but even the historical experience of the Soviet Union can have only a limited appeal. It was able to achieve integration of medical services only by a strict system of bureaucratic control of the medical profession and of other health workers within a highly centralised economy and a strictly regulated society [Field 1967]. Few developing countries have the administrative or the political resources to adopt such a task. Information on the day-to-day functioning of the Chinese medical system is unfortunately far too scarce and unreliable for its relevance as a model to be properly assessed.

However Western technology still has something to offer developing countries -if not directly from the health sector then from the modern management techniques developed in industry and government. Over the last few years various approaches to health planning have been devised using (or rather advocating the use of) such tools as systems analysis, programme budgeting, operations research, cost-benefit analysis and other decision-making techniques.

In this field, however, there is a gulf between theory

and practice. And in practice, ad hoc adjustment is the order of the day. In Africa and Asia many developing countries inherited from the British some sort of ongoing medical system based on hospitals in the cities and rural dispensaries in the countryside with the emphasis on meeting the demands of the people for curative services [Titmuss p. 30] ; in Latin America a system evolved that catered to the urban employed and, through charitable institutions, to other small sections of the population but left the rural areas largely unattended [Hall 1969, pp. 18-30 Bryant 1969, p. 71-4]. Very few countries have devised health plans which attempted a radical transformation of the systems they inherited. At best the organisation of medical systems has been adapted little by little.

The result is that many countries retain the basic structure of organisation and management that they have had for many years. Funds are often allotted to different divisions on the basis of ^{the previous year's} ~~last~~ allocations or organisational needs (e.g. an overcrowded hospital gets a new ward) without close analysis of the impact of the overall programme, or its several parts, on the levels of community health. Certainly new elements -and in particular malaria eradication campaigns- have been introduced but a total attack on the community's problems has not been mounted, nor have existing practices been radically scrutinised on the basis of cost effectiveness. No one knows what the effect of a health centre in a particular location will be but it is placed there if there is a vocal enough demand and the annual

budget permits it. The overall budget is often simply the sum of the budgets of the different divisions. Alternate methods of approach are not formulated -and the cost accounting and budgeting system makes such approaches difficult for in the words of a W.H.O. document,

"...in most developing countries methods of allocating funds and systems of accountability and control are outmoded. In particular, health budgets are seldom arranged in a manner that is useful for recording the resources devoted to particular parts of the health programme." [W.H.O. 1967, p. 35].

Lack of coordination is a serious problem. In some Latin American countries different government departments duplicate facilities in some fields while it is not clear which is responsible for the gaps in others. Very common is the problem of a medical school turning out graduates in the Western tradition, while the Ministry of Health independently produces a medical system focused on other needs. It is not surprising that there is little fit between them -or that in Thailand, for example, the ratio of doctors to population is 1 to 940 in Bangkok with many doctors in private practice, whereas in rural areas it is 1 to 200,000 (Bryant p.75). Bryant cites another example of the general problem:

"A division of tuberculosis control is responsible for population surveys, diagnosis, and treatment. Health centers are operated under a separate division of rural health services. Patients travel past health centers to tuberculosis clinics, and tuberculosis personnel travel past health centers to patients' homes. These personnel are concerned about tuberculosis in the patients' family members, but other problems are outside their responsibility, even those that share with tuberculosis the causal factors of

crowding, poor ventilation, dirtiness and ignorance. Here the approach to the problem is determined by the organisational structure of the health service, not by the nature of the problem." [Bryant p.110]

These are particular examples which could be multiplied many times.

The developing countries have not, however, been short of advice, or of advisors. Four of the general approaches that have been recommended will now be examined. An effort has been made not to set up "straw men" and obviously impractical and obscure approaches have been disregarded. The schools of thought discussed (at times a number of authors with similar views have been grouped together) represent the most prestigious of the research projects undertaken and those most frequently cited in the literature. It will be suggested that while each approach makes some contribution each lacks certain major elements.

a) The A.I.D.-Johns Hopkins Approach: Manpower Planning

In 1961 A.I.D. awarded a grant to the Department of International Health of the Johns Hopkins University School of Hygiene to study health manpower requirements in countries at different stages of economic and social development. Peru, Taiwan, Turkey and Nigeria were selected as countries for study.

The first study -perhaps the prototype for the series- was published in 1967 under the title "Health Manpower Planning in a Developing Economy: Taiwan, A Case Study in Planning" [Baker and Perlman]. The technique employed was reasonably simple. First a survey was conducted of the present supply of health workers (doctors, nurses, herbalists, dentists, sanitary workers)

and the pattern of usage ~~of the client population~~ was worked out with a breakdown of the client population according to age, sex, income group, and place of residence (urban-rural). Most patient care is at present undertaken by doctors and herbalists in private practice, so economic demands for services were projected for a number of years hence on the basis of the predicted enlarged population and its new age, sex, income, and geographical breakdown. To this was added the manpower needed to fulfill the pre-existing Ten Year Plan for the government sector with a correction for understaffing of hospitals. These projections were taken to be the manpower needs in the future and thus indicated training needs today.

The survey collected a great deal of interesting data, but it is somewhat difficult to see the point of the whole exercise. As the authors state they did not consider the establishments of new institutions, technological change or changes in disease patterns [ibid p.4]. Nor did they attempt to identify diseases the eradication of which might be especially ^{help full} ~~beneficial~~ to economic progress. Patient demand is an unreliable indicator of actual morbidity rates. Patient demand in the economic sense (i. e. ^{worse?} willingness to pay for the service) is an even poorer indicator for planning, as patients may be prepared to go to the doctor with a complaint which he cannot cure, while they may regard more serious illnesses as "normal". This is one of the major reasons why health services are publicly provided. The market fails because the public utility (i.e. the benefits derived from a

healthier work force) or from reduced risk of infection) outweighs the cost, but the private utility as seen (perhaps imperfectly) from the patient's point of view does not. This is a special case of external economies with which the market mechanism cannot deal. It thus appears to be a strange exercise to use private demand for an existing service, unrelated to economic development, as a basis for "health manpower planning in a developing economy". (In fact, in Taiwan, the patient survey found that by far the most common illness of those causing days lost from normal activity was the common cold -for which, of course, the medical profession can provide only the symptomatic relief available in an aspirin bottle.)

The Peru study [Hall, 1969] is somewhat more sophisticated -it introduces additional projections based on the need for physicians to carry out specific programmes, and alternative projections of government use -but essentially the manpower planning method is the same with heavy emphasis on "effective demand". It is only in the last chapter, almost as an after-thought, that the implications of providing preferential service to various sectors of the community are discussed, and sensible pragmatic suggestions (somewhat along the lines of the next ^{approach} ~~one~~ ~~time~~) made on the reorganisation of the system, especially in rural areas. Unfortunately these are not the basis of the projections in the rest of the study.

At one stage in the Peruvian study the author notes,
"The manpower planner is concerned with providing the

administrator with a reasonable supply of health personnel at some future date, in accord with the country's ability to support this personnel and the principal health problems encountered. The administrator, or program planner, is then concerned with the specifics of how this personnel should be utilised and distributed." (p.69)

This is not of course the procedure followed in the study as the manpower planning carried out is not on the basis of the "health problems encountered". But even if it were, the steps have surely been confused. First, the health problems must be studied to see different ways in which they can be met with different types of health workers and limited resources; then manpower projections can be made. The Johns Hopkins studies of manpower planning are based on existing methods with existing types of health worker. Although it admits of some improvements it is essentially a policy of "more of the same" but somewhat better distributed. However if we are correct in believing that it is the system itself which is at fault then this approach is a blind alley.

b) The British Approach: Pragmatism

There is no body of literature by British writers on the theory of health planning for developing countries. There is however considerable literature setting out plans or the basic ingredients of plans. Sometimes this is in the form of general rules applicable to all countries such as the manual compiled by Dr. King, "Medical Care in Developing Countries" [King, 1966]. Sometimes it is in the form of a plan for a particular country such as the 1964 report to the government entitled "The Health

Services of Tanganyika" [Titmuss, 1964] . These documents have in common a basically pragmatic approach to decision-making in the health sector. The basic problems and resources and the existing practices are examined usually from a background of considerable practical experience as a medical practitioner in a poor country. Their deficiencies are ~~highlighted~~^{pointed} out, good features are highlighted and reorganisations suggested which will in the author's view create considerable improvements based on past experience.

The resultant plans are usually full of sound insights and make sensible and common sense improvements on the existing system. Thus, for example, Dr. N.R.E. Fendall, former Director of Medical Services in Kenya in a series of articles [1963,1964] argues that there is little point in putting doctors out in rural areas where lack of facilities, isolation, and the crush of cases ~~is~~ means that they are able to do little more than a health auxiliary. Thus he suggests a system of referral -where medical attention is graded from symptomatic diagnosis and empirical treatment at the periphery, through the regional health centre, and finally to the central hospital when definitive diagnosis and scientific treatment are necessary. As the patient moves closer to the centre he gets increased care -at increased cost. The system however, as Fendall is aware from experience, depends on a good transportation infrastructure or else it breaks down.

