THE TEACHING OF PUBLIC HEALTH IN EUROPE
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Preface

In 1957 WHO published a monograph on “The teaching of hygiene and public health in Europe”. In view of the many changes that have since taken place, the time is now ripe for a new publication that brings up to date the facts reported by Grundy & Mackintosh. The previous monograph consisted to a large extent of analysis, discussion, and comment. Since much of this is equally valid today, there is no attempt in the present work to cover the same ground again. The first section contains a review of changes that have occurred during the past twelve years and a survey of current trends in public health teaching, and draws heavily on opinions expressed by educators from Europe and elsewhere at a series of meetings organized by the WHO Regional Office for Europe.

The greater part of the present volume is devoted to accounts of public health teaching and specimens of curricula in individual European countries. Under each country heading, the national system of health organization and general medical education is briefly described, and this is followed by a survey of the teaching in public health available to undergraduate and postgraduate students. For more detailed information on schools of public health and postgraduate courses, the reader is referred to WHO’s World Directory of Schools of Public Health.¹

Most of the information for the sections on individual countries was obtained through a series of visits by two consultants, Professor B. Kesić of Zagreb and Professor R. Senault of Nancy. Further visits were made by Dr J. D. Cotrell and staff members of WHO. The text of each section was sent to the government concerned for comment and correction, and in some cases it was partially rewritten by local experts.

The number of countries dealt with has been increased from 19 to 27. Since the USSR and other socialist countries of eastern Europe were not discussed in the earlier monograph, particular attention is paid here to public health education in that part of the continent. A special section is devoted to a brief description of present-day health services and teaching in the USSR, and the general principles underlying Soviet medicine. Except in occasional

points of detail, statements in this section are also applicable to other eastern European countries.

A short note is included on the special needs of students from many African and Asian countries, who come to Europe for both undergraduate and postgraduate training in a wide variety of subjects.
Education and training have always been given a prominent place in WHO programmes. This is natural enough, because health services everywhere depend on a pyramid of trained personnel, and in many countries a shortage of doctors and other health workers is one of the main obstacles to the provision of adequate personal and community health care. WHO has also consistently stressed the importance of public health in a general medical education. In developing countries, prevention is the most economic and often the only practicable approach to massive disease problems. Furthermore, the most serious deficiencies in undergraduate medical education more often relate to public health, or preventive and social medicine, than to clinical and pathological medicine. This is true of both developing and developed nations. Most medical students throughout the world become reasonably competent in clinical diagnosis and case management, but they are not always well prepared for medical practice in today's world because their training gives insufficient attention to prevention, organizational subjects (the scope, structure, manning, and operation of health, welfare, and social security services), and the behavioural sciences. These subjects usually appear in the undergraduate curriculum under the heading of public health studies, and their main purpose should be to improve the competence of doctors in clinical work and health care practice. Once it is recognized by teachers and students that this, and not the presentation of technical and specialist aspects of hygiene and community health care, is the primary objective, the case for including "public health" in a general medical education needs no special pleading. A better understanding of these facts has been encouraged in recent years by WHO conferences and other meetings on education that have enabled teachers of clinical medicine and teachers of public health to exchange views.

There is now a widespread conviction that the whole undergraduate curriculum should be permeated by a preventive and social outlook. The value in undergraduate teaching of an integrated approach that takes in the social and community aspects of medical problems is also generally
accepted. However, integration implies that there is something to integrate. The student cannot be taught to see the medical and social problems of patients as a unified whole until he has received a firm grounding in clinical subjects on the one hand and in the structure and organization of health and welfare services on the other. Clearly, the clinical teacher cannot provide systematic instruction in organizational subjects without undue deviation from his main purpose, and such teaching is usually given in a non-clinical department, i.e., a public health department with a range of activities and contacts outside the teaching hospital.

Particular problems of undergraduate and graduate instruction are evidently related to the over-all aims of medical education. For practical purposes, these aims are to train relatively large numbers of general and specialist medical practitioners and smaller numbers of medical administrators, specialists in community health care, teachers, and biomedical research workers. All these medical workers, whatever their grade or specialty, have to discharge professional obligations within the context of a particular society, and it follows from this that their education cannot be designed effectively without due regard for the existing and emerging forms of health services in the society in which they will live and work.

No single undergraduate curriculum can now provide fully comprehensive training: every doctor needs postgraduate training and in-service experience to complete his medical education. There are indications that schools in Europe and elsewhere are tending increasingly to conform to this principle by offering a basic education in the biomedical and social sciences, followed by further training in various vocational specialties, one of which is general practice. A major problem that has been discussed in many places and at many levels is the most suitable length and content for the basic professional education common to all doctors; in other words, where specialization should begin, and on what foundations. The section of this monograph devoted to medical education in the USSR describes the outcome of a rational approach to this problem, and solutions adopted elsewhere in Europe are indicated in other sections.

During the last decade there has evidently been substantial progress in the refashioning of undergraduate medical education in European countries. In the majority of schools, the public health curriculum has been liberated from the straitjacket of sanitary and laboratory practices. Health care has ceased to be regarded as synonymous with medical care of the sick. In clinical pathology, the concept of diagnosis and treatment has been broadened to include a social element. The hospital is no longer the only place where clinical instruction is given. The study of disease as a community phenomenon is now usually given a place in the undergraduate curriculum. Statistics, sociology, psychology, epidemiology, and organizational aspects of health services are represented in the curricula of most schools. Teaching, though still far from making full use of modern
techniques and aids, is steadily being rid of anachronistic formality. Obsolete examination procedures have been abandoned in some schools, and are under review in many more.

The advances are impressive, but one inevitably wonders whether curricula and teaching methods are being revised fast enough and radically enough to keep pace with the scientific, technical, and socio-economic revolution that is straining the adaptive capacity of both individuals and human societies.

No developments in recent years have more profoundly influenced the form and content of undergraduate medical education than the expansion of medical care outside the hospital and the development of team practice from specially constructed health centres. The importance WHO attaches to these developments and to the inclusion of the concept of prevention in health care services is evident in many recent publications. The subject of the two-day technical discussions at the Sixteenth World Health Assembly in 1963 was: “The education and training of the physician for the preventive and social aspects of clinical practice”.

Recent changes in attitudes towards hospitalization are part and parcel of the development under consideration. In particular, the last decade has witnessed much greater discrimination in the selection of patients for admission to hospital, and a policy of earlier discharge. How far these practices are based on economic considerations, how far they are attributable to therapeutic advances and the medical benefits of early ambulation, and how far they are due to recognition of the adverse effects of prolonged hospitalization and the greater practicality of home care and ambulatory methods of treatment, it is hard to say. But whatever the explanation, it is now recognized that for conditions that can be treated and managed at home, hospitalization has certain medical, social, and economic disadvantages. This is especially true, for instance, of young children, the elderly, and the mentally disordered, who tend to deteriorate rapidly in the climate of social isolation and dependence of the institution. These considerations are in part responsible for an enlarged concept of care in the community and the expansion of medical care services outside the hospital; they have also contributed to the introduction of extra-hospital clinical instruction on a limited scale into the undergraduate curriculum.

In a number of countries, short attachments to a general practice and exercises in case management in the patient’s home have been introduced in the clinical period, and in a few places the clinical student is required to
attend a health centre. Schools with an associated health centre for teaching and demonstration now have the means of training the undergraduate to be the leader of a socio-medical team, an aspect of medical education that has hitherto been seriously neglected. There is little substance in the objection that a health centre conforming to university standards may mislead the student because it is not representative of the general run of conditions in medical practice. The gulf between the desirable and the actual can readily be brought to the student's notice by suitable observation visits.

By and large, the behavioural sciences are being introduced somewhat slowly into medical undergraduate studies. The reasons for this are doubtless complex. In some quarters a fear has been voiced that social studies may result in turning out medical practitioners who are more social workers than physicians. This fear is based on a misconception. The presence of health officers and sanitary personnel has lifted the burden of environmental sanitation from the shoulders of the ordinary doctor, and in many countries has enabled sanitary science to be removed from the undergraduate medical curriculum altogether. The inclusion of social workers in health care teams will have a similar effect: it will relieve the doctor of a burden of social case work, and the medical student will no longer need to become competent to act in this field.

In many ways the practising physician is becoming more and more a collator and interpreter of facts assembled by others—for much of his time he is, in effect, the director of a health care team—but he needs more than ever to be made aware of the importance of social problems in medical practice, to know what social and allied workers can do, and how to make full and proper use of them.

Extension of the concept of epidemiology to embrace the non-communicable diseases, disabling conditions, accidents, and personal attributes is another notable recent development, the value of which has been demonstrated in many areas of medicine. Formerly restricted to the study of communicable diseases, the term "epidemiology" is now commonly applied to a set of analytical techniques widely used in planning and in etiological studies, and this broader subject now has an established place in a number of countries. Even where there is reluctance to use the word in this wider sense, an enlarged epidemiology is often taught under such headings as "health statistics" and "geographical pathology".

The volume of psychiatric disorders in medical practice has been widely publicized in recent years. Indeed, it has been said, with some truth, that psychiatry is one half of medicine. With notable exceptions, however, this fact has so far failed to secure the recognition it deserves in undergraduate training. Although substantial improvements have occurred in the last 10 years, psychiatry is still a relatively neglected subject in most undergraduate schools.
FOREWORD

The meaning and usage of "social medicine" were always somewhat controversial, and the expression appears to be falling out of favour. It has perhaps served its purpose, as there is no longer any need for a reminder that most sickness has social aspects and social implications, that social services are often needed in addition to medical care services for effective health maintenance and treatment, that there is a social factor in the etiology of many diseases, and that medical care services are an integral part of the social services of a community. These principles have found appropriate expression in the design of undergraduate curricula in many European countries.

The adoption of less formal methods for assessing the ability and performance of students is a welcome development. Many schools that previously depended largely on the traditional written examination have supplemented or replaced this by a combination of progress reports, dissertations, extended oral examinations, and multiple-choice questionnaires. The superiority of these methods over unprepared exercises in composition at speed is now widely accepted. Each rational reform of the traditional examination system is a step towards dispelling a not uncommon student attitude that equates study with a process of preparing for examinations and elevates success in examinations to a primary objective.

WHO has always taken a special interest in schools of public health. Historically, this interest can be traced back to a tradition established 40 years ago by the International Health Division of the Rockefeller Foundation and by the Health Organization of the League of Nations. Functionally, it is attributable to WHO's awareness that the organization and development of health services depends in large measure on placing specially trained personnel at key points. Health planning, evaluation, and the administration of health services, for instance, now rely on complex techniques that can only be acquired by systematic studies. The time has passed when highly gifted persons with no special training could be recruited from medicine and other professions to fill key posts in the health services. The large-scale organization of personal health services, the administration of mass screening procedures, and the conduct of research into organizational and other health problems are instances of developments that have underlined the need for a variety of training courses for specialized and senior health officers. Alongside environmental medicine and community health surveillance, these developments are also a part of public health practice in many countries.

Unlike undergraduate schools of medicine, postgraduate schools of public health offer a wide range of academic courses. In addition to a main postgraduate course for doctors making their career in public health, they usually run specialist courses not only for medical graduates but also for other professional workers, such as sanitary engineers, public health inspectors, public health nurses, hospital administrators, health
educators, and veterinarians. It is not unusual for them to contribute to postgraduate courses offered by other university departments and schools, and to offer courses preparing their nationals for public health practice overseas. As few schools of public health exist outside Europe and the Americas, schools in both these continents commonly receive students from other countries in considerable numbers to pursue both general public health courses and more specialized public health training to equip them for practice in their own countries.

A few years ago, a WHO Expert Committee identified at least five major areas of public health that ought to be represented in general public health courses: organizational subjects, health statistics, epidemiology, environmental health, and microbiology. These subjects form the nucleus of a public health curriculum designed to train men and women in the investigation and assessment of health situations and in the planning and administration of health services. There is a discernible trend in many schools of public health to build main courses around the basic subjects, and to concentrate mainly on the principles and techniques of decision-making. Nevertheless, a formidable number of additional subjects appear in the general and special syllabuses of different schools. A list compiled from the prospectuses of 25 European schools includes demography, health economics, social psychology, health education, physical education, maternal and child health, occupational health, health aspects of housing and town planning, the administration of rural and other non-institutional health services, international health, mental health, nutrition, the methodology of health planning, health in the tropics, and the organization of mass campaigns.

Many schools distinguish between subjects that are basic and compulsory for all students and elective subjects that are pursued in greater depth within the limits of a general course. Even so, there is a general conviction that the range of specialization now demanded of the physician cannot be accommodated within a general public health course; in other words, it is no longer feasible to present special public health subjects in sufficient depth during a single academic year. Among steps that have been taken to meet this situation are an enlargement of the scope of elective subjects in the general curriculum and the provision of ad hoc specialist courses. It is now generally accepted that the senior medical administrator requires formal specialist training, and that existing general public health courses are not the answer. One suggestion is that circumscribed specialist courses should be offered to doctors who already possess a diploma in public health or its equivalent. An alternative solution would be the provision of specially designed courses for doctors who possess a higher medical qualifi-
cation, but who have not necessarily pursued a postgraduate public health course. It is probably too early to say whether these divergent approaches will find permanent expression in separate patterns of postgraduate public health training, or whether they will in due course be reconciled within a single pattern. Be this as it may, special courses for hospital administrators, medical administrators in government service, medical planners and future public health teachers are already offered by some schools. In 1964, a Study Group was convened by WHO to examine whether courses are needed for national staff with higher administrative responsibilities in the health services and, if so, what form they should take.¹

In his introduction to an earlier monograph on the teaching of public health in Europe² the late Professor Jacques Parisot, a distinguished medical educationalist and an outstanding figure of his generation in the field of world health, wrote as follows:

Medical training institutions, like all others, must improve and adapt themselves to the continual advances in both medicine and social welfare, advances which have been particularly remarkable during the last half-century.

In amplification, it might be added that both undergraduate and postgraduate institutions must look farther and farther ahead in the adaptive process if they are to free the instruction they offer from the shackles of the present as well as the past.

In so far as undergraduate training is vocational—as in some degree it must be—it cannot, by the nature of things, keep fully abreast of the times. The clinical student is taught within the constraints of services that rarely succeed in keeping pace with the fast-changing concepts and needs of society. The time-lag between scientific discovery and application dictates a second limitation; the process of revising curricula also takes time. Much the same applies to graduate education.