Fendall has thus arrived by empiricism at the place where systems analysis may have led him. And probably, to date, it is

45

this approach (on which, of course, the British have no monopoly) which has been most fruitful in practice. What it lacks, however, is first, that it does not permit a systematic examination of the variety of possible methods by which any medical goal may be achieved. Second, it does not allow for a fundamental reexamination of the basis of the whole health care delivery system. Finally it does not integrate health services to socioeconomic development planning as a whole.

c) Systems Analysis: the Comprehensive P.A.H.O. Approach and Suboptimisation

At the other extreme from pragmatic incrementalism is the rational-comprehensive method which comes under a variety of names, the most common of which are systems-analysis or operations research. The steps taken in this approach are much the same whether the problem is preparing a national health plan, a TB eradication campaign, or the optimal organisation of a textile mill. The steps may be summarised as follows:

- 1) Formulation of the problem and, in particular, definition of objectives
- 2) Collection of relevant data
- 3) Analysis and hypothesis formulation leading to an input-output model
- 4) Derivation of solutions from the model by an iterative process of changing the value of a small number of key variables and noting (with the aid of a computer) the effect on output

- 5) Choice of the optimal solution and forecast of result
- 6) A test run of the optimal solution in practice
- 7) Recommendation of the solution including a control system.

Thus the "essence of operations research is that logical thought combined with careful observation and methodological analysis should form the basis for decision-making." [Anderson 1964, p. 304]

This approach has been taken up most enthusiastically -at least on paper- by American authors. It is best exemplified in the work of the Pan American Health Organization which has attempted to formulate a comprehensive blueprint for the application of systems analysis to the entire national health plan [P.A.H.O. 1965] .

The P.A.H.O. approach identifies its aim (in ~~the~~ ^{the} first approximation for the purpose of explanation of the method) as being simply maximum reduction in mortality rates: " in assessing the effects of a given health activity on any health hazard, the yardstick used will be the number of deaths prevented through that activity, irrespective of the benefits arising in the form of a reduction in morbidity or disability." [ibid, p.6] . Thus the output is deaths prevented, and the inputs are resources of all types reduced to their monetary value at market prices.

The planning process is then described in a number of steps. The first is "diagnosis" of the existing state of health of the community. This demands an epidemiological study of morbi-

dity and mortality rates from different diseases, in different regions throughout the country, the factors affecting these rates and an analysis of which are the most relevant to different health activities. It is then necessary to take an inventory of the resources already available and the activities being carried out so that an estimate can be made of how much it costs to prevent death from a specific cause by the most efficient method. This is thus far a highly simplified account of the P.A.H.O. method but it is already apparent that it has an enormous "information cost" given the paucity of reliable statistics in most developing countries and the lack of trained workers to obtain them. (One example of the difficulties that can occur even in a small region comes from a pilot study in Nicaragua where morbidity rates were collected for particular diseases from the records of mobile clinics, rural health centers and by specialised surveys. Detailed statistics resulted -but they were quite different from each of the three sources. [Ruderman, 1966]).

With the information collected it becomes possible to identify those health activities which on cost-benefit analysis are the most efficient. Each regional planner will then proceed to prepare two alternate plans using these techniques. One plan -the minimum alternative- will be the most efficient method by which the existing health level can be maintained- more specifically its aim is the maintenance of the "mortality rate resulting from reducible diseases and satisfaction of the demand for curative services per inhabitant at the same levels." [ibid p.56].

The other plan is the maximum alternative which would establish "the highest possible rate of increase in the health level of the community ... assuming unlimited physical and money resources" and limited only by the "area's capacity for effectively utilising a greater volume of resources." [ibid p. 55]. The national planner then coordinates the regional plans. The minimum alternatives will have first call on the national budget. This ensures that equity is not disregarded completely in favour of efficiency and that no area is drained of health resources and allowed to deteriorate because deaths can be more cheaply prevented elsewhere (though the flow of resources to an area may be reduced as the regional plan is the most efficient plan for maintaining standards, not the existing one). The national planner will also have before him a list of the diseases that each region considers to hold highest priority once the minimum alternative has been satisfied, the respective costs per life saved, and the expenditures required for the proposed activities. He should then allocate resources in excess of those required by the minimum plans "in such a way that efforts designed to combat reducible diseases ensure maximum reduction in the number of deaths together with minimum cost per case treated." [ibid p. 72]

It is obvious that many of the details of this blueprint are open to criticism. * Since even its supporters regard it

* One aspect of the plan should be mentioned at this stage because of its relevance to later parts of the paper and because it is a prescription for enormous misallocations of resources. This

only as an early model, this paper will not concern itself with the specifics of the plan and others like it, but rather its significance and its failings as a pointer to future effort.

It must first of all be said that the application of rationality to planning in the health sector is long overdue. It is surprising how rarely answers are demanded to questions like "How will programme X change the disease pattern of the community?" "Has programme Y achieved the results claimed for it?" "Can similar results be attained by other equally effective and less expensive methods?" To the extent that this approach has been successful in focussing on questions such as these, the outlook of public health administrators has been broadened and a enormous step forward has been made.

But at the same time it seems to me very unlikely the comprehensive-rational model in this style of blueprint form

is the use of market prices in calculating costs. What is important, especially in developing countries, is not the market price of a resource, but its opportunity cost - the value of benefits it would otherwise produce in its best alternative use. Thus in many developing countries the real cost of labour for example, is not the wage paid but in fact, zero, since the worker would otherwise be unemployed and unproductive. On the other hand because exchange rates are overvalued and there is little duty on medical supplies an imported medicine is undervalued at its market price - its real price is the local value of goods which could otherwise have been imported with the foreign exchange. In other words, "shadow" prices must be used if a country is to make best use of its resources.

56

will be very fruitful for developing countries at least in the short and medium run. This is for two sets of reasons -one specifically a result of the present state of medical knowledge, and the other rooted in public administration practices and the limits on human rationality.

First, cost-benefit analysis relies on our being able to link a particular change in inputs with a particular change in outputs, and this is precisely what we are unable to do in the field of public health. There are costs we can calculate -the cost of establishing and running a health centre or hospital, for example- and intermediate outputs we can measure -the number of patients treated, babies delivered, wells installed, etc. But except in very few special cases (e.g. malaria control) there is no way of linking these costs or intermediate outputs to the benefits with which we are concerned: changes in morbidity and mortality rates.* One author at least has seen this and pointed out that "by trying to quantify complex and poorly understood relationships between health activities and health levels, the method has served to concentrate attention on precisely those areas where the scientific underpinnings of medicine and public health are weakest. Present knowledge is inadequate to relate cost to benefit, or cause to effect, even where routine statistical information is relatively abundant and accurate." [Hall, 1966 p.1306]

In economic terms we simply cannot specify production functions

* A promising study of the impact of Ethiopian health centres on on community health levels and attitudes [Spruyt et al.] was cut short for lack of funds.

in most of the health sector.

However even if these problems are eventually solved public administration experience in Western countries indicates that the demand for "comprehensive rationality" cannot be satisfied. As Lindblom pointed out more than a decade ago, such a demand "assumes intellectual capacities and sources of information that men simply do not possess and it is even more absurd as an approach to policy when time and money that can be allocated to a policy problem is limited, as is always the case ... Limits on human intellectual capacity and on available information set definitive limits to man's capacity to be comprehensive. In actual fact, therefore, no one can practice the rational comprehensive method for really complex problems and every administrator faced with a sufficiently complex problem must find ways drastically to simplify." [Lindblom 1957, p. 80,84]

Once the simplifying assumption that the ^{goal} ~~end~~ of the health plan is to maximise the number of deaths prevented within a given budget is dropped, it is clear that a very complex problem becomes far more complex. It is no longer possible to set up some abstract objective where, say, the prevention of blindness in children, the palliative treatment of cardiac failure in males over forties, and reduction in maternal mortality rates each have some abstract weight and the best means for attaining these ends in their optimal ^{combinations} ~~combinations~~ can then be calculated. In fact the administrator can only choose "directly among policies in which these values are combined in different ways. He cannot first clarify

his values and then choose among policies." [ibid p. 82] As each aspect is more closely examined the problems of comprehensive planning (even when it is computer-based) multiply. It seems inconsistent to seek to establish a medical delivery system adapted to local needs and resources and at the same time advocate a system of health planning more sophisticated than the rest of the government mechanism and in fact of a standard not yet reached anywhere in the world.

It is not suggested that radical change in the health sector is not needed, or cannot occur. Rather, it is suggested that those who advocate radical change must take into account existing practices if they are to change them. Two authors have described the situation in community health agencies in the United States in the following terms:

"...the lack of adequate methods and resources for comprehensive planning in community health ... has not inhibited the development and application of planning schemes that fit inadequate statistics into arbitrary formulas. Arcane manipulations of limited data on too few variables produce sweeping conclusions that claim to be binding upon the community." "Advanced techniques of comprehensive planning, utilising highly quantitated methodologies are not often appropriate to the present situation of community health agencies and can be objected to on organisational, resources, and methodological grounds...this type of planning lies beyond the resources and the developed competencies of most executive and operating personnel...." [Hilleboe and Schaeffer 1967, pp. 5, 18].

If these are the problems of the U.S., their solution in the next few years in developing countries, with a far greater shortage of skilled administrators, cannot be expected. In fact, although the P.A.H.O. plan was produced less than five years ago,

(and comprehensive systems analysis continues to be strongly advocated) it has lost a great deal of support within the Pan American Health Organisation itself though a few central concepts have been retained. A related avenue that the P.A.H.O. is at present following is the presentation of scenarios for one or two selected countries of the health situation that would result from particular changes in the medical system. These serve as alternatives from which policy makers can choose. This approach recognises that existing personnel, status systems, and administrative practices cannot be ignored and changes must take the existing system into account.

What then remains of the systems analysis approach? It will be argued in the next section that its most important application lies in the analysis of the tasks of the doctor and medical institutions so that new health worker roles and new institutions can be devised. At least two other important elements also remain:

- 1) The moulding of a new approach to public health administration where somewhere in the process of review, administrators will ask themselves not whether they have spent their budgets nor whether the number of patients seen exceeds that of the previous year nor whether there has been an increase in the number of doctors per 100,000 inhabitants but instead will ask themselves what the purposes of their programmes are in terms of community health, whether these objectives are being achieved, and whether there are cheaper ways of doing the same thing.

b) The direct application of systems analysis in particular restricted spheres where the linkages are clear and the objectives straightforward i.e. suboptimisation. Once it has been decided that the aim is to provide TB therapy to all active cases within a particular population or a certain frequency of outpatient care in a particular region, even if these are not ends in themselves, cost-benefit analysis and linear programming can be used to provide minimum cost solutions for a particular programme. There are of course considerable problems associated with sub-optimising [e.g. see Hitch and McKean 1966, pp. 128-131] but it provides a more rational answer than continuing traditional methods; there remains also the problem of skilled planners for such projects but many regions have similar problems and similar diseases, and once an optimal solution for TB treatment or for the organisation of mobile health clinics has been found for one region, its modified use in other areas is likely to be a considerable improvement over previous methods. (Feldstein [1969] has formulated a linear programming framework for the allocation of resources within a tuberculosis control division.)

d) The World Health Organisation and the Polonius Approach

This survey of the decision-making for health in developing countries would not be complete without some reference to the W.H.O. which has produced a flood of literature on the subject. Unfortunately this literature bears all the marks of the committee approach at its worst: avoidance of areas of disagreement and conflict and concentration on generalities and platitudes. Thus

perhaps the most representative document (W.H.O. 1967) is full of advice of which Polonius would have been proud, such as

"In some cases the health and sanitary conditions ^{of a country} are of such importance for its development that the minister of health should, wherever possible, be a member of the planning authority" (p.17) "The planning process could be greatly facilitated by a development of clear concepts" (p. 28) "Teaching and learning are interdependent. Accordingly teachers must be prepared for their teaching roles if the learners are to profit from the teaching. This implies the careful selection and preparation of teachers of planning" (p. 33)

and so on.

The general level of planning advice is evident from a selection under the sub-heading, "Application of the planning process to health" (pp. 24-5):

"Once an estimate of total health expenditure has been made, it must then be related to the population projected for that year, bearing in mind that the health plan will be one of the factors generating demographic changes. After allocating a proportion of the budget to central and regional services and to training, it is possible to calculate how much will be available for organized health services per unit of population. After various alternatives have been considered, it has to be decided how this budget should be divided between in-patient and other medical care services and preventive services of different types. In making these choices, consideration will be given to the disease pattern and changes in mortality and morbidity and the possibility of altering this pattern by suitably deploying available resources. Alternative budgets can then be prepared that envisage the employment of different categories of staff with all the supporting materials needed to enable them to work effectively. The various options can be considered in a concrete, manageable form."

This passage has been quoted because it is typical of so much of the literature on health planning. It neither provides new insights for the serious administrator or medical man nor rules that can be followed by the clerical assistant. Certainly

there are occasional flashes of sound sense but they are buried in acres of anodyne prose the purpose of which is difficult to discern.

One aspect of the W.H.O. approach is open to specific criticism as a bar to progress in planning. This is the manner in which the W.H.O. sets its targets. The targets for the first Development Decade, for example, were 1 physician per 10,000 persons, 1 nurse per 5,000, 1 technician per 5,000, 1 health auxiliary per 1,000, 1 sanitarian per 15,000, 1 sanitary engineer per 250,000. [W.H.O. 1965, p. 158] It is of course very open to question whether this is the optimal combination of health workers but the criticism is more fundamental than this; it appears absurd to set as targets not benefits or outputs, but inputs. It is as though a firm set as its target not the volume of production or of sales, but the tons of coal or the amount of electricity it would use. Ends in the health sector are changes in community health. Obviously this planning mechanism confuses means and ends; it measures production in terms of inputs rather than outputs and progress in terms of an increase in inputs. It thus has an inherent bias towards the inefficient use of resources and against the search for new institutions through which community health can be improved.

.

The outline above of each of the major theoretical approaches to decision-making in the health sector has attempted to focus on

its specific merits and deficiencies. There are, it seems to me, three areas in which all the literature is deficient and which should in addition be explicitly identified at this stage, though they are for the most part discussed elsewhere in the paper:

- a) The planning literature almost without exception takes existing medical roles and medical institutions for delivering health as givens, and concentrates on altering the mix. It is of course argued here that these institutions should not be accepted as constraints in planning but that the creation of new institutions is the central part of the planning process.
- b) With a few exceptions the literature does not tackle the problem of linking health outputs to socioeconomic change (apart from the admonition that health planning should be integrated into economic planning as a whole). It is unlikely that this can be done satisfactorily in quantitative terms* -the problems of calculating the benefits of social projects are at this stage far from solution [U.N. Research Institute for Social Development, 1965]. But as discussed in Part II, research can be very useful in determining the direction and general dimensions of change brought about by health activities. Even though numbers cannot be placed on these changes, an awareness of these elements is essential to sound planning.
- c) Without exception the literature ignores the existing power

* One paper entitled "How to Integrate Health Planning into the Planning of Economic Development as a Whole" solves this problem by concluding that "neither development nor health can be planned in terms of prices"! [deBernis 1966, p. 38]

structure of the health sector in developing countries and the political (in the broadest sense) obstacles to the introduction of new methods. Medical systems are not the least prestige -or power- conscious of social or bureaucratic systems; those who have a stake in the existing system can be expected to defend it. The introduction of change is not just a technical problem; it is first of all a political problem. As such it requires prior political analysis so that programmes can be presented in such a way and through such groups that they are most likely to win acceptance ~~at least~~ from the bulk of those who will have to implement them (or at least so as to isolate those groups who will most certainly oppose them).

Health Worker Roles

"With today's drugs, an intelligent villager, trained to recognise the two or three ailments most commonly found in a given area, may be able to do more to save lives and end sickness than the best doctor in the world could have done 25 years ago" [U.N. ^{Vol.} ~~1963~~ 5 p. 51] . This simple observation is buried in the 1963 report of the U.N. Conference on the Application of Science and Technology for the Benefit of Less Developed Areas. However reluctant the medical profession may be to recognise its implications, it provides a basic clue for the rational reorganisation of the pattern of health worker roles in developing countries.

The next few pages examine some of the most important elements in the existing pattern and current proposals for reform. The central proposition of an alternative and less conventional approach to reform will then be discussed.

There is a wide variety of medical roles in different developing countries and the numbers, status and functions of "auxiliary" medical workers, in particular, differ greatly. But there are similarities -especially in the role of the physician. Most doctors in developing countries have been trained either in Western medical schools or in schools patterned on Western standards. Such changes as have occurred in curricula in recent years have not yet had a significant impact on the basic orientation of the majority of practitioners. Curative medicine based on the individual patient holds pride of place; together with this

there is a strong belief that while it may be temporarily necessary to make do with "inferior" personnel, diagnosis and treatment should be carried out only by professionals with internationally recognised qualifications.