The gap between immediate and long-range requirements is bridged by a non-vocational education, the purpose of which is to provide a basis for future professional competence rather than to turn out finished practitioners; or in other words, to ensure that in the years ahead the doctor will be able to adapt his skills and attitudes to whatever disease and social situations may evolve, and that he will be competent to employ new techniques in the pursuit of new objectives and to take his place in the multi-disciplinary practice and research that are already on the horizon. The gap can be narrowed by a forward-looking curriculum that gives due weight to such matters as the medical applications of electronic data processing, the progressive quantification of medicine, the use of improved instrumentation, and the introduction of automated screening techniques. This curriculum

will impart a more fundamental understanding of the principles of the physical and biological sciences and almost certainly a greater competence in mathematics than is at present usual; it must also be broad enough to embrace the less exact sciences of sociology and economics in relation to health. Nothing short of an education that satisfies these requirements can ensure that the doctor of the future will be able to hold his own in a world of unprecedented social change and scientific advance. Education of this kind also implies that the student should as far as practicable be made explicitly aware of the evolving social scene—the health implications of progressive urbanization, the development of new industries, ever-increasing population mobility, new attitudes towards family life, new ways of living—and be invited to consider the range of probable developments in the organization of health services. In other words, it must be an education that takes full account of the far-reaching consequences of the major breakthroughs already made in biomedical and communications sciences, and alerts the student to the kind of medical practice that can be expected 20 years from now and to the kind of society in which doctors and patients will be living before the graduate of 1970 is half way through his professional career.

Of course, a forward-looking syllabus could be designed with greater confidence if one knew what the future holds. The systematic study of the future of biomedical science and medical care has hardly begun. Rigorous long-range forecasts in these fields are not at present within our grasp, yet in designing curricula to meet future needs something better than informed intuition will be needed if we are not to be overtaken by events. An outline forecast of likely developments in biomedical sciences and medical practice and in the organization of medical care services in the 1970s and 1980s would be of great value to the medical educationalist, and this is not impracticable. The probable applications of recent discoveries during the next 10–15 years can be foreseen with a fair degree of certainty. Techniques such as sophisticated trend-extrapolation and the systematic expert opinion polls now used for forecasting in military and industrial affairs might well be adapted to the purposes of the medical educationalist and the long-range health planner. Possible major developments in biomedical sciences and medical care practice are an appropriate subject for systematic study. It is unlikely that individual medical schools could undertake this task without serious dissipation of effort; it would probably be better for national or regional organizations to carry out the investigation. A study of the future of medicine and a review of projection techniques that could be used in the health field would be a valuable service to medical education and health planning.
Present-Day Trends in Europe

During the past decade three conferences organized by the WHO Regional Office for Europe have looked critically at current teaching, explored some of the dissatisfactions expressed by European medical teachers, and discussed suggested remedies.

The first of these conferences, held in Edinburgh in 1961, dealt primarily with the education of the medical student in relation to future practice as a family doctor, but much of it was relevant to the teaching of public health subjects. In 1964, a symposium was held in Nancy on the teaching of the preventive aspects of medicine at all stages of the undergraduate curriculum, in both pre-clinical and clinical departments. The 1966 Lisbon symposium on the education of the public health physician was the lineal descendant of the European Study Conference on Postgraduate Training in Hygiene and Preventive and Social Medicine, held in Gothenburg in 1953.

Despite the differences in subject matter, certain common aspects were considered by these three conferences. The most fundamental was the present overcrowded state of curricula and the constant pressure for inclusion of new subjects.

As Ellis has pointed out, overcrowding of the curriculum due to the mere addition of new subjects means that students “have no time for reflection or for their own integration of knowledge”. Some medical schools have tried to compensate for the addition of new subjects by the withdrawal of old ones, but such piecemeal subtraction is notoriously difficult.

The third method is radical overhaul and the development of new curricula based on a new concept of how to teach medicine, or its special aspects such as public health, social medicine, etc. Basically, the proponents of one type of revision much discussed today emphasize the development

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of the student's powers of scientific thinking and reasoning rather than acquisition of all the knowledge and all the techniques considered relevant to the current practice of medicine or public health. In other words, instead of being supplied with a set of blue-prints applicable to any situation he is likely to meet, the student should be given the basic knowledge and skills needed to solve new problems as they arise.

Even if it were possible to acquire an encyclopaedic knowledge of medicine and the skills to apply it, the volume and rapidity of change mean that much of the knowledge would be outdated tomorrow and its possessor left relatively defenceless.

Adoption of the revised approach would mean that the teaching of many details relevant to the specialty and the skills needed to apply them would have to be postponed to the stage of specialist postgraduate training (e.g., "detailed topographical anatomy is best regarded as a subject for specialist vocational training").

In terms of postgraduate education in public health, the new approach would mean that, in addition to the teaching of general principles and basic knowledge, courses would concentrate on subjects that have a wide application, either in problem-solving (e.g., statistics and epidemiology) or in the selection of remedial measures (e.g., psychology and sociology). On the other hand, it would mean considering fundamentals to the exclusion of much detail on matters that in many countries are now delegated to non-medical experts, such as those aspects of hygiene that are dealt with by sanitary engineers.

These may be regarded as avant-garde views, and certainly they are not yet generally accepted. Many believe that vocationally oriented training for present-day practice is still the best form of training in medicine and public health. Those holding this view would disagree quite strongly with, for example, the provision of optional or elective courses on various subjects, as they believe that these would lead to disintegrated teaching.

Nevertheless, the more general approach seems to find support in both east and west. At the Lisbon symposium Professor Petrov of the USSR quoted the ancient saying that a student is "not just a bowl to be filled but a torch to be lit". At the Edinburgh conference Professor Sensault of France declared that "the training of the doctor-to-be is the training of his mind and not the saturation of his memory". As Boesch pointed out at the same conference, there are two kinds of learning: the kind used by electronic computers—the storing of data and their relationships—and the kind that enables a man to reason and construct computers. An

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1 General Medical Council (1967) Recommendations as to basic medical education, London.
applied scientist such as a physician needs both, it is a question of striking the right balance.

In the USSR another solution has been found: early specialization. After a joint course lasting two years there are separate courses for general physicians (therapists, but including surgeons, etc.), paediatricians, and hygienists. The same procedure is used in Czechoslovakia, whereas in Romania there is separate training for paediatricians but not for hygienists. In Poland, the Warsaw medical academy is the only one offering separate training for paediatricians.

Further experiments are being carried out in the USSR on rather similar principles, but this time concerned with clinical specialization, e.g., surgery. The whole medical curriculum is now divided into three stages instead of two: basic medical sciences and general clinical medicine are each taught for two and a half years, and the sixth year is used to give students some “orientation” (in Russian “profilization”) in the field they intend to specialize in—after graduating. This means that details not essential to basic medical education can be eliminated from the pre-clinical sciences and the clinical teaching, and taught in the appropriate specialization course in the sixth year.\(^1\)

Similar thinking is evident in the United Kingdom. Looking towards the future, the General Medical Council said that it could “surmise the possibility of a basic course of instruction, reduced to four-and-a-half or eventually four years instead of the present five, but followed by a carefully oriented clinical course lasting for two years or more, depending on the field of medicine in which the graduate seeks to practise”.\(^2\)

These examples illustrate the point that much of the detail at present included in undergraduate curricula should be reserved for postgraduate training. The early part of the curriculum would be more science-based and the latter part more vocational than at present.

There is yet another method whereby the teaching of public health subjects can be strengthened without adding to the curriculum. It consists of delegating to clinicians and other teachers a good deal of the instruction in preventive medicine and in the social aspects of clinical medicine. This has not proved easy, and is often more honoured in the breach than the observance. The ideal is that the whole curriculum should be permeated by a preventive and social outlook. In general, this comes closest to fulfillment in the socialist republics of eastern Europe, where strong official directives require all teachers to follow this policy.

This method was carefully considered at the 1964 symposium in Nancy, and it was agreed that “Clinicians have many opportunities for teaching preventive medicine to the students in the hospitals and in clinics apart from hospital... Teachers, in dealing with the routine management of the

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2. General Medical Council (1967) *Recommendations as to basic medical education*, London.
patient, should cover the socio-medical approach and give a full description of any social services relevant to the needs of a given patient”.

In some schools this teaching is in part co-ordinated by departments of preventive or social medicine, especially where integrated teaching has been introduced. It can also be complemented by socio-medical ward rounds and the various methods of teaching “medicine outside the hospital”.

In Finland students follow three courses in social medicine, and the second, dealing with the social aspects of clinical medicine, is left to the clinical teachers, who are expected to point out to students the important social aspects of cases under their care. Similarly, in the United Kingdom, the former recommendations of the General Medical Council specified that “During his study of all clinical subjects the attention of the student should be continuously directed by his teachers to the importance of the inter-relation of the physical, psychological and social aspects of disease”.

Gradually a new generation of medical teachers is emerging in Europe, able and anxious to bear these responsibilities. As undergraduate teaching in public health subjects improves, future teachers will be better prepared for these tasks, but the winds of change blow slowly in some countries. In the meantime, much of this teaching must remain in the hands of departments of public health and social medicine.

Their task can be powerfully aided by the new drive towards “integrated” teaching, in which all aspects of an anatomical or physiological system or a specific “topic” are treated in a single course, and by a team rather than by individual teachers.

This type of teaching was also considered at the Nancy symposium, where it was agreed that “rigid and often antiquated compartmentalization of the curriculum increased the difficulties of students, ... [whereas] whenever the various departments that collectively constitute a medical faculty co-operate in their teaching duties and research activities, the long period of education evolves in a way that makes it clear to the students that medicine ... is really one and indivisible”.

Integration of this type is a feature of the revised French curriculum, though it is being implemented rather slowly, and is strongly encouraged by the General Medical Council in the United Kingdom. In Sweden it was introduced 10 years ago in the clinical part of the course. It takes perhaps its most advanced form in Europe in the new curriculum in Newcastle upon Tyne and at the Hacettepe School in Ankara, and its use is planned in some of the new schools in the German Federal Republic and in the experimental curriculum in Poland. More details are given in the sections dealing with the individual countries.

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1 WHO Regional Office for Europe (1965) The teaching of the preventive aspects of medicine in medical schools in Europe, Copenhagen (Document Euro-279).

2 General Medical Council (1957) Recommendations as to the medical curriculum, London.
The three conferences already referred to, dealing with undergraduate and postgraduate education, called for greater emphasis on certain basic subjects, such as epidemiology, sociology, and psychology.

Epidemiology

The concept of epidemiology varies widely in different parts of Europe. In the USSR it is essentially "the science of the objective laws underlying the origin, spread and decline of infectious disease in human population groups and of the prophylaxis and eradication of these diseases".\(^1\)

Recently, however, it has been conceded that epidemiological methods of investigation "have come to be employed in investigations of non-infectious diseases: cancer, hypertension, cardiovascular diseases, etc. ... clearly, the use of epidemiological methods of research in the study of non-infectious diseases, ... while quite justified, does not imply an expansion of the subject-matter of epidemiology as a science and, therefore, the use of the term for other purposes is purely optional and cannot be considered as strictly scientific".\(^2\) These uses of epidemiological methods are not taught to any great extent in courses on epidemiology in the USSR.

In the United Kingdom epidemiology is defined as "That branch of medical science that is concerned with the study of the environmental, personal, and other factors that determine the incidence of disease".\(^3\) Modern epidemiologists would add "disabilities and injuries". In fact, it is common in the United Kingdom to regard epidemiology as a "set of techniques" that can be applied to a wide range of problems encountered in the different aspects of medical practice.

This difference in interpretation gives rise to wide differences in teaching between medical schools that restrict their courses to communicable diseases and those that devote at least as much time to the epidemiology of non-communicable diseases, disabilities, and accidents. In between are faculties that give a more or less full course on the classical epidemiology of infectious diseases and graft on to this a brief study of the epidemiology of non-communicable diseases. Very broadly, these three divisions are characteristic of teaching in eastern Europe, north-western Europe, and central and southern Europe respectively.

Although the Russian definition of epidemiology, which extends it to include "prophylaxis and eradication", would probably not be universally accepted, in practice both causes and control are usually dealt with in the same course, e.g., "epidemiology and prevention of accidents".

In much of Europe there seems to be a growing belief that "general epidemiology" is a set of widely applicable problem-solving techniques,

complementing the body of knowledge concerning individual diseases that is taught under the heading of "special epidemiology".

It will therefore be readily understood that the teaching of epidemiology in the undergraduate curriculum may be restricted to the course of infectious diseases, or may extend to detailed consideration of the methods of prevention and control. In the United Kingdom, where the techniques of epidemiology are regarded as applicable to the study of non-communicable diseases, disabilities, and accidents, some schools consider these techniques a matter for postgraduate rather than undergraduate study, and there is little formal instruction in "general epidemiology". The "special epidemiology" of communicable diseases is covered in the course on microbiology, and that of other conditions during the general clinical consideration of the diseases or systems concerned. This may be reinforced during ward teaching, especially if there are combined or "integrated" ward clinics, or ward teaching organized by the departments of social medicine.

Participants in the Nancy symposium in 1964 were urged to take a broad view of epidemiology as a dynamic subject. Every effort should be made to make the subject interesting, and medical students should take part in properly designed surveys of simple data. An example of experimental teaching along these lines at the Nancy Medical School was quoted, and variations on this theme can be found in the sections on individual countries, e.g., the courses offered at Plovdiv in Bulgaria and at St Thomas's Hospital Medical School in the United Kingdom.

A further symposium, organized by the WHO Regional Office for Europe in Brussels in 1967, considered the teaching of epidemiology in undergraduate medical schools. The importance of epidemiology in the work of the public health official was stressed, but it was also pointed out that some study of the subject is necessary in the undergraduate curriculum, since every doctor will have to answer queries from his patients concerning such matters as the relationship between smoking and cancer of the lung. A review of the teaching of epidemiology in Europe revealed that by and large this was very inadequate in the undergraduate curriculum, and only a few centres were covering the subject adequately at the postgraduate stage. Detailed proposals were made concerning the teaching of epidemiology at all stages of medical training.

On the subject of postgraduate teaching Grundy & Mackintosh noted: "At the Göteborg conference it was agreed that, as one of the fundamental aims of training was to produce an understanding of epidemiological principles, the teaching of biostatistics and epidemiology should pervade the course". 1

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The Lisbon meeting in 1966 devoted considerable time and a panel discussion to the topic of epidemiology. Here the concept of epidemiology as a basic essential tool of public health administration was further developed. It was pointed out that epidemiological work was essential to supply the administrator with:

1. surveillance of current disease situations;
2. feedback data on the effect of remedial measures;
3. early warning of future disease trends.

A majority of participants felt able to extend the concept of epidemiology to cover the necessary “sensitive and imaginative ... surveillance of the strange and unknown risks which may suddenly befall a modern community: for example the side effects of new drugs such as thalidomide, the toxic effects of pesticides, and so on”.

It is in the United Kingdom that the concept of epidemiology as a multi-purpose tool of administration has been most widely developed and taught, and epidemiology is regarded as one of the cornerstones of the course. For instance, the following subject headings appear in the detailed curriculum of the Edinburgh course for the Diploma in Social Medicine.

**Analytical studies in epidemiology**

1. Communicable disease
2. Non-communicable disease
3. Medical care provision for the community
4. Health behaviour and education

In an address to a symposium of the Society of Medical Officers of Health, Professor Morrison even reversed this order: “Medical care research is only one side of epidemiological study. The other side is co-operative study with clinicians of disease problems.”