Private practice -necessarily organised along Western lines- remains widely prevalent, popular impressions to the country. Over 50% of doctors in Latin America are in private practice [P.A.H.O. 1969]. The typical ~~general~~ doctor in Peru, for example, works in a salaried position till noon each day and in solo private practice in the afternoon and evening [Hall 1969, pp. 98-99]. In Taiwan about 75% of doctors are in full-time private practice and some of the remainder in part-time. The low salaries, lack of facilities and frustrations of government service in most countries drive even the most idealistic of practitioners towards private practice [deGraemer and Fox]. With private practice goes urban concentration - almost without exception, developing countries show a concentration of doctors to population five to ten times higher in the capital city than in the rest of the country.

Those doctors who do ~~not~~ practice in ~~the~~ health centers, especially in the rural areas, are usually overwhelmed by the crush of patients with individual ailments and find themselves in the conventional Western medical role. Individual patients are "cured" and returned to their community - the doctor has little time to consider his impact on community health levels. Most health centre doctors in an Indian study considered curative

medicine as their primary task; one third spent less than 20% of their time on preventive medicine [Takulia et al. p. 35-44] and reorientation courses have had little impact on these attitudes. [ibid p.68].

Nor can it be said that the doctor is effectively using his training even in his clinical work. The rush of patients and the lack of facilities ensures this. Three hundred patients a day is not an unusual load. In Indian health centres, the average time spent with a patient was reported by one third of doctors to be one to three minutes, and by another third to be 30 to 60 seconds! [ibid p. 38] The story is much the same throughout the world, the rural doctor has neither time nor facilities to provide anything but elementary medical care, his medical skills go unused and are apt to deteriorate, and he is usually anxious to return to the city.

Western-style medical morality demands that the doctor attend to each patient, ^{who presents himself} and ~~attend to him~~. The fact is that public health work is widely held in very low esteem by the medical profession. The study cited above found that the belief that curative medicine had a higher priority than preventive and social medicine was held not only by health centre doctors but also by university teachers of social and preventive medicine! The Chairman of the W.H.O. Executive Board found it necessary recently to warn a medical audience of the hopelessness of the situation in developing countries "unless Public Health doctors can gain universal acknowledgement as the equals in status of their colleagues in other

specialities." [Refshauge p.9] The Assistant Medical Officer, whose training and duties are on a par with that of many doctors but whose role is specially designed for developing countries is, in practice, even less inclined than the physician towards public health or preventive medicine (apart from carrying out immunisations). [Rosinski and Spencer p. 125-31]

The large majority of these medical practitioners thus practise medicine along the lines of the Western model based on the doctor-patient relationship which we argued in Section 1 was inappropriate to societies in which they live.

As far as the role of "auxilliarities" is concerned, the first thing that must be said is that if the shortage of doctors in developing countries is overwhelming, the shortage of auxiliaries is worse. In country after country, there are only half as many qualified nurses as there are doctors and in some countries, the proportion is even less [W.H.O. 1968]. This means that doctors often have to perform services for the patient which elsewhere are provided by a nurse or other assistant.

However, primary attention - and controversy - at present centres not around personnel who assist the doctor (and for whom the urgent need is everywhere recognised) but around personnel who replace the doctor, in some or all of his activities. Already mentioned is the Assistant Medical Officer regarded as an essential health worker by some, as a colonial vestige by others, as being peculiarly suited to poor countries by his supporters and ^{as} "too costly to be used at community level but

not well enough trained ^{to be used at} at a supervisory level," [Bryant p. 179] by his detractors. Next in skill is the medical assistant who has received sufficient training for diagnosis and simple therapy, but not, say, for differential diagnosis and major surgery. Both these grades are obviously related in many ways to the Russian feldsker who assists doctors in urban areas but replaces the doctor in the countryside. Like him, they provide essential services but suffer the image of being "second class doctors." [Sidel]. Some countries, in particular, in Africa, ^{and} Fiji, and New Guinea are continuing to train A.M.O.'s, others have ^{ceased} ~~ceased~~ and are retraining and upgrading existing A.M.O.'s to full professional status, while in Latin America, A.M.O.'s and medical assistants have never been trained and are regarded as totally contrary to medical tradition.

The functions of these health workers and the arguments surrounding them have been well described elsewhere [by Rosinski and Spence, Fendall 1968, de Craemer and Foke, Bryant pp. 172 - 198] and there is no need to repeat this debate here. Nor are the roles of other workers such as midwives, dressers, dispensary aides, sanitation workers and so forth discussed here as their roles are reasonably straightforward and their exact place in the system will obviously differ from country to country. Rather the remainder of this part will be concerned with the general principles along which these roles might be organised.

Proposals for reform inevitably centre around the doctor, the *lynchpin* of the present system. The deficiencies in the

present use of his services are recognised - and energy is devoted towards change in two directions: changing the doctor from practitioner to the leader of a medical team, and enticing him from his fascination with diseases of the urban rich into the countryside where the bulk of the people live. Thus, "in a developing country a doctor's main task must be to act as a teacher, organiser, supervisor and consultant to a team of auxiliaries," [King 1.15] and he "will have to meet the demands of leadership in social, educational, and civic affairs, as well as those related to public health, sanitation, and health education." [Dogramaci p. 180]. Further, it is argued, since the doctor is not at present trained for this role, his basic education and orientation will have to be changed.

It will be argued here, however, that this is in some ways a misguided approach. The doctor takes up the study of medicine in order to practise medicine not to lead teams, organise or inspire. Perhaps ^{The practice of medicine} ~~this~~ is what he should be best left to do. This does not mean that there will not be specialists in public health or preventive medicine, that medical education should not be more closely related to the social realities of the developing country, nor that there will not be a certain proportion of "managerial physicians." It is suggested, however, that a) the political, social and psychological obstacles to turning every practitioner into an organiser-teacher-visionary are probably too great to be overcome voluntarily, b) such a change would constitute a waste of his medical training, and c) alternative

and better pathways to meeting the medical needs of developing societies are available.

The enormous resistance of the medical profession to ^{a complete} ~~this~~ reorientation - even if its leaders often pay lip-service to it - is obvious. Despite frequent assertions of the need for reform, the profession remains essentially the same. For the concept of what is a doctor, and what are, and are not, his functions, is deeply ingrained. As it has developed, it has come to stand for a blending of patient care and modern technology - whatever it is that the reformers wish medical men to become, it is not a "doctor" as the term is understood by members of the profession, or those who aspire to become members. Undoubtedly this will change, (especially as Western medical ideas themselves are changing) and then the profession may attract different types of people, and evolve in a new direction. But it is a change that is impossible to force on those who are doctors today (and medical teachers today) - for it demands that they admit that their whole life-style is wrong. Certainly, medical school curricula can be altered to increase the amount of time devoted to forms of cheap therapy and to increase the amount of time devoted to preventive medicine - and this should be done. But the primary image of the doctor as the clinician in the white coat will take a long time to fade. The leaders of the Soviet Union in the 1920's felt that they could reorganise the health care delivery system only by breaking the power of doctors as a corporate group and, a more difficult task, reducing their

status to that of other health workers [Field, 1961, pp. 541-5]. Governments in developing countries do not have the political and administrative resources to make this a viable option.

Furthermore, governments and elites in newly independent countries have a very deep (and understandable) suspicion of advice from industrialised countries that their standards should be different from those of the West. This is especially so if it means that their professionals' qualifications would not be recognised elsewhere; and, in fact, if medical schools in Africa and Asia were to make all the changes advocated in their curricula their graduates might well not be able to practise in the West - just as Western doctors are in fact, for the most part, incompetent to practise the type of medicine needed in developing countries. The case of the Congo where the government (and the medical assistants themselves) regarded the medical assistant as a colonial vestige, considered that "in an independent country one must be a doctor," and arranged at enormous cost and loss in professional time, for the retraining as doctors of the majority of these already well-qualified medical assistants, illustrates this point. [de Craemer and Fox]. While this attitude may fade with time, the drive to maintain "international standards" serves an important political function, and explanations from Western experts that different standards are not necessarily "inferior" standards are unlikely to win acceptance.

Finally, there is an important psychological and sociological obstacle to luring doctors out of the capita cities.

As a society moves from traditional to "modern", vertical mobility increases; but, in the early stages, the avenues for vertical mobility are ^{still} extremely limited. Education is obviously one of the major means of moving upwards, and medical (and perhaps legal) education is possibly the best method for a young man to move rapidly up to a high (and secure) status in society. This has been a common (if unadmitted) reason for entering medical school in Western societies (it might be termed the "my son, the doctor" syndrome); it is even more important in developing countries where upward paths are much more limited. [Foster 1966]

Thus the fundamental motivation (whether unconscious or half-recognised) of at least a significant percentage of men who become doctors is to escape from their former status, to move up in society, and to become the god-like figure with the stethoscope. To ask them to move to rural areas and become concerned with sanitation and the living conditions of the villager, cannot be achieved simply by curriculum changes in medical education - one is asking again that they overturn the whole purpose on which their life is based. Demands that they do so will lead (and have led) only to extremely strong resentment, rationalisation, and resistance - resistance which is all the stronger for the fact that its underlying cause cannot be admitted.

Furthermore, in so far as there is a continuing demand for curative services and some of this can only be met by a clinical physician, he is not well placed to do his work in a rural setting. There, as has been suggested above, the service he offers in his

minute or so with each patient is little different from that of the medical assistant. He is better placed in a central hospital at the end of a referral system where he has the facilities to use the skills acquired in his training and can pass them on to others. Particularly misguided are schemes which suggest that there should be a compulsory period of two to three years in a rural outpost for each doctor after graduation. Doctors on graduation have acquired few skills and their first few years out of medical school ~~is~~^{are} a crucial period in which they learn from senior members of the profession, and lay the foundations of their subsequent practices. The young doctor in an isolated community with no one readily on hand to guide and correct him, and no colleagues with whom to discuss problems, will almost inevitably forget much of what he has learned and emerge practising bad medicine, possibly for the remainder of his career.

We argue here, therefore, that while gradual reform in the doctor's function and education is worthwhile, the training of large numbers of doctors (~~aim~~^a major W.H.O. aim) and transformation of their traditional role is not a major element in the solution of the problems of the developing countries. Rather, both doctors and expensive professional medical schools should be de-emphasised and resources devoted to the training of new types of health workers each with his own role within a reorganised health care delivery system that aims at improvements in community health levels.

The same approach ~~is~~^{can} be applied to the provision of

medical services as has been applied in the past to other tasks performed by skilled craftsmen when it became necessary to meet the demands of a mass market. The particular medical need ~~can~~ be identified, and the task that normally meets that need examined and analysed. The task can then be broken down into its component parts in such a way that at minimum cost each one of these parts can be performed by a "specialist" - an individual who is trained specifically to carry it out, and whose training is low cost and requires only a few weeks or at most a few months. [Morison pp. 258-9]. (One immediate advantage is that, unlike so many doctors ~~and~~ in developing countries, these new workers will not be subject to the temptations of the "brain drain.") It is of course more difficult to bring division of labour of this type into the provision of services than into the production of goods - but it is important to keep in mind that many of the most important medical tasks in developing countries do not require direct contact with the patient, and experiments to date in breaking up even the clinical aspects of the doctor's job have been most encouraging. It has been shown that many of the doctor's activities can, in fact, be computer programmed and carried out by persons with minimal training. There will remain some tasks that only a skilled professional can perform. Other tasks may require somewhat longer periods of training. But this approach is the only hope of bringing to the mass of the people at a reasonable cost the benefits of medical technology at present available to the rich.

This approach has of course begun to be applied in the

United States to the process that Kissick terms the "downward transfer of functions." [Kissick p. 84]. Studies in this country have concluded that "much of the work of general practitioners could be done by people with different education and training," [Chase and Craig p. 34] and recommended that doctors should restrict themselves to delivering medical care appropriate to their education and training, while hospitals and medical schools experiment on a large scale with the use of non-physician personnel - including some whose job roles are not yet defined - in the delivery of primary medical care [ibid p. 40]. Kissick defines the reorganisation of U.S. medical care in the following terms:

"Giving each service the level of skill it needs, no more and no less, may be the principal challenge to health manpower. Meeting this challenge requires detailed study of health services and a subdivision of specific functions into the component tasks. Then individuals possessing only a limited range of skills and competencies can be drawn into the manpower pool to perform many of the tasks, freeing those more highly trained and skilled for the performance of duties requiring their more advanced level of competency." [p. 84]

The best known of the U.S. programmes is Duke University's two year programme for training "physician assistants" who are then directly employed by private practitioners. Other programmes include the training of "medical emergency technicians" at Ohio State University and "paediatric public-health nurse practitioners" in child health at the University of Colorado.

This approach then, should be able to produce a standard of medical care which is acceptable. It will not be equal to that, say, in the best private urban hospitals in the U.S. - but

this is a luxury product that is not available even to the vast majority of Americans. The rich are always able to purchase better medical care - the aim of this approach is to meet at least the minimum needs of the poor, at minimum cost. It would replace the overworked and expensively, but inadequately, trained substitute doctor, with a team of health workers each with a short period of training but sufficient for the task. In his particular task, whether screening for particular illnesses, well-baby examination, immunisations, care of particular skin lesions, the health worker will not be a substitute for the doctor; he will perform his specific task better than the doctor in a new delivery system.

Undoubtedly, this proposal will also meet with resistance from some areas of the medical profession. Any suggestion that diagnosis or treatment should be placed in non-professional hands cuts across medical beliefs. Furthermore, doctors are extremely reluctant to think in economic terms or to apply cost-benefit analysis to their activities. *at, increasingly in their own private or team practices.* This is firstly because part of medical dogma is that all life is priceless and that "everything possible" must be done to save it (though in practice this means that a doctor must do everything for his patients - the profession is less concerned with the priceless lives of those who do not have the opportunity to become patients). Secondly, doctors obviously do not wish to embark on an exercise the purpose of which is show which of their activities could be equally well (if not better) performed by others at less cost - for in

this there is a threat of damage to their image of their own role and of a breakdown in their monopoly over the provision of medical services. Nevertheless, it seems that this professional resistance could be overcome - and limited experience to date in Latin America, tends to confirm this. First, these proposals do not directly transform the doctor's traditional role - the demand for the physician's services will continue and insofar as his role affected, he is released for the medical tasks most requiring his skill and judgment. Second, it does not create "second class" doctors which are the subject of so much heat. The new health worker can in no way be regarded as a "doctor" on the cheap as his skill and training is very limited. If a distinction can be made between ends and means, then the profession might be led to believe that there are many means to the end of community health, and that maintaining the same standards as the West does not necessarily mean adopting the same methods. Finally, the very fact that this approach is likely to be applied first in the U.S. and other Western countries may make it more acceptable to both medical and political elites in other parts of the world.

Experimentation ^{on a small scale} in the deliberate creation of new health roles has of course been going on for many years. The concept of a health team consisting of a health officer, a community nurse and a sanitarian trained in the same institution and going out to work in rural health centres was developed in Gondar from 1953 on [Han, Spruyt et al] and is an early example which, despite

teething problems, has worked out well - though its impact on health levels is still uncertain. Another interesting innovation in Venezuela and Colombia is the rural health aide. This worker is usually a woman with primary education who is trained for from one to three months at a centre in her region. She then returns to her home community where, for a small salary, she carries out such functions as immunisation, elementary maternal and child health supervision, treatment of minor illnesses and injuries, and collection of some demographic, vital and ~~social~~^{epidemiol-}ogical statistics [Hall p. 236; P.A.H.O. interview].

The success of these ad hoc innovations provides support for the expectation that the systematic application of a systems analysis approach to primary medical tasks can result in the formulation of a new low-cost delivery system for both curative and preventive medicine.

.....

Before leaving the question of medical roles, brief mention must be made of the indigenous healer. The healer has had high status in the past in traditional society and has at the least provided the individual with psychological support in times of illness. It should be remembered that this was also pretty much the limit of the Western doctor's effectiveness until the turn of the century.

The introduction of Western medicine has left the indigenous healer in an ambiguous position. In some countries, his position has been undermined while in others, a temporary

compromise has been reached. Among Taiwanese who continue to consult herbalists, the older and less educated predominate and the herbalists' practice is declining [Baker and Perlman p. 71-2] on the other hand, it is reported that "the African turns readily enough to Western practice for treatment, especially where ...the benefit is immediate and dramatic, but for the removal of the cause of his illness, he turns to the traditional practitioner. Thus, while he may accept Western medicaments for the control of his tuberculosis, he relies on traditional methods to counter the malign influences which led the tubercle bacilli to invade his body." [Fendall 1964 p. 53]

But organised Western medicine ^{is} ~~is~~ for the most part hostile to the traditional practitioner, belittles his role and looks forward to his demise. Thus a Pan American Health Organisation working paper reports that

"in certain sections of some Latin American countries there still exists a kind of indigenous medicine, a leftover from the primitive ministrations of priests, witch doctors and fortunetellers to the aboriginal tribes in the days prior to the colonization of America. Today, this does not represent an important element and is limited to small ethnic groups living in remote mountainous or jungle regions which do not yet enjoy the benefits of civilization."

At worst, this hostile attitude can spell misery to a population.