Undoubtedly very similar techniques would be used in the USSR to study broad aspects of community health and medical care systems, but again they would not be regarded as coming within the field of epidemiology.

**Sociology and psychology**

*Undergraduate teaching*

In 1957, Grundy & Mackintosh stated: “Although there is a widespread conviction that it is as important for the medical student to be instructed in the social sciences as in the natural sciences, few formal courses on

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sociology are to be found in the curricula of European schools”. \(^1\) Although 
there has been some advance since then, this statement remains broadly 
true today.

During the Edinburgh conference in 1961, the importance of a holistic 
approach by the physician to his patient was frequently brought out in 
papers and discussions. Allied to this is the increasing interest, noted in a 
growing number of countries, in “medicine outside the hospital”.

Broadly speaking, sociology is concerned with the structure and behav-
ior of communities and societies and, in the present context, with their 
influence on health, disease, and the patient. Psychology is concerned 
with individual make-up and behaviour, with the individual’s reactions 
towards his group and other individuals, and with the influence of these 
factors on his own health.

In the United Kingdom, Susser has suggested that the actual functions 
of medicine in society are three-fold: “At the organic level, to cure and 
prevent disease ... at the personal level ... to reassure, and allay anxiety in 
individuals ... at the social level ... it helps to absorb the social strains of 
sickness”. \(^2\) Few physicians in Europe would disagree with these words 
or doubt that social factors are important in disease. “The significant 
question”, Susser continues, “is whether they need to be equipped to handle 
the notions relating to these factors, or whether an empirical, amateur 
approach is sufficient.” \(^2\)

In passing, it is interesting to note the views of such a well-known 
“biologist” as Macfarlane Burnet, within the general concept of human 
biology. “For large groups within the profession and especially for the 
doctor of first contact, education in depth will be or should be concentrat-
ed on the behavioural sciences, the sciences that deal with the individual as 
a whole.” \(^3\)

A glance at the current medical curricula in European countries suggests 
that many teachers are still convinced that “an empirical, amateur approach 
is sufficient”. Some are indifferent to the contribution the social scientists 
may make to medicine, and others are even fearful, suggesting that over-
concentration on these subjects may tend to turn the doctor into a super-
social-worker.

In the USSR and other socialist republics of eastern Europe, considerable 
time is devoted to such subjects as political economy, Marxist-Leninist 
philosophy, and scientific communism. During these courses the psycho-
logical teaching of Pavlov is emphasized.

In Zagreb (see p. 236) and elsewhere in Yugoslavia, first-year students 
take a course in sociology with special reference to medicine. The course

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\(^1\) Grundy, F. & Macintosh, J.M. (1957) *The teaching of hygiene and public health in Europe*, Geneva


in Zagreb occupies some 60 hours and is given in the first and second semesters. It deals with the general theory of social development, explaining the origin of social groupings, tendencies in their growth, and the development of institutions instrumental in the formation of organized social life. Emphasis is laid on the possibilities in the contemporary world for a humanistic and ethical revival, with particular reference to the meaning and objectives of socialist humanism. Attention is also drawn to the close relationship between physical and mental health on the one hand and social environment on the other, to the importance of health in society, the socio-economic foundation of the utilization of health services, the position of public health in the self-governing system, and the ethical aspects of medical practice.

Similarly, a proposal has recently been put forward in Romania to teach sociology and psychology. Sixty hours of lectures and 15 hours of seminars would be devoted to each, during one semester.

In Amsterdam (see p. 143) the course on “anthropobiology” (cultural anthropology) includes aspects of sociology and anthropology taught during the first and second years.

In Newcastle upon Tyne (see p. 223) students take a course of 16 lectures and four visits, which deals with the origin and development of human society and contemporary society, and their relation to health.

The optional course on sociology and psychology at Edinburgh covers such subjects as: normal mental attributes and processes, perception and thought mechanisms, personality, the individual and society, the family, the community, stratification, social change, social pathology, social services, social medicine (social, cultural, and economic influences on the community pattern of disease, problems of behaviour and attitudes with relevance to medical practice), the scientific study of behaviour, and elementary statistics. The course, which lasts for one year, occupies about five hours a week, with a considerable amount of discussion and study group teaching.

The new school in Hanover offers two optional courses on sociology. During the first semester, as part of the “introduction” to medical studies, there are six lectures on “medicine and society”. In the third semester there is a broader course on “sociology in medicine”.

These few examples of courses in sociology give some idea of the slowly growing trend towards inclusion of the subject in the medical undergraduate curriculum. This trend can be expected to continue, especially if sociology and other behavioural sciences are accepted as part of the general study of human biology.

Psychology has gained much ground in curricula in recent years. At the Edinburgh conference, “There was unanimous agreement that general and medical psychology should be taught throughout the whole of the medical course... Psychology should be taught as a basic discipline,
introduced alongside the other sciences basic to medicine. Thereafter medical psychology—the psychology of patients, physicians and their relationships—should run on through the clinical years." 1 Today, in at least some medical schools in 10 or more European countries, psychology is included in the curriculum at varying times, and aspects of "medical psychology" as defined above are dealt with in many courses on social medicine.

At the Nancy symposium little specific reference was made to sociology, but great importance was attached to psychology in the early years of training. It was agreed that the teaching of psychology should continue throughout the whole period of medical training, gradually merging into the teaching of psychiatry. "During this transition, every effort should be made to teach the early signs of mental ill-health, laying great stress on the preventive aspects of psychiatry." 2

Finally, it may be apt to quote the statement in the new recommendations of the General Medical Council of the United Kingdom: "In the Council's view the study of human structure and function should be combined with the study of human behaviour. The Council considers that instruction should be given in those aspects of the behavioural sciences which are relevant to the study of man as an organism adapting to his social and psychological, no less than his physical environment. Instruction in the biological and sociological bases of human behaviour, normal emotional and intellectual growth, and the principles of learning theory should be included." 3 The Council further considered that the relevance to clinical problems of psychology and sociology (together with other basic sciences) should be illustrated throughout the whole period of medical studies.

Postgraduate teaching

Grundy & Mackintosh devote an excellent paragraph 4 to the reasons for studying applied psychology during postgraduate training for administration in public health. The Lisbon symposium reaffirmed the importance of this subject, and the report states: "Together with this (sociology) should go a general knowledge of human psychology, especially as applied to groups of people, and social anthropology so that the student grasped the necessity of studying why people think and act in certain ways". 5

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3 General Medical Council (1967) Recommendations as to basic medical education. London.
Nevertheless, little importance seems to be attached to the teaching of psychology in postgraduate public health courses in Europe. Out of 20 countries with organized postgraduate courses in public health, only five list psychology in their curricula, either alone or under a general heading of "behavioural sciences". In some of these five cases, the emphasis is mainly on psychology in occupational medicine. This is not to say that psychology is not covered at all in the remaining 15 countries. Some aspects may be discussed in dealing with sociology or, especially in the eastern European countries, in extensive courses on health education. It is interesting to note that several countries that omit instruction in psychology in their postgraduate courses, do include it as a compulsory subject in the undergraduate course.

Slightly more attention is paid to sociology in postgraduate curricula, either as a subject in its own right or under "social medicine". It receives most emphasis in the United Kingdom and the Netherlands.

Statistics

*Undergraduate teaching*

The general heading "statistics" usually includes both statistical method and vital and health statistics linked with demography.

*Statistical methodology — biometry.* Grundy & Mackintosh described this as "a newcomer in the medical curriculum whose claim to a place is not everywhere established". This is still true, and even where the subject is included it is often a voluntary or optional course (as at Oslo and Kiel) and is not popular with students. A WHO Symposium on teaching statistics to medical students, held in Geneva in 1962, considered that vital and health statistics was the only aspect of the subject "already taught satisfactorily in many medical schools".

Although important for public health as the basis of many epidemiological techniques, an elementary knowledge of statistical method is just as essential to the whole science of medicine as to any other science.

The arguments for teaching statistical methodology to medical students were clearly stated in the previous monograph, and need not be repeated here. Grundy & Mackintosh conclude that every doctor does not need to be an accomplished statistician, but he should be aware of the existence of statistical methods, their purpose and their limitations. "There are aspects

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of medicine and the sciences on which medicine relies which are almost beyond comprehension to anyone who cannot think statistically. 1

The Nancy symposium was in general agreement with the report of the Copenhagen symposium, and stressed the importance of students collecting, collating, and analysing data for themselves.

Even where statistical methodology is included in undergraduate curricula, there are two schools of thought regarding the content and method of teaching. The one favours a fairly extensive course in statistical methodology, treating it more or less as a science in its own right. The following course at the Free University of Brussels is an example:

*Elements of general statistics* (10 hours theory, 10 hours practice)

Analysis of data: grouped, ungrouped, continuous, or discrete; histogram, mean, variance, coefficient of variation, etc.

Elementary notions of probability

Binomial distribution and its applications

Normal distribution; fitting a normal distribution, \( \chi^2 \) test; normal sigmoid curve, standardized normal distribution; tables

Theory of samples, estimation of mean in large and small samples, standard error of the mean; estimation of a proportion, standard error of a proportion

Testing statistical hypotheses: equality of means in large samples

Small independent samples from populations with the same variance; F-test, T-test: small samples that are not independent; T-test for paired comparisons

Contingency tables: \( 2 \times 2, 2 \times L, L \times L \); \( \chi^2 \) test; comparison of proportions

Linear regression with one independent variable; standard error of the regression coefficient (b); test of \( b = 0 \)

Correlation between two normally distributed variates; standard error of the correlation coefficient.

On the other hand, some schools believe that training in the use of numerical methods should not be given in one concentrated lecture series, but at appropriate times throughout the course. Accordingly, statistical methods are described and used in relation to the student’s current studies in a way that makes them meaningful and relevant to his work at the time and in the future. Professor R. C. Browne of Newcastle upon Tyne (personal communication) states: “It is most important to demonstrate the relation of figures to clinical and preventive practice. This requires a good deal of skill and involves linking the mind of a senior member of staff who may be a mathematician who thinks in symbols with the mind of a medical student who thinks in pictures or solid geometry.”

The relatively simple syllabus at Newcastle upon Tyne, where there is extensive integrated teaching, can be given as an example.

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Stage 1 (first term)

Four hours of lectures and discussions, introducing concepts of variability in biological observations. These lectures are linked with students’ own measurements in practical work in the physiological laboratories, e.g., the students’ own haemoglobin values or contrasted tests of respiratory function in groups of smoking and non-smoking students. The results of the statistical analysis are discussed with the students in the laboratories.

The lectures are complemented by printed notes, containing a few simple exercises, and cover such aspects as frequency distributions, measures of position and scatter, mean of a sample, standard deviation of a sample, the standard deviation as a measure of scatter, use of sample mean for estimating a population mean, standard error, comparison of two sample means, tests of significance, confidence limits, and paired comparisons. It is important to note that the student starts to use the techniques as soon as he has learned them.

Stage 2 (fifth term)

Four to five hours of lectures on the measurement of health and various aspects of vital and health statistics, leading on to the statistical assessment of the results of epidemiological studies, tests of significance, scatter diagrams, and simple correlation coefficients.

One hour’s lecture on “design and analysis in therapeutic trials”, linked to the analysis of students’ experiments on themselves in pharmacology.

Stage 3

This stage deals mainly with epidemiology. There are two or three formal lectures on epidemic patterns of disease and methods used in studying them, supplemented by detailed study during the course on microbiology and during the introductory teaching on each system of the body.

In view of the admitted difficulties and admittedly unsatisfactory teaching of statistical methods in many European schools, a course suggested by the Copenhagen symposium on teaching statistics to undergraduate medical students is shown below. It was stressed that there should be great flexibility, and that the importance of each section varied from country to country and according to the conditions under which the doctors worked.

1. Elementary statistical methods and principles

This section, which should be compulsory, requires a minimum of 20 hours. The need for practical work is emphasized.

- General introduction on variability in biological and medical data
- Sources of data (surveys and experiments)
- Reduction and presentation of data, frequency distributions (means, variance, etc.)
- Introduction to probability
- The concepts of population and sample, sampling problems
- Statistical estimation, tests of significance and their application, e.g., to proportions and means
- The concepts of association (including correlation) and of concomitant variables and causal relationship
- The need for properly designed surveys and experiments
2. Application of statistical methods to medical and biological problems

The teaching should demonstrate the relevance of these methods to the curriculum as a whole. The problems covered should include:
- Physiological and biochemical norms
- Diagnosis and symptoms
- Prognosis and survival rates
- Controlled clinical trials
- Epidemiological surveys
- Biological assays of drugs and toxic substances

3. Vital and health statistics

The course at Zagreb, for instance, closely follows these recommendations.

As medicine becomes more and more scientific and less dependent on tradition and authority, the need for a sound, if elementary, grasp of statistical methods and principles is bound to grow. In fact, the judicious use of statistics is sure to expose the weakness of authoritarianism based on impressions. This view is gradually being accepted in Europe, and most proposals for new curricula include courses in statistics or biomathematics (as in Poland, at Ulm in Germany, etc.).

*Vital and health statistics.* Although this subject is generally better taught than statistical methods, the amount of teaching varies widely in different schools, and in some is still very sketchy.

In many European countries, increasing attention is being paid to the accuracy of mortality figures relating to causes of death. This depends ultimately on the accuracy of the death certificate filled in by the individual physician, and students are not everywhere given sufficient training in this important task. An example of thorough teaching in death certification is the course on legal medicine at Copenhagen University (see p. 85).

Postgraduate teaching

Although demography and vital and health statistics are important subjects in the curricula of public health courses in Europe, there are quite wide variations in the amount of time devoted to statistical method, e.g., from "statistics and demography: 4 hours" in Milan to "statistical methodology: 48 hours" in the "basic" course at Leiden.

Of 21 countries with organized postgraduate courses in public health, four have a negligible amount of instruction, seven have 20 or more hours, and the remainder have something in between. Of course, in some countries the amount of time devoted to any individual subject may vary quite considerably from school to school. In general, though with some
notable exceptions, there is an upward gradient in the number of hours devoted to statistical methodology from the east and south of Europe towards the north and west. In countries that stress the importance of this subject the most favoured length of the course is some 20–25 hours, but Romania is exceptional with 80 hours, mainly practical work (see p. 172).

To stimulate teaching in statistics and epidemiology, the WHO Regional Office for Europe sponsors a French-language course in Brussels, an English-language course in London, and a Russian-language course in Prague.

**Hygiene and environmental sanitation**

The term “hygiene” is used here in the restricted sense described by Grundy & Mackintosh, i.e., as a synonym for sanitation—the nineteenth-century concept of public health.