"The introduction of medicine has meant a loss of faith in the known, and when the new medicines proved too expensive people found themselves without any medicine." [Mead, p. 252]

It seems clear that the traditional healer does in fact have a continuing role. First he can play much the same part as

did the Western practitioner till the 1920's [MacDermott 1964, p. 663] i.e. he can continue to provide the individualised attention, support and compassion which the sick person needs, while the real inroads on community health standards are made by impersonalised public health technology and economic change within the community. Secondly, the ranks of the traditional healers are a major source of manpower as low level health workers. Probably nowhere have they been better utilised than in China where the 370,000 or so ~~existing~~^{existing} traditional practitioners were used by the new government as part of the health services. They were given elementary instruction in hygiene, vaccination and preventive medicine. They were also used in hospitals because patients liked them and they could provide symptomatic treatment where Western medicine had no cure. [Fox p. 34] The question of more recent Chinese attitudes to the place of traditional medicine is too complex to be entered into in this paper - but in the early days of the regime, we have a model of the best use of the traditional healer as a propagator of simple preventive medicine and a provider of comfort and support to the individual patient.

e) Medical Institutions

Institutions will not be examined here in any detail as the general approach has already been discussed at length, its application to the change of existing institutions and development of new ones would entail much repetition and, in any case, particular changes and innovations must be related to the particular health problem involved. Obviously institutions should be designed

to support health workers in their new roles. cost-benefit analysis should be applied to the different alternatives, and research into intermediate technology intensified. Not all improvements require great imagination -an emphasis on functionality and the use of cheaper building materials in new hospitals would be a start. Not all innovations require new institutions -the utilisation of tobacconist kiosks for the cheap sale of aureomycin for the treatment of trachoma in Tunisia is an example of the use of existing institutions in new ways.

Two particular institutions -the health centre and the medical school- which are of central importance, will, however, be briefly discussed in the next few pages:

i) Health Centres

The placement of a government-financed health team within a community to provide it with comprehensive medical services has been the major institutional innovation in developing countries. (A similar proposal to place comprehensive care units in a regional pattern around base hospitals in Britain was made in the Dawson Report in 1920. The aim was to maximise use of resources by minimising duplication and ^{to} ensuring more equitable access to medical service, but the attachment to existing institutions was too great to be overcome. [Takulia et al. p. 10]).

In theory at least the "patient" for these health centres is the community as a whole. The team in a health centre is not expected to wait until patients come to it but to go out into the community to promote healthier living conditions and practices.

It provides curative and preventive medicine. Curative services are supposed to include all conditions which do not require hospital facilities -the provision of these services is often a prerequisite to the acceptance by the community of preventive medicine.

The staffing and organisation of health centres vary from country to country. In Kenya they are staffed solely by medical auxiliaries [King 3:4] in India by a physician plus a team of auxiliaries [Takulia et al.] . The precise definition of a health centre varies from country to country and Peru, for example, has a system of centres ranging from the health centre proper in larger towns, through the "medical post" located in smaller towns (both staffed, ideally, by physicians), to the "health post" providing minimal nursing, public health and first aid services to small rural communities, and the "people's drugstore" in areas without access to a pharmacy [Hall 1969, p. 24]. In Kenya it is planned that "dispensaries" be replaced by "health sub-centres" which like the health centre would practice integrative, comprehensive medicine but instead of being staffed by a medical assistant offering definitive diagnosis and therapeutic medicine would be staffed by a single dresser offering symptomatic diagnosis and treatment [Fendall 1963, p. 980]. Various schemes of organisation and reorganisation - usually involving a system of referral from the periphery to the central hospital of the more difficult cases - have been described [e.g. Fendall 1964, Hall 1969 p.232-5], and it has been suggested that mobile clinics would be the best

78

solution in some areas. These are clearly questions that are amenable to solution by cost-benefit analysis [Rado in U.N. R.I.S.D. pp. 127-9].

However two fundamental problems are evident in the functioning of health centres. The first, already mentioned in the previous section, is that their impact on community health has never been properly analysed. No full scale study of both health centre and control areas has been undertaken. The preliminary results in Ethiopia are equivocal [Spuyt et al.]. In Cali (Colombia), a city where the population/doctor ratio is as good as 910:1, a survey ⁱⁿ of the area by one of the most strongly staffed health centres showed that while 40% of people used the health centre, 28% knew of it and didn't use it, and 32% did not know anything about it. Over a third of the children dying in Cali receive no medical treatment at all or none in the forty eight hours prior to death [Bryant 1969, p.88]. A great deal more needs to be known about the interaction between the health centre and its community before its functions can be assessed and improved.

The second problem is that while these centres are supposed to provide comprehensive community medicine very often they do not. The more skilled of the staff - whether physicians or auxiliaries - are overwhelmed by the demand for curative services and have little time or inclination to supervise the other staff in the performance of their public health duties. This is certainly the experience in India [Takulia et al.] and has been repeated

elsewhere [Bryant 1969]. These empirical observations reinforce the case for a reassessment of the role of the health centre.

Medical Schools

The literature on medical education in developing countries is already voluminous* and there is little new that can be added to it here. The message of the literature is always the same: the Western heritage and the desire to maintain international recognition of degrees has distorted medical education, and urgent reforms are needed in teaching practices and the content of the curriculum to match the social and economic reality of the country in which the graduating doctor will practice. African medical schools, for example, are urged, in view of the shortage of talent available, to decrease their wastage instead of priding themselves on high failure rates [Landau 1966, p. 448]. All medical schools are urged to increase the time devoted to public health and preventive medicine and to teaching the prevention and treatment of diseases common in their own countries instead of the diseases of their former ^{colonising} ~~mother~~ country. Typical of this advice is an extract from a recent report of the British Paediatric Association:

- "it is not enough to teach modern concepts of
- a) replacing fluid and electrolyte needs in infantile diarrhoea without discussing how this may be done without laboratory aid for great numbers at the lowest cost.
- b) nutritional needs and diseases without indicating how the inhibitory influences of local beliefs and customs may be overcome and how measles might be prevented.

*Hyde [1966 pp. 325-44] contains a comprehensive bibliography for the years 1956 - 66. Further analysis is in Bryant [1969] Ch. 8 and 9.

- c) assisted ventilation without spending as much time on the vast problem of preventing tetanus.
- d) dietetic care in metabolic disease without a knowledge of how inadequate lactation may be supplemented in very poor communities.
- e) diagnosis in congenital heart disease without stressing the causes and prevention of rheumatism.
- f) managing Fibrocystic Disease of the Pancreas without spending proportionate time on tuberculosis." [cited in Stapleton 1969 p. 3-4]

In view of the unanimity of this advice, it is perhaps remarkable how little change there has been in practice. The addition of courses in, and departments of, preventive medicine has not much affected the teaching of the core of the curriculum. The major target of the medical education - and of the doctor - continues to be the individual patient who seeks care, and not the surrounding community.

There is little that can be added to this advice but the approach to health worker roles in the preceding part suggests two changes in emphasis from the bulk of the literature. First, while agreeing that preventive medicine must be integrated into the curriculum and the doctor should learn more about the diseases prevalent in his own country, the analysis above of the role of the doctor suggests that attempts to place the ability to practice medicine with minimal supporting facilities and the "motivation for rural medicine" at the centre of his training are misguided.

Second, it seems that there has been too great a pre-occupation, especially among educators in the West, with the

problems of training doctors as compared with the training of other health workers. In this respect, Ethiopia was probably fortunate that no medical school was in existence in 1953 to divert attention from the Gondar experiment. It is low cost training of existing and new varieties of health workers that demands urgent research and planning. Medical schools, even if they do not train such workers, are the obvious places where this research can be carried on. New institutions must be developed to do the actual training, — and on the question of institution - building in developing countries, a body of general theory is of course being developed and should be of practical assistance, if the barriers between academic disciplines can be broken down.

SOME IMPLICATIONS FOR INTERNATIONAL ASSISTANCE PROGRAMMES

The length of this paper precludes the undertaking here of an exhaustive survey of the implications of its main themes for international assistance programmes. Many conclusions have already been presented in the body of the essay. Here I will merely list some areas where it would seem that large amounts of resources are being mis-allocated - resources that might be made available for more rational programmes. (An examination of A.I.D. programmes [A.I.D. 1968] suggests that these criticisms apply to a far greater extent to programmes funded by other national and international agencies, and voluntary organisations than they do to the official U.S. programme).

The four major areas in which it seems that resources are going to waste are in the provision of assistance to medical schools, the graduate and postgraduate education of nationals from developing countries in the West, the provision of equipment and construction of hospitals, and the sending of special teams to undertake curative services.