**Undergraduate teaching**

In many European schools today all teaching of preventive and social medicine is the responsibility of departments of hygiene, but much that is now regarded as social medicine has in most cases been grafted on to what might be described as “sanitation and sanitary techniques”. In some countries the next step has been to split the Chair of hygiene into two Chairs, a Chair of hygiene and a Chair of social medicine, as described by Grundy & Mackintosh.²

Of greater real interest, however, is the time devoted to the teaching of hygiene in its restricted sense, and in Europe today this varies widely. Grundy & Mackintosh³ set out very clearly the arguments for reducing the teaching “in technical hygiene and laboratory practice in public health bacteriology and chemistry to a minimum in the undergraduate curriculum”, and also considered the reasoning and problems of countries that did not entirely favour such reductions. These arguments, which are valid today, rest on the premise that a developing public health service employing full-time public health physicians and a staff of ancillary health officials (sanitary engineers, inspectors, etc.) will take the burden of environmental sanitation from the shoulders of the ordinary doctor. Consequently, the undergraduate will need instruction in general principles only, and detailed techniques can be left to specialized postgraduate training. In the British Isles today there is a definite trend in this direction, but elsewhere, as Grundy & Mackintosh⁴ predicted, acceptance of the new curriculum is much slower.

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² Ibid., p. 131.
³ Ibid., p. 137.
⁴ Ibid., p. 135.
Nevertheless, some moves in this direction can be seen today. In Copenhagen, where a new Chair of Social Medicine is being established, teaching in hygiene is being reduced partly as a result of the transfer of some subjects to the new Chair, but also because of the transfer of some aspects of hygiene to the postgraduate course for prospective general practitioners (see pp. 85 and 88).

In France, in some schools at least, the new reformed curriculum has resulted in a reduction in the time devoted to hygiene and other aspects of preventive medicine. Another straw in the wind is a recent reduction in the hygiene course at Oslo from 60 to 54 hours.

Whatever the final changes may be, medical students in most European medical schools are at present devoting a great number of hours to the study of hygiene, as a few examples will show:

<table>
<thead>
<tr>
<th>Country</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>USSR:</td>
<td>144 hours</td>
</tr>
<tr>
<td>Germany (Kiel):</td>
<td>65-70 approx.</td>
</tr>
<tr>
<td>Sweden:</td>
<td>45 hours.</td>
</tr>
<tr>
<td>Poland:</td>
<td>19 hours.</td>
</tr>
<tr>
<td>Portugal:</td>
<td>20 hours (minimum)</td>
</tr>
</tbody>
</table>

On the other hand, schools such as those at Amsterdam, Geneva, and Newcastle upon Tyne provide only about five general lectures, with no laboratory work except in microbiology.

Postgraduate teaching

While it did not minimize the importance of environmental hazards to the health of European communities, the Lisbon symposium said very little about the details of instruction in environmental sanitation. The general consensus of opinion was that in most European countries nowadays the physician, even the public health physician, should be given a firm grounding in the basic principles of environmental sanitation rather than an extensive knowledge of technical details.

The symposium took the view that: "The major functions and tasks of the present-day public health physician reveal a major shift in emphasis from environmental factors to human factors ... and the need for collaboration with a growing number of disciplines ... His functions do not necessarily demand knowledge of technical detail in these disciplines, but a
sufficient knowledge of principles to use specialists to solve technical problems.\(^1\)

As regards the curriculum, a considerable number of participants believed that “a vast amount of technical detail, particularly in those subjects in which the future health officer can delegate responsibility to bacteriologists, engineers, statisticians and other specialists” should be excluded. At the present time this view is not universally accepted in Europe, partly because these “other specialists” are often not integral members of the public health team. In general, the extent of postgraduate hygiene teaching varies in much the same way as that of undergraduate teaching. It should be borne in mind that in the USSR postgraduate instruction is for graduates of the hygiene faculties, not the therapeutic faculties, and therefore builds on a different foundation.

The extent of the divergence in teaching today can be seen by comparing, for instance, the curricula for the postgraduate courses at Edinburgh (p. 230) or Leiden (p. 148) with those at Gothenburg (p. 185) or Madrid (p. 176).

The only other point that needs mentioning is the increasing use of sources of ionizing radiation in the generation of power, in industry, and in medicine. This has brought fresh environmental hazards in both clinical medicine and the general environment. In most European countries it is considered essential for all doctors, particularly public health officials, to have at least a general knowledge of the risks entailed and of where these risks are likely to be encountered.

**Occupational health and rehabilitation**

*Undergraduate teaching*

Grundy & Mackintosh do not specifically mention rehabilitation, but set out the reasons for including occupational health in the undergraduate curriculum.\(^2\)

At the Nancy symposium the dangers of occupational diseases and other hazards were stressed. At the same time it was pointed out that they were excellent examples of conditions that could be prevented either by avoidance of exposure or by the adequate protection and education of workers. “Visits to industrial plants where the conditions under which a particular job is performed can be seen and studied are essential. Reports following such visits, with stress on suggested ways of protecting the health of workers, might be helpful.”\(^3\)

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With occupational health, like other subjects, there is a difference in practice between the socialist republics of eastern Europe and most other European countries. In the east the occupational health services cover all aspects of prevention and medical care for the workers, whereas elsewhere the services are mainly concerned with prevention, first aid, and early detection of occupational diseases.

In some highly industrialized European countries, medical students are given a considerable amount of instruction in occupational health and rehabilitation.

Various aspects of occupational medicine are covered fairly fully in the curricula of all the socialist peoples’ republics, partly in the hygiene courses, partly in the courses dealing with the organization of health services. The study of occupational diseases may be considered as a subject in its own right, as in Bulgaria where 19 hours (11 lectures and 8 practical) are devoted to it, or as a sub-division of internal medicine, as in Czechoslovakia where the course lasts 26 hours (10 lectures and 16 practical), or as in Romania where a combined course on occupational diseases and hygiene lasts 86 hours, with much practical work. In addition, various aspects of rehabilitation are considered, with some emphasis on the physician’s role in the assessment of working disability and residual working capacity.

In western Europe occupational medicine is perhaps most thoroughly covered in France, where the 120 hours of social medicine teaching are divided equally between occupational health and rehabilitation and preventive medicine and hygiene. The syllabus of the occupational health and rehabilitation course is outlined on p. 110.

At Kiel in Germany, industrial hygiene is taught as such for one hour per week in the fourth semester, about 16–18 hours in all. In Sweden different aspects are considered in both the hygiene and the social medicine courses.

In Spain the subject is dealt with under the headings of “industrial health and hygiene, including diseases, industrial poisonings, control of ionizing radiation” and “invalidity and rehabilitation”, part of the course in social medicine and administration (23 periods). There is also an interesting period devoted to “hygiene of ships and health problems of seafarers”. In the United Kingdom there is great variation. Newcastle upon Tyne, for instance, has an 18-hour course on “environmental medicine”, given by the Department of Industrial Health, which deals mainly with the working environment. It is described in more detail on p. 223. The same school also considers occupational diseases as such during the integrated teaching courses. At St. Thomas’s Hospital Medical School, the time available under various headings does not exceed 8–10 hours, including a visit to a coal-mine. Again, such subjects as occupational diseases and assessment of disability are considered incidentally during the clinical courses.
Postgraduate teaching

Grundy & Mackintosh\(^1\) drew a distinction between "occupational health" and "occupational medicine". They regarded the latter as a separate specialty, and the former as an important subject in all public health courses, closely linked with the "personal health services".

This is consistent with the present situation in Europe as a whole. Occupational medicine is everywhere a separate specialty, whether recognized formally or not. In the eastern European countries, the departments of industrial hygiene and occupational diseases within the institutes for postgraduate training run a variety of courses for specialists; in Romania, for example, there is a 9-month course in occupational hygiene and a 6-month course in occupational medicine. In other European countries there are courses organized by universities (e.g., Belgium, United Kingdom), by special institutes (e.g., Finland) or by schools of public health and institutes of preventive medicine (e.g., Leiden, London, and Rennes).

However, the extent to which occupational health is taught in the general courses on public health varies considerably. In the eastern European countries, aspects of the subject are covered both in courses dealing with the organization of health services and in courses in hygiene. In other European countries there are great variations. In the second part of the Gothenburg course, for example, 97 of the 276 hours are devoted to occupational health, whereas at Leiden the subject as such is not mentioned in either the "basic" postgraduate course in social medicine or the subsequent course in public health administration. However, Leiden has a separate postgraduate course in occupational medicine (see p. 148).

In a course offered until 1968 at the London School of Hygiene and Tropical Medicine, the subject was still dealt with fairly extensively under various headings, such as physiology, occupational health, occupational psychology, and ergonomics, whereas at Edinburgh these subjects have been replaced in the curriculum by broader and more general headings, such as "host, agent and environment".

At Rennes nine hours are allotted to occupational medicine, and other aspects may be included under the heading of "physics-chemistry-toxicology".

In some places it is realized that many clinical specialists as well as public health physicians need some specific training concerning occupational diseases and injuries, e.g., internists, accident surgeons, dermatologists, chest physicians, etc. Too often this training depends more on the interests of individual teachers and local pathology than on organized programmes, but in Poland, for instance, some aspects of public health are introduced

into the training of clinical specialists. Vyšohlid has emphasized the need for extra-mural training to help students understand the importance of social problems, of broad preventive measures, and of a holistic approach in clinical work.

Finally, in north-west Europe especially, considerable emphasis is placed on the psychological aspects of industrial health.

**Health education**

**Undergraduate teaching**

In connexion with undergraduate teaching Grundy & Mackintosh do not specifically mention formal instruction in organized health education. They discuss the “education of patients” as a joint function of the family practitioner, the nurse, and other members of the health team, but this is not education of the public. The reasons for teaching medical students about health education have been summed up in the report of the WHO Expert Committee on Training of Health Personnel in Health Education of the Public.

At the Nancy symposium it was agreed “that there was an urgent need to teach medical students the principles of health education. The title Doctor implied that the holder had a permanent responsibility, not only for treating his patients, but also as a health educator who should endeavour to impart enlightenment in matters of health to the whole family” and, one might add, community. The family interview was considered of the utmost importance, particularly in paediatrics and geriatrics, and the student should be brought to understand how people think and feel, and to avoid being biased by his own personal or psychological problems when giving advice to his patients. Students should be given practical work to do on health education.

As Mackintosh has said: “Teaching people about health is as old as the hills but a well-defined course in health education ... is something that demands the careful training of teachers.” The role of every doctor in organized health education of the public is greatly stressed in the socialist people’s republics of eastern Europe, as explained in the chapter on health services in the USSR. Consequently, it is in these countries that undergraduate teaching in health education is most highly developed.

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3 WHO Regional Office for Europe (1965) The teaching of preventive aspects of medicine in medical schools in Europe, Copenhagen (document Euro-279).
In the USSR the main subject "social hygiene" includes "health education in public life, in institutions, tasks and role of voluntary bodies, etc.". Similar headings occur in the curricula of other eastern European countries. In Romania, as part of their practical work, students working in groups of five are required to draw up a plan for health education in a community, with special reference to local conditions. In Zagreb, students have an opportunity to take part in organized health education projects in the field.

Elsewhere in Europe health education is specifically mentioned in only five of the illustrative curricula given in the sections on individual countries. As a subject it is mainly omitted in north-west Europe, although presumably some mention is usually made during consideration of other, broader topics.

Postgraduate teaching

In view of the fact that health education is a major therapeutic weapon of social medicine it does not, except in eastern Europe, receive adequate attention in European postgraduate courses, and the subject is still omitted from several postgraduate curricula. At the Lisbon symposium the importance of health education was repeatedly emphasized, and many participants felt it was insufficiently taught.

A good course on health education is included in the training for a master's degree in public health at Zagreb. There are 30 hours of theoretical teaching, plus practical field work. The course covers methods and techniques of health education, work with small and large groups, the role of health education in public health, and action to promote public health.\(^1\)

In other parts of Europe courses vary in length from four to some 20 hours. However, increasing attention is being paid to the subject in many countries, and this trend can be expected to continue. In the Netherlands and the United Kingdom particularly, health education is being closely linked with studies of the behavioural sciences.

In the USSR the scientific study of health education receives powerful support from the Central Research Institute of Health Education. In western Europe this function is partly fulfilled by voluntary organizations, such as the International Union for Health Education, and the Central Council for Health Education in the United Kingdom.

As an example of increasing interest in western Europe, special courses in health education are given at the University of Perugia, and the course director has visited other European countries as a WHO consultant. The London University Institute of Education offers a diploma course in health education for physicians, other health workers, and teachers.

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Medicine outside the hospital

In undergraduate teaching in Europe today, more and more is being heard of “medicine outside the hospital”, “domiciliary visits”, “general practitioner attachments”, and so on. In some countries (e.g., the Scandinavian countries) it is customary for a senior student to act as *locum tenens* for a general practitioner. In the United Kingdom attachments to selected general practitioners are becoming common; the school at Edinburgh (where there is a Chair of General Practice) has incorporated a form of community doctor service, and Guy’s Hospital Medical School plans to do the same.

Students at Zagreb spend time both in urban health centres (general practice units) and in a rural area, where they see all aspects of health protection and health care in a community. Such field work is customary elsewhere in Yugoslavia and in all other eastern European countries, where students spend time in polyclinics, sanitary-epidemiological institutes, and special preventive clinics.

Elsewhere, as in Brussels and at St Thomas’s Hospital Medical School in London, students are allotted a family to visit and follow for varying lengths of time.

The purpose of all these schemes is partly clinical. They serve to introduce the student to conditions not requiring hospital admission or to a follow-up of previous hospitalization. At the same time, however, the student learns something of the relationship of the environmental and social background to health and illness, and sees that his hospital patient has a “past” and a “future”. He is thus encouraged to take a holistic view of the patient rather than simply concentrating on a disease.

Such activities are clearly very useful in teaching various aspects of public health and social medicine, and they also show students something of the working and organization of a family practice, in which many of them will eventually work. This vocational aspect is given particular stress in countries such as Yugoslavia.

Where they exist, formal schemes for work with family practitioners require careful organization, and the practitioners need to be specially selected and briefed in the purposes of the scheme. Ideally they should be given some status as recognized teachers, and introduced as widely as possible into other aspects of teaching.

Administration and management

In recent years there has been increasing interest in the need to train future public health services staff in administration and management. The subject is partially discussed on page 226 in the section on the United Kingdom, where it is particularly topical at present.
In their discussion of "public health administration and practice", Grundy & Mackintosh pointed out that teaching methods should "remain experimental, with change in emphasis from time to time, and with the addition of new subjects as occasion requires".¹

The demand that has arisen during the past decade for teaching in methods and techniques of administration and management is an example of such change of emphasis and new subject matter. In many European countries, though not in all, the public health officer carries executive functions and, as Grundy & Mackintosh stated, he should be given "what he needs in order to do his job better",² including his planning and executive functions.

In addition he is, or should be, more and more required to take part in national and regional planning and the joint execution of projects. To do this he has to come into contact and communicate effectively with men from other disciplines who may be highly trained in the science and practice of administration.

At the Lisbon symposium, the question was raised whether the health service trainee should be a lay administrator with a knowledge of medicine, or a physician with a knowledge of administration.

"Without prejudice to the need for lay administrators, it was stressed again and again that physicians with a good knowledge of administration were required. However, if such physicians are to compete with the professional administrator on equal terms they must themselves have a training in administration which measures up to professional standards."²

The curriculum of the new course for a Diploma in Social Medicine at Edinburgh is given on page 230. This aims, inter alia, to provide adequate instruction in administration. It includes such subjects as "organization theory, economics and finance (10 hours)" and "systems design, work study methods, operational research, planning, etc. (35 hours)". On the other hand, the WHO Regional Office for Europe, during the past decade, has stimulated the establishment of three courses specifically concerned with hospital and medical services administration: an English-language one in Edinburgh (since discontinued), a French-language one in Brussels, and a Russian-language one in Moscow.

These two examples serve to illustrate a difference of opinion in Europe today. Some feel that a single course should be arranged to provide adequate training for those working in all branches of administrative medicine (e.g., ministry staff, area health officers, and hospital service and social insurance administrators). Others take the view that persons engaged more specifically in planning, administration, and management

need special courses that cover these aspects of their work in depth without overloading the curriculum.

Probably the solution adopted will vary from country to country according to the organization of the national health services, but it should be based on a detailed job analysis of the managerial functions of various health administrators and on a careful comparison of the resulting job descriptions. It is doubtful if this has yet been done to any extent in any European country, although it is understood that such an analysis is under way in Sweden.

A small working group convened to evaluate the WHO-sponsored courses in hospital and medical services administration has this to say on the subject: "Though they have many needs in common, somewhat different training is required for the general health services administrator and the administrator specializing in the management of hospitals and the organization of hospital services. This may be provided in various ways, including completely separate courses, a common course with elective subjects (or) an introductory basic or core course followed by special courses"\(^1\) (see sections on Belgium and the Netherlands).

Whatever the final decisions on methods may be, there is no doubt that the need is felt in many countries for better training in administration and management.

**Training schemes**

For many years the training programme for various types of public health practitioner in the socialist republics of eastern Europe has comprised 3–4 years of systematic supervised training, consisting partly of in-service and home training in the student's own branch of work and partly of one or more periods of theoretical training in a postgraduate institute. Normally, the entire programme is organized by the postgraduate training institute and is under its overall supervision. Naturally the student receives a salary throughout the whole period.

A rather similar system of training was proposed\(^2\) in the United Kingdom in 1961. After two years spent in general practice, psychiatry, geriatrics, paediatrics, etc., the student would undergo a probationary period of 6–12 months attached to a local health authority or a regional hospital board, followed by an academic course of at least nine months broadly covering the development, organization, and evaluation of health services, and dealing specifically with epidemiology, the use of computers, statistics, methods of measurement, and general sociology. There would then be a practical course with a minimum of formal lectures (except for case

\(^1\) WHO Regional Office for Europe (1967) *Working group to evaluate the courses in hospital and medical services administration*, Copenhagen (document Euro-1380).

conferences). This would include attachments to hospitals and local health authorities and, if possible, to university departments of social medicine, where the student could work on research projects, reviewing specific problems in community medicine, with a view to preparing a thesis.

A very similar training scheme is already being introduced in one section of the Scottish health services, but it is as yet too early to predict whether or not other western European countries will follow suit.

Teaching methods and training of teachers

The idea that a teacher of medicine or public health should have some training in teaching methods is new in Europe, and as yet relatively unpalatable. Undoubtedly some people have a natural gift for teaching, and students soon pick them out and flock to their lectures. Others may never teach with the same brilliance, but with training their performance can be greatly improved. There is no place today for the so-called teacher who lectures with his eyes on his notes and with little or no recourse to blackboard or other visual aids. In the careful training of teachers the nursing profession is far ahead of the medical profession.

Even a good and experienced teacher may have something to learn from a professional in the field of education. It may be too much as yet to ask senior teachers to review their teaching methods (though this has been done in the USA), but newcomers and junior teachers can receive training as a matter of course and avail themselves of fellowships for the study of teaching methods and field practice abroad.

Although very little is done in Europe at present to improve teaching methods, this matter loomed large in the Lisbon symposium, where two papers were considered. One, largely theoretical, dealt with the teaching and learning process and with the knowledge and skills required for teaching in a public health school. The second, more practical, dealt with the mechanics of teaching, such as lectures, group discussions, visual aids, and so on. In the final evaluation of the symposium, teaching methods received more comment and recommendations than any other individual subject.

One or two experiments are being carried out with programmed instruction and teaching machines, e.g., at Bristol for the teaching of statistics. Many European schools still rely heavily on the didactic lecture, but there is a slow trend towards more active student participation in teaching and learning by the use of seminars and other methods.
Health Services and Teaching in the USSR

In the earlier monograph on public health education Grundy & Mackintosh stated, "As the [public health] course is vocational to a considerable degree, although in an academic setting, it is evident that teaching and practical work in an institute or school should be closely related to current practice."¹ This is equally true today. However much a public health course may be broadened and pruned of unnecessary detail, it is still designed to fit a man for the life's work to which he has been called, namely to foster and preserve the health and well-being of communities, families and individuals.

In studying public health education in any country, therefore, it is essential to know at least the basic principles on which the practice of public health is founded.

References in this work to public health systems and practice will normally be restricted to special principles considered important in individual countries. Further details can be found in a companion report produced by the WHO Regional Office for Europe.² However, since the USSR was not dealt with in the previous monograph, the principles governing the practice of public health and hygiene in that country are set out in this section at rather greater length.

Many aspects of Soviet education in public health and hygiene are more readily understood if some of the fundamental principles of Soviet medicine are appreciated.

The public health services of the USSR, which cover all aspects of health protection and medical care, are based on the following principles: (1) the establishment of an integrated, planned State health service; (2) the provision, free of charge, of high-quality medical care; (3) prevention through the use of therapeutic measures in a wide sense and the introduction of dispensary methods of work; (4) health education of the public and wide participation.

² WHO Regional Office for Europe (1962) Health services in Europe, Copenhagen (document Euro-119).
of organizations and communities in building up health protection; and
(5) bringing medical science and medical practice closer together.

In considering the first of these principles, it should be realized that Soviet medicine is firmly based on a political philosophy. This bald statement may seem strange to readers from other countries, but it should be remembered that in other parts of Europe, too, increasing stress is being placed on giving the future doctor a good grounding in social sciences. In the Soviet Union, the theories and principles of behaviour developed by Pavlov are closely associated with the basic Soviet tenet of “dialectical materialism”.

Pavlov developed a materialist theory of the phenomenon of mind and laid the foundation of materialist psychology. He postulated that the mental activity of man is based on material physiological processes that take place in the cerebral cortex. He developed the study of conditioned reflexes, which has had great theoretical as well as practical significance and is regarded as one of the major scientific pillars of dialectical materialism.

Pavlovian thinking permeates all aspects of Soviet medicine and, as will be seen later, students are given a very firm grounding in Pavlovian methods and principles. Much in Soviet public health springs from this all-pervasive belief in material “cause and effect” and hence in the influence of the material environment, in its broadest sense, on human health.

The other side of the coin also receives great emphasis; it is fundamental to Soviet medicine that disease, by diminishing the activities of normal life and reducing working ability, makes a strong social impact. Consequently, the ramifications of medicine extend deep into the USSR’s factories and other workplaces. After the revolution, the plans for the new Soviet society demanded a strong and healthy work force, in the farms and the new industrial enterprises alike. This has been assured by a network of health stations for the workers, responsible both for the hygiene of the working environment and for the health of the worker. The care they offer is not restricted to industrial injury or disease, but includes full “front line” care for the worker and often his family, backed up by the resources of the local polyclinic and hospital. As an illustration of the importance attached to the workers’ health, all Soviet medical students receive a firm grounding in such subjects as the hygiene of the working environment, occupational disease and occupational disablement, and the use of dispensary methods in industrial health units.

From the materialist view of the link between the organism and its environment stems a fundamental emphasis on prevention that permeates all Soviet medicine. This is the most important of the principles on which Soviet medicine is based. An American observer, Roemer, has written an interesting appreciation of Soviet medicine as seen through “Western”

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eyes. Referring to the great emphasis on prevention of illness and promotion of health, he states: "It starts with medical education which includes much more attention to instruction in environmental sanitation, health education, and preventive concepts than is found in the West. The status of these subjects and their teachers is obviously higher than in Western medical schools."

The dispensary care system

One of the most striking expressions of the emphasis on prevention in Soviet medicine is the concept of "dispensary medicine" or "dispensarization". Western Europe has long been familiar with the dispensary as an institution for disease control, especially, perhaps, in the form of the tuberculosis dispensary. As long ago as 1910 in the United Kingdom, a Medical Advisory Committee of the Charity Organization Society wrote: "No scheme has proved more effective than that of the anti-tuberculosis dispensary with its specialised examination of patients, its home visits and educative influence, its detection of contact cases, its co-operation with existing agencies for the supply of suitable treatment in each case, the whole forming an efficient method not only of curing the disease but of preventing it." ¹ The transformation of the concept of dispensary care and its extension to every kind of health institution and to cover non-communicable diseases is one of the finest achievements of Soviet medical genius.

Dispensary care lies at the heart of the Soviet system of medical care, and as such is an important item in medical education. The dispensary system includes the following activities:

1. Early detection of illness in the population by means of mass periodical or other examinations (psychological, X-ray, immunological, bacteriological, etc.) in order to reveal the initial forms of disease.

2. Continuous recording and systematic check-up of individuals, families and population groups at special risk.

3. Immediate application of fast-acting therapeutic and preventive measures in order to control disease at the earliest stage of its development, to re-establish working capacity, and to prevent the further spread of disease in the community.

4. Application of therapy and rehabilitation measures in more advanced forms of disease in order to prevent invalidity, and the application of continuous follow-up supervision.

(5) Detection and control of environmental factors—biological, physical, chemical, and social—that adversely affect human life and work and produce disease.

(6) Development of health education in order to involve the whole population actively in the attainment of health and the prevention of disease.

It must be stressed that in the Soviet Union today these activities are organized and directed not only from special units, e.g., tuberculosis or venereal disease dispensaries (where these exist), but from every type of organized health institution: hospitals, industrial health stations, polyclinics, and district medical practices. In fact, much of the actual work is done by the "district medical officer" (equivalent to the "general practitioner" in western Europe) under the general supervision of a senior hospital doctor.

Health education

In the Soviet Union great importance is attached to educating the public in health protection. A good doctor everywhere recognizes the obligation to advise or educate his patients on matters of health. In the USSR this obligation has become a contractual one: individual advice from doctor to patient has in part given way to group education by the doctor of the general public. Every physician, whether he works in a hospital, polyclinic, health station, or sanitary and epidemiological ("sanepid") station, or makes house calls in his district, is required to spend a fixed proportion of his working time on organized health education. The same is true of paramedical and auxiliary personnel. Many hospitals have special health education departments.

Besides being an essential method in curative and preventive medicine, moreover, health education is regarded as "a social duty in which trade unions, voluntary organizations and voluntary workers participate". Responsibility for it is also borne by government departments other than the Health Ministry, especially the Ministry of Education.

It is consequently not surprising that health education looms large in the medical curriculum. A good account of how it is organized can be found in one of WHO’s Public Health Papers. The importance of the subject is emphasized by the existence of a Central Research Institute of Health Education responsible to the Ministry of Health. The Institute is served by three advisory bodies: a council of its own senior staff; a scientific and art council; and a film committee.

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1 WHO Regional Office for Europe (1965) Health services in Europe, Copenhagen (document Euro-119).
Integration of curative and preventive medicine

Functional integration of curative and preventive medicine is much talked of, but never easy to attain. The USSR has gone a long way towards achieving this integration by insisting that the concept of prevention should permeate all health and medical care services. The duty of all physicians and other health staff to engage in organized health education has already been mentioned. The hospital, to which is attached a polyclinic from which the district doctors work, is described as a “therapeutic-prophylactic” institution.

The environmental aspects of public health centre on “sanepid” stations staffed by graduates from the hygiene faculties. These stations are roughly equivalent to the bureaux d’hygiène in France or the health departments of municipalities or other administrative areas elsewhere. Each incorporates a public health laboratory. They work in close conjunction with other organized health services, such as those for industry and schools, with district doctors, and so on. At the local level these is a considerable degree of administrative integration. In most rural rayons (regions) the responsibility for health services lies with a chief physician who is medical director of the central rayon hospital, while his first deputy is in charge of sanitation and epidemiology. All medical students are instructed in detail in these organizational matters.

Physical medicine

The great emphasis placed on physical medicine as a broad concept again stems from the principles of dialectical materialism. Throughout the country there are widespread programmes of physical exercise. Besides the organized physical culture for youth, there are set periods in factories when work stops and all are expected to carry out certain physical exercises. Hospitals have well-developed physical therapy departments, and all convalescent patients are expected to exercise daily.

All students are instructed in “physical education, therapeutic physical culture and medical supervision of exercises” (partially equivalent to “sports medicine”). Medical students are normally required to take part in physical training activities (gymnastics, sport, etc.) throughout their course. They learn how to apply gymnastics, sports, and other physical activities as therapeutic measures. They also learn (usually two hours per week for one semester) how to carry out continuous supervision of persons engaged in organized physical activities—“medical supervision”. This instruction is given at greater length than in most other European countries.

Paramedical staff

Paramedical staff are extensively used in the health services in the field. Nurses, feldshers, nurse-feldshers, etc., play a large role in the application
of the dispensary system, along with the many "follow-up" activities that this system requires, and are also prominent in health education. Para-
medical and auxiliary staff, of course, also perform many other tasks.

Teaching of medicine

Teaching in the USSR is naturally greatly influenced by the principles underlying Soviet medicine and the nature of Soviet medical practice. The division of undergraduate medical education into three faculties, for training "therapeutists", "paediatricians" and "hygiene specialists", is described in more detail in the section on the USSR (see p. 202). These three faculties, together with the faculties of stomatology and pharmacy, are grouped in institutes of medicine responsible to the Ministry of Health, although some institutes have less than five faculties.

All curricula contain a series of subjects of political and socio-economic character, with the aim of developing in the student the idea of a socialist society based on materialist philosophy and of acquainting him with communist ideology. More than 400 hours are devoted to these subjects, which run through the first four years of the course.

The emphasis placed on public health subjects has already been mentioned. These subjects, including microbiology, are taught from the fourth to the tenth semester. Special emphasis is placed on the control of communicable diseases and the organization and administration of health services. Great efforts are made to permeate clinical training with preventive concepts, and the preventive and social aspects of curative activities are particularly stressed.

Finally, much time is devoted to practical work in laboratories and in the field. Work in the laboratory frequently outweighs theoretical instruction (see Table 23, p. 204). Laboratory and field work is usually carried out in small groups of 10 students, who take an active part in the teaching under supervision.

One of the main objectives of this system of medical training is to develop physicians who have, in addition to technical skills, a good understanding of socialized medicine whereby all citizens receive full health protection and medical care through a system of State health institutions. Accordingly, public health and preventive medicine lie at the heart of medical education in the USSR, whereas in some other European countries they are relegated to the fringes.
Medical Students from Asian and African Countries at European Medical Schools*

Europe is one of the world’s great receiving areas for students from developing countries. Over half the fellowships granted by WHO, for instance, include at least some study in Europe.