The defects of medical schools in developing countries have been discussed - assistance to them has been on a University to University basis [Hyde p. 110-122] and U.S. schools have not been well equipped to remedy these defects. They have for the most part tended to develop departments in their own image. One major difficulty is that good teachers can be persuaded to go overseas only if it does not affect their career prospects and there is the opportunity to carry out prestigious high-level

work. If the real need is for the training of lower-level personnel and the development of low cost environmental, nutritional and preventive techniques there is a far more important role for Western medical schools in the development of new delivery systems and the training in particular areas of teachers for lower-level institutions.

Obviously the value of training students from developing countries in Western medical schools - a favourite form of technical assistance in some aid programmes - must be re-examined. It is not simply that the training they receive is inappropriate and is often based on equipment unavailable at home, nor that they often do not return home at all (points often made) but that when they return they become a model against which local medical training is compared for fear that local graduates will be considered inferior. Postgraduate specialisation training abroad has also been overemphasised. The all too frequent effects have been well described by Stapleton:

"If one of these young graduates goes abroad and learns to use a complex bit of apparatus, when he returns the only special thing he has learnt which he did not know before is how to use this bit of apparatus. His government have already invested some money in him. They have difficulty in assessing how important his bit of apparatus is or what contribution it will make to the economy and so they often have to buy more in order to enable him to use this skill which he has been taught abroad. I have little doubt that many postgraduates who have come to England and Australia return home less valuable rather than more valuable doctors for their own countries." [Stapleton 1969, p. 5]

It has already been suggested that the provision of equipment and the construction of hospitals can drain resources ✓

away from more important areas. New equipment acts as a focus for the medical profession (which is always anxious to acquire the latest technological skills however irrelevant they might be [Reiser]) and diverts attention from other problems. It stimulates demand for similar facilities elsewhere and thus helps to entrench the existing medical system. The provision of high-powered clinical medical teams for short periods can have a similar effect. A particular problem is faced by the religious missions which provide a large proportion of the medical services in a number of countries and the majority of whose workers are clinically oriented. Their activities are very much based on treating the individual who presents himself at the mission hospital rather than with ~~with~~ the health level of the community [Bryant 1969, p. 304-9] and they thus face major problems of readjustment if they are to continue to meet the demand for curative services and at the same time develop new programmes.

There will of course still be some need to aid developing medical schools, train doctors, and provide equipment and clinical services - but each of these programmes must be re-examined to see if they really do assist developing countries in their major goals and if the money could not be better spent. This paper has argued that the Western medical model is unsuited to the conditions of developing countries and irrelevant to the goal of socioeconomic growth. International medical assistance should not be provided so as to reinforce existing Western-based

delivery systems .but. so as to help developing countries in a search for new models.

BIBLIOGRAPHY

- Abel-Smith, Brian "Major Patterns of Financing and Organization of Medical Care in Countries other than in the United States." Bulletin of the New York Academy of Medicine XL (July 1964), 540-59
- Abel-Smith, Brian An International Study of Health Expenditures, Public Health Paper no. 32, World Health Organisation, Geneva, 1967
- Agency for International Development Report of the Health, Population and Nutrition Activities of the Agency for International Development, Dept. of State for Fiscal Year, 1968
- Anderson, Stig "Operations Research in Public Health" Public Health Reports, LXXIX (April 1964) 297-305
- Arbora, Guillermo and Morales and Oteso, R. "Difficulties in Planning Public Health Programs in Tropical Areas" American Journal of Public Health, XXXVL (1945) 1057-62
- Baker, Timothy D. and Perlman, Mark Health Manpower in a Developing Economy: Taiwan, A Case Study in Planning, The Johns Hopkins Press, Baltimore, 1967
- Barlow, Robin "The Economic Effects of Malaria Eradication," American Economic Review, May 1967
- Blasingame, F.J.L. (Chairman) Report of the Vietnam Medical Appraisal Team (mimeo) ~~1967~~ 1967
- Bryant, J.H. "The Gap between Modern Biochemical Technology and Health Needs in Developing Countries," Science and Technology in Developing Countries, Cambridge University Press, 1969
- Bryant, J.H. Health and the Developing World, Cornell University Press, 1969
- Btresh, S. "International Research in the Organisation of Medical Care," Medical Care, Vol. 3 (Jan. 1965), pp. 41-46

- Buck, A.A., Sasaki, T.T., Anderson, R.I. Health and Disease in Four Peruvian Villages, Johns Hopkins Press, Baltimore, 1968
- Candau, M.G. "Problems in Developing International Health Programs," American Journal of Public Health, Vol. 50 (June 1960), part 2, pp. 3-7
- Candau, M.G. "Some Observations on the Problems of Medical Education in Africa," The Journal of Medical Education, vol. 41 No. 5 (May 1966), pp. 446-50
- Cavanaugh, Joseph A. "Future Health Manpower Needs in Latin America," Public Health Reports, LXXIX (1964), 911-916
- Chase, J. Samuel and Craig, William R. The Physician's Use of Time, Harvard Medical School, 1969 (mimeo)
- de Bernis, G. Destanne How to Integrate Health Planning into the Planning of Economic Development as a Whole, Unpublished document NHP/WP/66.2, W.H.O., Geneva, 1966
- De Craemer, Willy and Fox, Renee C. The Emerging Physician, Hoover Institution on War, Revolution and Peace, Stanford University, California, 1968
- Division of Medical Sciences (National Academy of Science - National Research Council) Public Health Problems in 14 French Speaking Countries in Africa and Madagascar: A Survey of Resources and Needs, Vols. I & II (mimeo) 1966
- Duran, H. "Health Planning in the Countries of Latin America" Canadian Journal of Public Health, Vol. 56 (1965) pp. 271-5
- Dogramaci, Ihsan "An Experiment in Medical Education in Turkey," Journal of Medical Education, Vol. 41 No. 9 Part 1 (Sept. 1966), pp. 180-185
- Fein, Rashi "Health Programmes and Economic Development," in The Economics of Health and Medical Care, University of Michigan, 1964, pp. 271-282
- Feldstein, Martin S. Cost-Benefit Analysis and Health Program Planning in Developing Countries, Harvard University Press (mimeo), 1969
- Feldstein, Martin S. Health Sector Planning in Developing Countries, Discussion Paper No. 62 (Feb. 1969) Harvard Institute of Economic Research, Harvard University

Fendall, N.R.E. "Kenya's Experience - : Planning Health Services in Developing Countries," Public Health Reports LXXVIII (Nov. 1963), pp. 977-88

Fendall, N.R.E. "Organisation of Health Services in Emerging Countries," Lancet 11, (1964) pp. 53-56

Fendall, N.R.E. "The Medical Assistant in Africa," Journal of Tropical Medicine and Hygiene, 71 (April 1968), pp. 83-95

Field, Mark G. Doctor and Patient in Soviet Russia, Harvard University Press, 1957

Field, Mark G. "Medical Organization and the Medical Profession" in The Transformation of Russian Society, Cyril Black (ed) Harvard University Press, 1961, pp. 541-552

Field, Mark G. Soviet Socialised Medicine: An Introduction, The Free Press, New York, 1967

Foster, G.M. Problems in Intercultural Health Programmes, Social Science Research Council, Pamphlet No. 12, 1958

Foster, G.M. "Cross-Cultural Medical Education. Some Social and Cultural Factors," Journal of Medical Education, Vol. 41 No.9 Part 2, (Sept. 1966), pp. 166-174

Fox, T.F. "Medical Care in China Today" American Journal of Public Health, Vol. 50 (June 1960), Part 2, pp. 28-35

Fredericksøn, Harold "Malaria Control and Population Pressure in Ceylon," Public Health Reports, Vol. 75 No.10, (Oct. 1960), pp. 868-8

Fredericksøn, Harold "Determinants and Consequences of Mortality Trends in Ceylon," Public Health Reports, Vol. 76 No. 8, (Aug. 1961), p. 659-63

Goode, Richard Comment on R. Fein "Health Programmes and Economics Development" in The Economics of Health and Medical Care, University of Michigan, 1964, pp. 282-5

Hall, Thomas L. "Planning for Health in Peru - New Approach to and Old Problem," American Journal of Public Health, LV1 (Aug. 1966), 1296-307