The period following the Second World War has been characterized by various aid programmes offered by international organizations and numerous European states to developing countries in Africa and Asia. Within these programmes, especially those for bilateral technical assistance, the education of medical students has occupied an important place. At a great many European medical schools, hundreds of students are being taught the science and art that they will eventually put into practice in their native countries.

In considering the education of medical students from African and Asian states, the following aspects of the situation in these countries should be borne in mind:

(1) the main health problems encountered there, such as widespread infectious diseases, high morbidity and mortality among children, mal-nutrition, lack of safe drinking water and basic sanitation, and limited health protection and medical care;

(2) the acute shortage of health workers of all categories, but especially at the professional level.

As the number of professional workers is very limited, most of the actual work of prevention and cure is in the hands of auxiliary health workers, who should work only under the constant guidance and supervision of fully qualified professionals. This should be borne in mind in connexion with the training of future physicians for these countries.

In view of all these facts, it seems justifiable to conclude that the type of physician needed in African and Asian countries today is a public-health-

* Based on a contribution by Professor B. Kesić.

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minded general practitioner, with adequate professional skill in public health practice and a background of well-balanced and sound scientific and technical training. This kind of physician would be able to cope with the complex problems of health and disease encountered in such countries, and would be efficient in his basic functions: leadership, supervision, in-service training, highly skilled practical work, and continuous self-improvement.

The curricula of medical schools taking foreign students should be adapted to the national pathology, social structure, cultural habits, socio-economic conditions, and the organizational pattern of public health services in the countries from which their students come.

Unfortunately, the skills and knowledge offered by the majority of European medical schools to students from African and Asian countries do not prepare the students to cope with the complex health problems existing in their own countries. To bring about at least some improvement in this situation, such schools should add the following subjects to the training programmes:

(1) health organization in African and Asian countries (principles and examples);

(2) tropical medicine (environmental health, nutrition, etc.);

(3) communicable diseases in the tropics (clinical and epidemiological aspects, methods of mass control, vector control, etc.).

As an example of what can be done, the WHO Regional Office for Europe has assisted a medical school in Ireland that takes a large number of foreign students to set up an orientation course in tropical medicine. This was done in collaboration with two English schools of tropical medicine.

At the postgraduate level, two courses “tailor-made” for the student from the tropics are described in the sections on individual countries. These are the course for a Diploma in International Public Health, given jointly by Belgium and the Netherlands, and the course in tropical public health at the London School of Hygiene and Tropical Medicine.
Details of Public Health Teaching in Individual Countries

The following sections are an attempt to describe how public health subjects are taught in individual European countries. Of course, within each country the same curriculum may be taught quite differently by different teachers. The methods they use, the emphasis they give, and their understanding of a subject may all vary widely. It is clearly extremely difficult to compare curricula from different countries and to ascertain how they are taught, even if considerable detail is available.

It is not possible to define some of the terms used, as they have widely varying connotations in different countries. “Social medicine”, “hygiene” and “public health” are obvious cases in point. They have been accepted as given by the various countries, but it is hoped that the sense in which they are used in each case will be clear from the context.

Sufficient detail is given to bring out the salient features of teaching in each country. As far as possible, the time allotted for teaching major subjects is indicated. When it is stated that 16 subjects are covered in 18 hours, the extent of the coverage is fairly obvious. Where much of the teaching takes place in the wards and uses clinical material, it is clear that a large element of chance is involved. It can usually be inferred that such teaching will concentrate on illustrating “methods” rather than on providing systematic coverage of all possible situations.

A further problem is that many matters may be taught under one or more of a variety of subject headings. For instance, alcoholism and drug addiction may be dealt with in lectures on social medicine or psychiatry, as well as in those on pharmacology. Much good public health is often taught in the departments of obstetrics and paediatrics; in many faculties in continental Europe, puericulture and paediatrics are linked subjects, and departments of child health exist in the United Kingdom.

Some indication is given of the amount and timing of teaching in a variety of subjects that, if taught in the right way, may have considerable relevance to public health. Such subjects include microbiology, clinical infectious diseases, forensic medicine, history of medicine, psychology,
and sociology. It should be borne in mind, however, that the curriculum does not always show the total amount of time devoted to social and preventive medicine, for there is a growing trend for clinical teachers to discuss the social and preventive aspects of their own subjects.

The references to research are not intended to be exhaustive, but merely indicate where some of the newer aspects of research on medical care, public health practice, and the epidemiology of non-communicable disease are being carried out.
ALBANIA

Population (1966) 1 938 500

Albania has a socialist medical system under the responsibility of the Ministry of Health. Within each of the country’s 26 regions, the Executive Committee of the People’s Council runs its own health unit. This unit directs all health activity in the region, and is under the technical supervision of the Ministry of Health.

The health services are well organized, and great progress has been made in the health field since the war. Trachoma and syphilis are now completely under control, and epidemics of typhoid fever no longer occur. Nevertheless, intestinal infections in children remain an important health problem.

Undergraduate medical studies

There is one faculty of medicine within the State University of Tirana, which depends administratively on the Ministry of Education and Culture. When the Faculty was founded in 1952, it was responsible to the Ministry of Health, but was incorporated in the newly-founded university in 1957. The Faculty is headed by a Dean and two Vice-Deans, and prepares its own teaching programme and budget.

The school trains general practitioners and physician-stomatologists. The courses for these two groups begin to diverge as early as the first year of study. Until 1960 some 90 students graduated each year, but since then the number has been above 100 and in 1966 there were 148 graduates, made up of 129 general physicians and 19 physician-stomatologists.

Conditions of admission and duration of study

Students for the diploma of Physician are admitted in accordance with a State plan, and are required to hold a certificate of secondary education obtained after 12 years’ schooling, together with a certificate of good health. Holders of the “medical aide” diploma (feldshers) are also admitted if they obtain excellent results at the end of their studies. At first the course lasted five years, but this was increased to six at the start of the academic year 1966/67. The first two years are devoted to the basic
Teaching of public health

Hygiene and public health are taught in the fourth year of studies. This is more or less a classic hygiene course of some 185 hours, fairly equally divided between theoretical and practical instruction. The course includes:

- General hygiene (atmosphere, housing, pollution, etc.)
- Community hygiene (communal hygiene, occupational hygiene, etc.)
- Food hygiene and nutrition
- Personal hygiene
- Hygiene of infants
- General prophylaxis
- Social institutions and organization of health services.

During the course visits are made to various health services institutions. Epidemiology and the control of communicable diseases are covered in the course on infectious diseases. The course on microbiology occupies four hours each week during two semesters of the fourth year. Practical work occupies three and a half hours a week.

Postgraduate education

Postgraduate education is provided by the Faculty of Medicine in all specialties except hygiene and epidemiology. All specialists are recalled from time to time to take refresher courses lasting 3–6 months, after which they undergo an examination and receive an appropriate certificate. Physician-hygienists are trained at the Institute of Hygiene, while the epidemiologists and microbiologists study at the Institute of Epidemiology (formerly the Central Laboratory for Production and Bacteriological Research). These trainees staff the sanitary and epidemiological (“sanepid”) stations run by the regional health units.

AUSTRIA

Population (1961) 7 073 807

Austria is a federal republic divided into nine provinces or Länder, including Vienna. The principal health authority is the Federal Ministry of Social Administration, which contains the Division of Public Health.
This Division is headed by a Director of Public Health and consists of a number of departments and sub-departments responsible for different public health matters. One of these departments is responsible for medical and paramedical personnel. The Ministry does not exercise direct powers over the health services of communities, hospitals, health resorts, etc., as these are under the authority of the Länder. The governor of each Land (Landeshauptmann) is bound by the directives of the Federal Ministry, but has a supervising health officer under his direction, who, assisted by the necessary specialists, exercises executive powers.

Undergraduate medical studies

In Austria there are three medical faculties, within the Universities of Vienna, Innsbruck, and Graz. The universities, and consequently the medical faculties as well, come under the Ministry of Education, so that the Ministry of Social Administration has practically no influence on the training of physicians. Each university is headed by a Rector, and each medical faculty by a Dean.

In accordance with academic tradition in Austria, both study and teaching are far freer and far more flexible than in the majority of European medical schools. For instance, the completion of a semester is recognized on the basis of the number of hours of lectures registered in the student’s matriculation document. As a minimum, students should register 20 hours a week; in the fifth semester, when they take their first State examination, only 16 hours a week. The order in which subjects are registered is left to the student’s free choice, but the subjects should not overlap.

Conditions of admission and duration of study

Students are enrolled in the medical faculties on the basis of their Matura certificate, obtained on completing secondary education. There is no selection or entrance examination, and the number of students in Austrian medical faculties is not limited.

To obtain the degree of Doctor of General Medicine (Doktor der gesamten Heilkunde), the student must successfully complete 10 semesters and pass three State examinations (Rigorosen), which means that formal study and examinations take five and a half to six years on average. The primary objective of medical faculties in Austria is to train general practitioners able to give medical care to the sick.

Teaching of public health

In Austria today there is very little tendency to stress to medical students the importance of preventive and social aspects of health and disease.
Almost all teaching activities are focused on classical curative medicine, typical of Austrian medical schools in the first decade of this century. Thus training in hygiene has also remained within the limits of classical hygiene, and is concerned with the epidemiology of infectious diseases, microbiology, and the problems of environmental sanitation in the narrow sense.

Hygiene is a recommended subject and the student can register it in the course of the third, fourth, or fifth year of study (two semesters, five hours a week). In addition the student may, if he wishes, register a course in practical microbiology and serology (one semester, 60 hours). He is obliged to attend the lectures on hygiene for at least one semester. The subject is compulsory for the third Rigorosum examination. Teachers of hygiene are quite free to make their own teaching plan and programme and to lecture on whatever they find useful. Obviously, therefore, teaching plans and programmes of hygiene vary somewhat from faculty to faculty, according to the specialty of the teachers and their collaborators. On the whole, however, the content of hygiene teaching is more or less the same at all medical faculties, being mainly restricted to microbiology, serology, and the epidemiology of infectious diseases. The curriculum also includes hygiene of water and occupational hygiene. It is noteworthy that in Austria, which is a highly industrialized country, the education of medical students in occupational health consists merely of two to three optional visits to factories. As in some other countries in Europe, subjects such as demography, environmental health, maternal and child health, health education, etc., either do not appear in the curricula of the medical faculties or are cut down to a minimum.

Within the traditional forms, teachers of hygiene and their assistants make considerable efforts to promote the teaching of their subjects, and to arouse the students' interest through their choice and presentation of material. It has been noticed, for instance, that the students are glad to attend a course on practical microbiology (one semester: two hours of lectures and four hours of practical training weekly), because it provides them with practical knowledge necessary for their future clinical practice. Hygiene teachers encourage voluntary field visits to factories, health and sanitary institutions, etc. These visits usually take a half or whole day, and once a year there is also an excursion lasting three to four days.

Besides the courses on microbiology and lectures in hygiene, the different faculties include subjects relating to the public health training of medical students in a wider sense. For instance, biostatistics (one semester) is taught within the Department of Physiology at Vienna, introduction to medical biostatistics (one semester: two hours a week) within the Department of Anatomy at Innsbruck, social insurance and injury assessment (one hour a week) within the Department of Forensic Medicine at Innsbruck, and social medicine (two hours a week) within the Department of Hygiene at Vienna. However, none of these subjects is compulsory, and the students
only register them in very limited numbers, if at all. Even so, the presence of these subjects shows that the Austrian medical faculties contain the potential for improvement and development of the training of medical students in hygiene and public health.

Some aspects of public health are also included in medical jurisprudence, in which there is a compulsory examination.

The somewhat old-fashioned training of medical students in hygiene and public health contrasts sharply with Austria’s highly advanced health care services. At the present time, 85% of the population are entitled to medical treatment in the event of disease or accident, on the basis of the social insurance scheme for gainfully employed persons. A law on the insurance of agricultural workers is to be introduced in the near future, so that almost the entire population will soon have medical cover under the social insurance system.

**Postgraduate teaching**

In Austria there were 13,885 physicians at the end of 1963 (including 6,075 general practitioners, 4,011 specialists, and 1,471 stomatologists). About 5,000 students are enrolled in the three medical faculties. However, in spite of this large number of present and potential physicians, only 234 are working in public health administration as “health officers” (Amtsärzte).

In Austria there is no specialization in hygiene or other branches of public health. By law, physicians can specialize in any of 15 clinical subjects after working for six years in a hospital or similar institution authorized to provide the relevant facilities. No special examination is required. However, only professors and lecturers working at the university institutes of hygiene are entitled to the title of specialist (Facharzt) in hygiene. Austria has no institutes or schools that conduct organized training in public health for physicians, leading to a diploma or to a master’s or doctor’s degree in public health. However, the position of health officer (Amtsarzt) can only be held by doctors who have attended a Physicat course and passed the corresponding examination. The legal regulations governing this course for training public physicians remain practically unchanged since their introduction in 1873. Consequently, little has been changed since that time in the principles of training. Many efforts have been made by individual health workers and by the public health section of the Federal Ministry of Social Administration to adjust this training to the country’s present-day needs, but have so far been unsuccessful. The proposed Academy for Social Medicine mentioned by Grundy & Mackintosh has not yet been established.

The Physicat courses are held on a part-time basis in Vienna, Innsbruck, and Graz, and are organized by the provincial health administrations with the support of the hygiene institutes of the respective medical faculties.
Vienna has a more modern intensive Physicat course for the education of future health officers. Hygiene is divided into three sections, each with its own lecturer, and the full course lasts two semesters. Six lectures a week are devoted to “epidemic hygiene”: bacteriology, virology, communicable diseases, epidemiology, and immunology. There are also six lectures a week on “general hygiene”: environmental hygiene, technical water hygiene, food hygiene, occupational hygiene, protection against ionizing radiation, etc. Finally, two lectures a week are devoted to “social hygiene”, including vital and health statistics.

Lectures are held in the evening so as not to interfere with the physicians’ regular work. In Innsbruck the Physicat courses are held in the form of concentrated lectures twice a year for four weeks. This enables physicians from remote places to attend the course. In addition to the subjects already mentioned, candidates attend lectures on demography, radiation health, and so on. The regulations stipulate that some attention must also be paid to problems of forensic medicine, pharmacognosy, and veterinary science.

Another form of permanent, organized, postgraduate training in the field of hygiene and public health is the refresher courses for public physicians, organized every year by the Federal Ministry of Social Administration. There are two of these courses, which usually last seven days and deal with certain specific problems, e.g., alcoholism, water supply, tuberculosis control. Participants visit health, social, and sanitary institutions, where they have the opportunity of studying local problems and exchanging views with their colleagues.

Belgium has a three-tier system of health administration at national, provincial, and commune levels.

The national authority is the Ministry of Public Health and Family Welfare, which consists of a general secretariat and seven directorates—general responsible for public health and hygiene, social health, medical care (including hospitals), public assistance, family welfare and housing, war disablement compensation, and general administration.