- Hall, Thomas L. Health Manpower in Peru, Johns Hopkins Press, 1969
- Han, Leo-Min- A Historical Sketch of the Public Health College and Training Center, Gondar, 1965 (mimeo)
- Haskins, Caryl P. The Scientific Revolution and World Politics, Council for Foreign Relations, Harper & Row
- Hilleboe, Herman Ex Schaefer, Morris Papers and Bibliography on Community Health Planning, Graduate School of Public Affairs, State University of New York at Albany, 1967
- Hitch, C.J. and McKean, R.N. The Economics of Defence in the Nuclear Age, Atheneum, New York, 1966
- Holmes, Alan C. Health Education in Developing Countries, Nelson, London, 1964
- Horwitz, Abraham Health and Progress in the Americas, Pan American Health Organization, 1966 (Miscellaneous publicat., No. 80)
- Horowitz, A. Health a Basic Component of Economic Development, Pan American Sanitary Bureau, Misc. Publications, No. 66, 1961
- Hyde, Henry Van Zile (ed) "Manpower for the World's Health: Report of the 1966 Institute on International Medical Education. Association of American Medical Colleges," The Journal of Medical Education, Vol. 41, No. 9 (Sept. 1966), Part 2
- King, Maurice (Ed) Medical Care in Developing Countries, Oxford University Press, Nairobi, 1966
- Kissick, William L. "Health Manpower in Transition," Milbank Memorial Fund Quarterly, Vol. XLVI, No. 1 Part 2, Jan. 1968
- Landes, Jacob H. Development and Practice of a Public Health Unit in Israel, U.S. Operation Mission to Israel, Tel Aviv, March 1957
- Liebenstein, Harvey, Economic Backwardness and Economic Growth, John Wiley & Sons, New York, 1957
- Lindblom, Charles E. "The Science of 'Muddling Through'," Public Administration Review, Vol. XIX, Spring 1959 pp. 79-88

- Lucas, A.E. Mainland China & Birth Control: A Re-evaluation of Policy Fluctuations and Continuities, Harvard University Seminar on Contemporary China, 1969 (mimeo)
- McDermott, Walsh "The Role of Biomedical Research in International Development," The Journal of Medical Education, Vol. 39 No. 7, July 1964, pp. 655-669
- McDermott, Walsh "Medical Institutions and Modification of Disease Patterns," American Journal of Psychiatry, 122 (June 1966), pp. 1398-1406
- McDermott Walsh "Modern Medicine and the Demographic - Disease Pattern of Overly Traditional Societies: A Technologic Misfit," Journal of Medical Education, Vol. 41, No. 9 Part 2 (Sept. 1966), pp. 137-162
- McKeown, Thomas "Medicine and World Population" in M.C. Sheps and J.C. Ridley (eds) Public Health and Population Change, University of Pittsburg Press, 1968
- Malenbaum Wilfred Health and Productivity in Poor Areas, Discussion Paper No. 115, The Wharton School of Finance and Commerce, Dept. of Economics, University of Pennsylvania
- Maystrakh, K.V. The Organization of Public Health in the U.S.S.R., U.S. Dept. of Health Education and Welfare, Russian Translation Programmes, Bethesda, 14 Maryland, 1956
- Mead, Margaret (ed.) Cultural Patterns and Technical Change, UNESCO, 1953
- Molina, Gustavo & Noam, Ilana F. "Indicators of Health, Economy, and Culture, in Puerto Rico and Latin America," American Journal of Public Health, LIV (1964) 1191-206
- Morison, Robert S. "Opportunities and Obligations with Respect to International Action by United States Medical Education," Journal of Medical Education, Vol. 41, No. 9 Part 2 (Sept. 1966), pp. 255-266
- Mushkin, Selma J. "Health Programming in Developing Nations" June 1963 (mimeo)
- Mushkin, Selma J. "Health as an Investment," Journal of Political Economy, (Supplement) LXX (1962) 129-57
- Myrdal, Gunnar Asian Drama: An Inquiry into the Poverty of Nations, Pantheon, New York. 1968

Nelson, John P. "Infantile Diarrhoea and Neurological Defect," Hospital Practice, July 1967

Pan American Health Organisation Health Planning : Problems of Concept and Method (Scientific Publication No. 111), Washington D.C., 1965

Pan American Health Organisation Study Group on Coordination of Medical Care : Final Report, Washington D.C. 4-8 August, 1969 (mimeo)

Paul, Benjamin D. (ed). Health, Culture and Community, Russel Sage Foundation, New York, 1955

Perlman, Mark "Some Economic Aspects of Public Health Programmes in Underdeveloped Areas" in The Economics of Health and Medical Care, University of Michigan 1964, pp. 286-99

Polgar, Steven "Health Action in Cross-cultural Perspective" in Handbook of Medical Sociology, Freeman, H.E., Levine Sol, Leo G. (Eds) Prentice-Hall, 1963

Popov, G.A. Some New Techniques in Public Health Planning, W.H.O., Geneva, 1965 (unpublished document, N.H.F./SDM/WP/3.65)

Refshauge, William Australia's Role in International Health Service - the Present and the Future, Malcolm Gillies Memorial Lecture, Royal North Shore Hospital, Sydney, 11 August, 1969 (mimeo)

Reiser, Stanley J. "The Role of Voluntary U.S. Foreign Aid: A Case Study of Project Hope" Public Policy, 1966, Harvard University Press

Rosinski, E.F. & Spencer, F.J. The Assistant Medical Officer: The Training of the Medical Auxiliaries in Developing Countries, Chapel Hill, North Carolina The University of North Carolina Press, 1965

Roza, Frans W. "Training Health Worker in Gondar, Ethiopia" Public Health Reports, Vol. 77, No. 7 (July 1962), pp. 595-601

Ruderman, A. Peter Comment on M. Perlman, "Some Economic Aspects of Public Health Programs in Underdeveloped Areas" The Economics of Medical and Health University of Michigan, 1964, pp. 299-305

Ruderman, A. Peter "Economic Factors and Medical Education in the Developing Countries," Journal of Medical Education, Vol. 41, No. 9, Part 2 (Sept. 1966); pp. 162-165

- Ruderman, A. Peter "The Epidemiologist's Place in Planning for Economic Development," Public Health Reports, July 1966, pp. 615-21
- Saunders, L. Cultural Difference and Medical Care, New York, Russel Sage Foundation, 1954
- Sidel, Victor W. "Feldshers and 'Feldsherism': The Role and Training of the Feldsher in the U.S.S.R.," New England Journal of Medicine, 278, April 25, May 2, 1968, pp. 934-40, 981-92
- Sierra Leone Government Ministry Of Health National Health Plan, Freetown, 1965
- Spicer, Edward H. Human Problems in Technological Change, Science Editions, John Wiley & Sons, Inc., New York, Paperback Edition, 1965
- Spruyt, Dirk J. et al. "Ethiopia's Health Center Program - Its Impact on Community Health," Ethiopian Medical Journal, Vol. 5, No. 3, July 1967, pp. 1-87
- Stapleton, Thomas Some Problems in the Development of Medical and Psychiatric Services. Paper read to Kongres Nasional Ilmu Kesenatan Anak Pertama, Semarang, Indonesia, April 1968 (mimeo)
- Stapleton, Thomas Problems in Aiding Developing Countries, Paediatric Society of Victoria, March 1969 (mimeo)
- Stauffer, R.B. "The Biopolitics of Underdevelopment" Comparative Political Studies, Oct. 1964
- Takulia, H.S., Taylor, C.E., Sangal, S.P., Alter, J.D. The Health Center Doctor in India, Johns Hopkins Press, Baltimore, 1967
- Taylor, Carl E. & Hall, Marie-Francoise "Health, Population and Economic Development," Science, 157 (1967), pp. 651-657
- Titmuss, Richard M. The Health Services of Tanganvica: A Report to the Government, Pitman, London, 1964
- United Nations Science and Technology for Development. Report at the U.N. Conference on the Application of Science and Technology for the Benefit of Less Developed Areas, U.N., New York, 1963
- U.N. Research Institute for Social Development Cost-Benefit Analysis of Social Projects, Report of a Meeting of Experts Held in Rennes, France, 27 Sept.-2-Oct., 1965, Report No. 7, Geneva, April 1966

Wakamatsu, Eiichi "Overseas Medical Cooperation" in N. Hirgash (ed.) Medical Problems in Southeast Asia, Centre for Southeast Asian Studies, Kyoto University, 1968, pp. 11-25

Winslow, C. The Cost of Sickness and the Price of Health, W.H.O., Geneva, 1951

W.H.O. "The Use and Training of Auxiliary Personnel in Medicine, Nursing, Midwifery and Sanitation," W.H.O. Technical Report Series, No. 212, 1961

W.H.O. Suggested Outline for Use by Countries in Discussing Health Planning, Geneva: World Health Organisation, 1964

W.H.O. Inter-regional Seminar on National Health Planning, Addis Abeba, Ethiopia, 11-12 Oct. 1965. Interim Report, Geneva (Unpublished W.H.O. Document PA/66.5)

W.H.O. "National Health Planning in Developing Countries," W.H.O. Technical Report Series No. 350, 1967, Geneva

W.H.O. World Health Statistics Report, Vol. 21, 1968

W.H.O. "An International Study of Health Expenditure," W.H.O. Chronicle, March 1968, Vol. 22, pp. 83-94

Worth, Robert and Shah, Narayan K. Nepal Health Survey, University of Hawaii Press, Honolulu, 1969