In each province the Ministry’s general directorate of public health appoints one or occasionally two inspectors of public health, who advise the governor of the province on all health matters. Each province also has
inspectors of pharmacies and food inspectors. The inspectors of public health, who are responsible for the general surveillance of hospitals and similar establishments, have appropriate technical and administrative staff. Most provinces have their own bacteriological laboratory; other public health laboratory investigations are carried out by the Institute of Hygiene and Epidemiology in Brussels.

The provinces are divided into a number of arrondissements, each headed by a commissaire d'arrondissement who is responsible for all communes of less than 5000 inhabitants. Communes of more than 5000 inhabitants are directly responsible to the Ministry of the Interior. The larger communes, mainly cities, have their own health services.

Maternal and child health services are operated by the communes or a variety of voluntary agencies, subsidized by the Government and coordinated by the Oeuvre nationale de l'Enfance.

Health services for all schools are financed by the Ministry of Public Health and Family Welfare, but are administered either by the commune authorities or, in the case of a non-government school, by the school governors.

A compulsory social insurance scheme for all wage-earners and their families covers sickness, disability, maternity, old age, death, and unemployment. Insured persons are entitled to reimbursement of a part of the cost of medical care and hospitalization.

Undergraduate medical studies

The four undergraduate schools of medicine are faculties of the Free University of Brussels, the Roman Catholic University of Louvain, and the State Universities of Ghent and Liège. Teaching is in Dutch at Ghent, in French at Liège, and in both languages at Brussels and Louvain. Responsibility for medical education is exercised by the Ministry of National Education and Culture, through the parent university bodies.

The medical curriculum is fixed by law, but there are minor differences between the four universities in content, order, and methods of study.

The universities confer the degree of Doctor of Medicine, Surgery and Midwifery, the diploma of Licentiate in Dentistry, and the Pharmacist diploma.

Conditions of admission and duration of study

Entrance requirements are fixed by law for all the universities. The student must obtain the diplôme d'études secondaires (awarded on completing six years of secondary education) and pass a preliminary health examination. All students wishing to study may be admitted, and there is no numerus clausus.
The course lasts seven years and is divided into two sections. Three years' study of pre-medical and pre-clinical subjects leading to the Candidature en Sciences naturelles et médicales (a certificate in natural and medical sciences) are followed by four years' study leading to the degree of Doctor of Medicine, Surgery and Midwifery.

Teaching of public health

All students are required to follow certain compulsory courses in subjects related to public health:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical psychology</td>
<td>15</td>
</tr>
<tr>
<td>Hygiene and social medicine</td>
<td>45</td>
</tr>
<tr>
<td>Forensic medicine</td>
<td>45</td>
</tr>
<tr>
<td>Health legislation and medical ethics</td>
<td>30</td>
</tr>
<tr>
<td>Clinical demonstrations in occupational health</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>140</strong></td>
</tr>
</tbody>
</table>

These minimum requirements may be far exceeded. In Brussels, for instance, some 240 hours are devoted to these subjects. The French-language course in hygiene and social medicine is shown in detail below:

Hygiene, public and private

The environment (30 hours)
Climate, pollution of atmosphere, water and soil; lighting, heating, and ventilation; noise; drinking water; solid and liquid refuse (in the house, in the town);
Visits and demonstrations (20 hours).

The individual (30 hours)
Food, nutrition, drug addiction; general and special prophylaxis of epidemic and social diseases (with epidemiology); measuring the health of individuals and communities;
Visits and demonstrations (20 hours).

Occupational disease (10 hours)
Evolution of occupational medicine; work and energy expenditure; respiratory and cardiovascular synergy in work; work at high temperatures; industrial toxins, metals, hydrocarbons, solvents, etc.; siliosis and pneumoconioses; industrial dermatoses; ionizing radiations.

Social medicine (30 hours)
Medico-social demography;
Human ecology: the influence of the social environment on health and disease;
Preventive medicine: protection of mothers and children;
Legislation concerning public assistance and social security;
Organized practical work, consisting of the observation and treatment of families with medical, psychological and economic difficulties.
A feature of social medicine teaching in Brussels is that each student is attached to a family for a period of one academic year in order to bring him into contact with medicine outside the hospital. The families are chosen from a wide range of social classes, and attachment follows attendance at hospital by a member of the family, often an expectant mother or a child taken to the children’s department.

The student, aided by a welfare nurse when necessary, is expected to observe the family carefully, make appropriate “social” diagnoses and propose suitable remedies. At the end of the year he makes a written report to the professor and an oral report to a seminar. A voluntary weekly discussion group, which is well attended, provides each student with an opportunity to explain to the others the special features of the situation he has under observation. A fuller account of this scheme has been published.1

In the French-language course at Brussels, instruction in epidemiology is given in the sections dealing with the hygiene of the individual and with social medicine, but the Dutch-language course devotes a special section to this subject:

**Epidemiology**

*Epidemiology of infectious diseases* (including prophylaxis)
- Commensal infections
- Parasitic and accidental infections
- Special epidemiology
- Human societies and the diffusion of epidemic diseases

*Epidemiology of non-infectious diseases*
- General considerations and methods of study
- Malignant neoplasms, especially cancer of the lung (tobacco)
- Diseases of the cardiovascular system
- Diseases of blood corpuscles
- Diabetes
- Chronic arthritides and chronic rheumatism
- Mental diseases
- Accidents
- Dental disease
- Obesity

Besides the 30 hours of lectures, the course includes 20 hours of demonstrations and visits. The visits are paid to public establishments such as the Nosological Statistics Service of the Ministry of Public Health, the State Laboratory of Hygiene and Epidemiology, and the sanitary services of ports and airports.

Courses in bacteriology at Belgian medical schools vary from 90 to 150 hours. In addition, the first or *Candidat* stage of the medical course

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includes courses in mathematics, and in some cases statistics, together with elements of logic and moral philosophy.

In general, students are required to follow one elective course. The choice includes a number of public health or allied subjects, such as statistics, medical genetics, social medicine, history of public health, mental health, and industrial medicine.

In the second year of the Candidat course, students at Brussels are given a particularly comprehensive course in statistics, which includes the collection, analysis, and comparison of data obtained by general observation or planned experiments. Details of the course are given on page 28.

Postgraduate teaching

Postgraduate training in various public health subjects is provided by three special schools or institutes of public health: the Institute of Hygiene and Social Medicine (School of Public Health) within the Free University of Brussels, and two schools of public health within the University of Louvain, one teaching in Dutch and one in French. Organized courses fixed by law, leading to the degree of Médecin Hygiéniste, are also available at the State Universities of Ghent and Liège. The range of subjects covered by the schools of public health is illustrated by the following list of courses available at the Free University of Brussels:

1. Courses leading to degree of Médecin Hygiéniste (Public Health Physician)
2. Course leading to the Licence en Gestion hospitalière et Sciences médico-sociales (special certificate in hospital and medical administration)
3. Statistical methods applied to health problems
4. Occupational medicine
5. Advanced course in radiological protection
6. Advanced course in school medicine.

Even the course for the "basic" degree of Médecin Hygiéniste can be taken in a number of varying subjects. Certain subjects are common to all courses, and form the basic or "core" course, but students have the option of taking the rest of their studies in one of the following courses:

(a) Public health
(b) Social medicine
(c) Industrial or occupational medicine
(d) School health and physical education
(e) Radiological protection.
There are local variations in the name and content of the courses, and at Liège (where there is no separate “core” course) it is compulsory to study occupational health in addition to two other courses.

These are normally full-time courses lasting one academic year, but students can obtain authorization to spread the course over two years on a part-time basis. The degree of *Médecin Hygiéniste* is only open to holders of the degree of Doctor of Medicine, Surgery and Midwifery, but other students are usually admitted to the lectures.

The Dutch-language course at the School of Public Health in Louvain is as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core programme for all public health students</strong></td>
<td></td>
</tr>
<tr>
<td>History and organization of public health</td>
<td>25</td>
</tr>
<tr>
<td>Human ecology (biophysical aspects)</td>
<td>15</td>
</tr>
<tr>
<td>Human ecology (psychosocial aspects)</td>
<td>15</td>
</tr>
<tr>
<td>Biostatistics</td>
<td>15</td>
</tr>
<tr>
<td>Health education</td>
<td>15</td>
</tr>
<tr>
<td>Social medicine</td>
<td>15</td>
</tr>
<tr>
<td><strong>Degree programme in industrial medicine</strong></td>
<td></td>
</tr>
<tr>
<td>Organization of work and personnel</td>
<td>15</td>
</tr>
<tr>
<td>Work physiology</td>
<td>15</td>
</tr>
<tr>
<td>Industrial ecology</td>
<td>15</td>
</tr>
<tr>
<td>Occupational health</td>
<td>60</td>
</tr>
<tr>
<td>Safety technology</td>
<td>30</td>
</tr>
<tr>
<td>Labour legislation</td>
<td>22</td>
</tr>
<tr>
<td>Industrial traumatology</td>
<td>15</td>
</tr>
<tr>
<td>Seminars and field trips (weekly)</td>
<td></td>
</tr>
<tr>
<td><strong>Degree programme in environmental hygiene</strong></td>
<td></td>
</tr>
<tr>
<td>Microbiology</td>
<td>45</td>
</tr>
<tr>
<td>Food hygiene</td>
<td>30</td>
</tr>
<tr>
<td>Toxicology</td>
<td>15</td>
</tr>
<tr>
<td>Drug toxicology</td>
<td>15</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>30</td>
</tr>
<tr>
<td>Seminars and field trips</td>
<td></td>
</tr>
<tr>
<td>Laboratory exercises (weekly)</td>
<td></td>
</tr>
<tr>
<td>One of the following elective courses:</td>
<td></td>
</tr>
<tr>
<td>Hygiene legislation</td>
<td>15</td>
</tr>
<tr>
<td>Gerontology</td>
<td>15</td>
</tr>
<tr>
<td>Maternal and child health</td>
<td>45</td>
</tr>
<tr>
<td>Health legislation (i.e., legislation dealing with hospitals, the medical and paramedical professions, etc.)</td>
<td>22</td>
</tr>
<tr>
<td><strong>Degree programme in school health</strong></td>
<td></td>
</tr>
<tr>
<td>Maternal and child health</td>
<td>45</td>
</tr>
<tr>
<td>School health</td>
<td>30</td>
</tr>
<tr>
<td>Health legislation</td>
<td>22</td>
</tr>
<tr>
<td>Biometrics</td>
<td>15</td>
</tr>
<tr>
<td>Social psychopathology</td>
<td>30</td>
</tr>
<tr>
<td>Social diseases</td>
<td>15</td>
</tr>
<tr>
<td>Seminars and exercises</td>
<td></td>
</tr>
</tbody>
</table>
The Louvain School also offers a degree programme in hospital administration and medical care organization. This programme, which lasts one academic year, is open to holders of a final university degree (M.D., Dr juris, etc.) and to nurses who have passed a special one-year course in general subjects, such as economics, psychology (including social psychology), statistics, and book-keeping. This latter course is designed to bring nurses to the required level to take a degree programme in hospital administration.

Details of the degree programme are given below because, rather surprisingly, courses of this nature are almost non-existent in western Europe:

<table>
<thead>
<tr>
<th>Core programme: as for degree of Médecin Hygiéniste</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and labour legislation</td>
<td>45</td>
</tr>
<tr>
<td>Health insurance</td>
<td>15</td>
</tr>
<tr>
<td>Planning of hospital facilities</td>
<td>15</td>
</tr>
<tr>
<td>Organization of medical and nursing facilities</td>
<td>45</td>
</tr>
<tr>
<td>Organization of administrative departments in the hospital</td>
<td>30</td>
</tr>
<tr>
<td>Financial management of hospitals</td>
<td>22</td>
</tr>
<tr>
<td>Book-keeping</td>
<td>45</td>
</tr>
<tr>
<td>Theory of administration</td>
<td>15</td>
</tr>
<tr>
<td>Civil law</td>
<td>30</td>
</tr>
<tr>
<td>One of the following courses:</td>
<td></td>
</tr>
<tr>
<td>Society and health care</td>
<td>22</td>
</tr>
<tr>
<td>Medical economics</td>
<td>22</td>
</tr>
<tr>
<td>International health organization</td>
<td>22</td>
</tr>
<tr>
<td>Patterns of nursing education</td>
<td>22</td>
</tr>
<tr>
<td>Field trips</td>
<td></td>
</tr>
<tr>
<td>Seminars and exercises</td>
<td></td>
</tr>
</tbody>
</table>

Statistical methods

There are a number of advanced courses in statistics. Teaching is available in Brussels on statistical methods as applied to health problems (108 hours), the epidemiology of acute and chronic diseases (72 hours), health statistics (72 hours), and demography and vital statistics (36 hours).

Tropical public health

The Prince Leopold Institute of Tropical Medicine at Antwerp, in collaboration with the Royal Tropical Institute, Amsterdam, offers a course of one academic year leading to the Diploma in International Public Health. This course, which is given simultaneously in English and French, is held in Amsterdam and Antwerp in alternate years. It is designed for public health workers in tropical areas, and is comparable with the course in tropical public health at the London School of Hygiene and Tropical Medicine.
The basic part of the course, which lasts five months and leads to the Diploma in Health Development, covers the following subjects:

Economic and social aspects of health development
Co-operation in health development
Principles of health development
Important aspects of public health
Public health and disease in the tropics
Clinical and therapeutic aspects of tropical diseases

The remainder of the course is spent in the study of one or two of the following subjects:

Laboratory techniques
Vaccine production
The practice of public health administration

Industrial medicine

Industrial medicine can be taken as a major subject in the general public health course, and is compulsory at Liège. In addition, the Institute of Labour, attached to the Free University of Brussels, organizes an advanced two-year course leading to a special diploma in industrial medicine.

Radiation protection

Organized advanced courses are given for physicians at Brussels and Louvain. In Louvain, following the standard "core" programme, the special course consists of:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation effects and radiation control</td>
<td>22</td>
</tr>
<tr>
<td>Radioactive measurement methods</td>
<td>15</td>
</tr>
<tr>
<td>Radioactive waste disposal</td>
<td>15</td>
</tr>
<tr>
<td>Radiobiology</td>
<td>15</td>
</tr>
<tr>
<td>Radiation physics</td>
<td>15</td>
</tr>
<tr>
<td>Biology</td>
<td>15</td>
</tr>
<tr>
<td>Laboratory exercises</td>
<td>180</td>
</tr>
</tbody>
</table>

This course is open to physicians, pharmacists, and engineers.

School medicine

School medicine can be taken as a major subject in the public health course, and an advanced course is organized at the School of Public Health in Brussels.

Nutrition

A course in nutrition is offered at Louvain.
Teaching methods

Most teaching follows traditional methods, with didactic lectures, practical work in laboratories, and field and institutional visits. Considerable use is made of guest lecturers with field experience.

However, seminar teaching, whereby students participate in the preparation and running of the seminar, is becoming widely used in postgraduate education. In some cases postgraduate students participate in research projects as an introduction to research methods.

A thesis is either compulsory or optional in postgraduate public health courses.

Most departments of the Louvain Schools of Public Health organize short “continuation education programmes” for public health practitioners, and some advanced teaching techniques are used. These include small group discussions, role-playing, and group assignments, interspersed with short lectures and demonstrations. Ongoing evaluation by participants and faculty is built into the programme.

Research in public health

In recent years, especially at the schools of public health, a considerable volume of research into various aspects of public health practice has been organized. Some typical research projects are indicated below:

Critical evaluation of the value of periodical medical examination of people exposed to occupational risks;
Influence of daily milk supplies on health and disease in schoolchildren;
The role and position of the hospital physician in Belgium, France, the United Kingdom, and the Netherlands;
Methods of studying nursing activities in a patient unit;
Cost of preventive measures and of mass screening;
Multidisciplinary survey of a community and its psychiatric family care programme (in collaboration with Columbia University School of Public Health and the Department of Sociology, Louvain);
Inquiry into morbidity in two communities, Flemish and Walloon;
Community studies preliminary to drawing up a national hospital plan.

Louvain University’s French-language School of Public Health (located in Brussels) has research units for medical sociology, gerontology, medical genetics, blood banks and haematology, nutritional bacteriology and virology, and parasitology.
The country is divided into 28 provinces (okruzii), including the city of Sofia. The provinces are sub-divided into urban and rural communes. The State has assumed responsibility for the health of the people, and the Ministry of Health and Social Welfare, as the central authority for all health matters, controls a unified system of public health services. Free medical care and health protection are provided for the whole population, and all medical establishments are State-owned.

At provincial level the health services are directed by the public health and welfare departments of the provincial people’s councils. These departments are responsible for general and polyclinic health care services and for dental services, school health services, occupational health services, creches, and schools for training paramedical personnel. They are also in charge of the highly developed system of rural health services, and are assisted in running them by the chief doctors and specialists in the city hospitals. The control of sanitation in Bulgaria is exercised by 10 hygiene and epidemiology institutes and by their branches in the larger towns. In rural areas the commune doctor is responsible for both therapeutic and public health work, but he is normally assisted by a nurse and a “sanitarian”.

The Government also pays great attention to the protection of workers’ health and has developed a system of special health institutions for industry, mining and collective farms.

Since the Second World War, Bulgaria has made spectacular progress in the health field. The infant mortality rate dropped from 146.4 in 1938 to 108.2 in 1950 and to 37.3 in 1962. Similarly, the number of physicians increased from just over 3000 in 1940 to some 12,500 in 1962, just over 1000 of whom were working in sanitation and hygiene.

Undergraduate medical studies

All medical students are required to take a common undergraduate course, and can specialize in various subjects, including public health, after graduation. The three medical schools (higher institutes of medicine) are responsible to the Ministry of Health and Social Welfare.

The Higher Institute of Medicine in Sofia has three faculties (medicine, stomatology, and pharmacy). The higher institutes in Varna and Plovdiv have faculties of medicine only.

Conditions of admission and duration of study

Students apply to the chosen faculty after completing secondary education, and have to take a special entrance examination in biology and
chemistry. Some 600–800 students are enrolled each year, but the total number of applicants may be as much as eight times higher.

The course lasts six years, the first three of which are devoted mainly to pre-medical and pre-clinical subjects. Clinical subjects are introduced during the third year. The sixth year is devoted entirely to practical work in individual clinical and public health subjects. At the end of the sixth year, the student takes the final State examination, the passing of which entitles him to practise medicine.

Teaching of public health

The State has introduced a socialized health service, broadly based on the principles described in the chapter on the Soviet Union. Throughout the entire health service the preventive aspects of medicine are kept continually in mind, and exert a real influence on medical practice. For instance, all health institutions make efforts to develop dispensary methods and to approach the individual, whether healthy or sick, as a social being exposed to numerous influences in his social and physical environment.

This approach to medicine is having a profound effect on both the content and method of medical teaching. The aim is no longer to produce a physician who merely treats disease, but a physician who also knows how to protect the health of the community. The effects of these endeavours on the curriculum have taken three main forms:

(1) Social and preventive aspects have been introduced into the teaching of basic medical sciences as well as into clinical subjects, and teachers are responsible for emphasizing these aspects in all their lectures and other forms of training.

(2) Several subjects have been introduced with the intention of developing in the medical student a political awareness of the role of medicine in a socialist society. Special attention is drawn to socio-economic factors that are important in building a healthy community.

(3) Hygiene and other public health subjects are granted a large number of teaching hours (see Table 1).

Emphasis is placed on practical work, and during the sixth year each student spends 25 days working in hygiene and epidemiology institutes in both rural and urban areas. At Plovdiv, before they take the examinations in hygiene, students are required to carry out a health survey in a rural area and submit a written report supported by charts, photographs, and other material. The object of the survey is to provide the data needed for planning the health services of a given area. In this way, the future physician is brought into direct contact with the life of the community and factors affecting human health.
Within the medical schools, the teaching of public health subjects is carried out by four different departments: hygiene; organization of health services and history of medicine; epidemiology; and microbiology.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Lectures (hours)</th>
<th>Practical work (hours)</th>
<th>Total hours</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbiology</td>
<td>24</td>
<td>36</td>
<td>60</td>
<td>5,6</td>
</tr>
<tr>
<td>Hygiene</td>
<td>72</td>
<td>48</td>
<td>120</td>
<td>7,8</td>
</tr>
<tr>
<td>Epidemiology and infectious diseases</td>
<td>72</td>
<td>48</td>
<td>120</td>
<td>7,8</td>
</tr>
<tr>
<td>Occupational diseases</td>
<td>11</td>
<td>8</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>Tuberculosis control</td>
<td>12</td>
<td>12</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>Organization of health protection, history of medicine, and medical statistics a</td>
<td>36</td>
<td>36</td>
<td>72</td>
<td>9,10</td>
</tr>
</tbody>
</table>

a A revision of the curriculum now being undertaken proposes that "health statistics, including statistical method" should be allotted 15 hours of lectures and 15 hours of practical work in the third semester.

Hygiene. Emphasis is laid on the environmental and social factors influencing health and disease. Training is largely based on experimental work, and references are made to the achievements of the Soviet Union in the field of hygiene, with particular regard to rural problems. Practical training aims at enabling the students to master methods of conducting independent studies of the health status of the people. The programme includes:

General hygiene, including climate, soil and its physical characteristics, water and water supplies, epidemiological aspects, etc.

Community hygiene, including housing and community planning, sewage disposal, air pollution, etc.

Hygiene as applied to curative and preventive institutions, such as hospitals, maternity clinics, and polyclinics.

Food hygiene, including the role of nutritional ingredients of foodstuffs, dietary requirements according to age, sex, and occupation, food-handling sanitation, food poisoning.

Industrial hygiene, including the physiology of work, the working environment, hazards, injuries, toxins, noise, etc.

Maternal and child health and school hygiene, including protection of expectant mothers, physical growth and development, immunoprophylaxis, health education of schoolchildren, personal hygiene, and hygiene of premises.

Epidemiology. The aim is to acquaint the students with the causes, spread, and control of infectious diseases. After completing their theoretical training, the students carry out independent epidemiological studies, and set up control measures in epidemic foci. The programme includes:
General epidemiology
Content and method of work, sources of infection, mechanisms of spread, epidemiological processes, classification, social and environmental factors in the spread of infectious diseases, epidemiological surveys, fundamentals of the control of epidemics, disinfection, special prophylaxis, etc.

Special epidemiology
Study of each group of infectious diseases (short historical review, agent pathogenesis, source of infection, modes of transmission, occurrence control); classification according to site of entry, e.g., intestines, respiratory tract, etc.
Practical training, covering such subjects as disinfection and disinfestation.

Organization of health protection, history of medicine, and medical statistics. The primary objective is to relate the work of the physician to the life of the community. The programme includes:

History of health protection, including the historical development of health protection in non-socialist countries and in the USSR and other socialist countries, and leading to the development and special characteristics of health protection in Bulgaria.

State of the population's health, including statistics and statistical methods, nomenclature and classification of diseases and causes of death, demography and population theories, morbidity, physical development of populations, etc.

Organization and methodological aspects of health protection, including the basic theoretical principles applied to curative and prophylactic work, e.g., the dispensary system, integrated urban hospitals, occupational health services, maternal and child health services, health education, rural hygiene, medical ethics. The practical work includes a considerable number of joint visits and seminars.

There is a steady trend to increase the use of seminars and discussion groups. The students participate fully in these, and are frequently required to prepare and present the material for discussion. Visits and practical work in institutions are also regarded as valuable methods of teaching.

Postgraduate teaching

Postgraduate training in hygiene and other branches of public health is carried out under the direction and supervision of the Postgraduate Medical Institute in Sofia. Until the Institute was founded in 1950, specialization in all branches of clinical medicine was somewhat haphazard, and specialist examinations were introduced only in 1937. As the first of the general postgraduate institutes to be mentioned in this monograph, the Sofia Institute is described here in some detail. Plans for organizing the postgraduate training of physicians in general and for regulating the procedure for obtaining the title of “specialist physician” were made as early as 1945. The purposes for which the Institute was founded are as follows:

(1) to organize the planned specialization and postgraduate training of physicians;
(2) to assume scientific leadership in the specialization and postgraduate training of physicians;

(3) to draw up programmes for all specialties and subspecialties;

(4) to assist in establishing and maintaining field bases for the specialization and postgraduate training of physicians;

(5) to organize and carry out specialization in basic branches of medicine (internal medicine, surgery, paediatrics, etc.) and in various branches of work in hygiene and epidemiology institutes by means of short or long courses and other methods of work, either at the Institute or at field stations run by institutions of the health service.

In due course the Institute delegated responsibility for basic specialization to other institutions, though it continued to act in a general supervisory capacity. It retained responsibility for subspecialization generally and for the further training of specialists, as well as for the important task of training teachers for postgraduate programmes.

The Institute is headed by a Rector and two Pro-Rectors, one dealing with teaching and one with research activities. It has 33 departments in all, including the Departments of General Hygiene, Food Hygiene, Child Health, Microbiology, Social Hygiene, History of Medicine, Infectious Diseases, and Tuberculosis Control. There is an Academic Council comprising all professors and assistant professors.

Training programmes are prepared by a Commission of Education and Method directed by the Pro-Rector for teaching, and research plans are drawn up by a Commission for Research headed by the Pro-Rector for research.

The Ministry of Health and Social Welfare exerts great influence on the Institute's teaching and research plans, and collaborates actively with the respective departments in drawing up these plans. District health authorities are required to make known their needs every year, so that peripheral requirements can be taken into consideration when the plans are made.

Within the general regulations on specialization, a programme is worked out by each department. It is then analysed by the Commission of Education and Method, reviewed by the Academic Council, and submitted to the Ministry for approval.

For training purposes the departments concerned with public health subjects use the existing institutions of the health service, or research institutes such as the Institute of Sanitation and Hygiene, the Institute of Industrial Health and Occupational Diseases, and the Institute of Microbiology.

Education in social hygiene (public health) is carried out in accordance with a special programme prepared by the Postgraduate Medical Institute.
and approved by the Ministry of Health and Social Welfare. This education takes three forms: courses organized by the Postgraduate Medical Institute, individual training in the Department of Social Hygiene, and work under the direction of a specialist. The Institute organizes 6-month courses in the organization and guidance of health services, and a series of courses lasting 1–3 months in different aspects of social hygiene, the organization and guidance of different health services, health statistics and the application of statistical methods in medicine and biology, etc.

Physicians who complete two years' organizational work in the public health system and pass the Institute's examination in social hygiene are awarded the title "specialist in social hygiene". The Institute's teaching programme, which lasts two years, including the theoretical and practical parts and "in-service training", is summarized below:

Theoretical training

*Principles of health services* (6 weeks)

Scientific definition of health and disease; biological basis of health; heredity and environment; economy of health and economic results of health protection; Marxism-Leninism; social basis of health.

Concepts of curative, prophylactic, and social medicine; social pathology; socialist and capitalist health services; basic principles of socialist health services, e.g., state responsibility, free medical care, participation of the people, unity of medical science and practice, prophylaxis, etc.

Organization of health services as a scientific discipline; content and methods.

*History of health protection* (6 weeks)

General history of past civilizations in eastern Europe; health protection under capitalism, imperialism, in pre-revolutionary Russia, and its development in the present day in the USSR; developments in Bulgaria; the international importance of Soviet health protection; basic trends in the people's democratic republics.

*Health statistics* (10 weeks)

History, method and significance of health statistics; health statistical observations; grouping, tabulation, and analysis of data; methods of studying the state of the population's health and factors affecting it.

Demography (number and structure of populations; birth rates, fertility, etc.; general and special mortality and morbidity tables).

Morbidity (classification of diseases and causes of death; general and special morbidity; statistics from mass medical examinations; indications of morbidity; assessment of methods for morbidity studies).

Physical development of the population.

*General organizational principles of health protection* (10 weeks)

Health protection and legislation in socialist Bulgaria.

General principles of socialist health protection; methods of health protection; diagnosis, prophylaxis, and therapy; the dispensary system; special centres; polyclinics; home care.

Assessment of needs for health protection; planning the protection of general and special groups, including manpower planning.
Types of health institution; problems of specialization and integration of health services; organization and activities of health units; management of health services and training of staff; voluntary associations (Red Cross, etc.).

Curative and prophylactic services (3 months)
Tasks of hospital and polyclinic services; historical review.
Hospitals as basic curative and prophylactic institutions; unification of hospitals and polyclinics; hospital economics and management; assessment of the work of hospitals.
Structure and functions of unified urban hospitals.
Polyclinic services; basic health units; home care; first aid.
Training of health workers in research.

Sanitary and epidemiological services (3 months)
Environment (atmosphere, water, food, housing, etc.) and health hazards.
Epidemiological methods; morbidity due to acute infectious diseases; fundamentals of epidemiological control.
General study of environmental factors and their control.
Nutrition, food storage, food hygiene.
Historical review of the development of sanitary and epidemiological activities, and the “sanepid” stations as basic units.

Maternal and child health (2 months)
Health problems of childhood (infant mortality, physical growth, nutrition, childhood diseases, illegitimate children).
Health problems of schoolchildren and young people (physical growth and defects, special methods of studying health).
Mentally and physically handicapped children.
Pregnancy (work, diet, rest, miscarriages, and protection of pregnant women); history of maternal and child care in Bulgaria and the Soviet Union; present legislation.
Gynaecological and obstetric services; maternity wards and MCH centres.
Crèches, kindergartens, special homes and schools, and children’s health resorts.

Occupational health (1 month)
Work and health; legislative principles in Bulgaria.
General health problems in industry (studies of the health condition of workers; health hazards; temporary working disability; accidents, diseases and poisonings; tasks of occupational health services).
Principles of social insurance and workers’ health insurance; assessment of temporary and permanent working disability.

Rural health protection (6 weeks)
Health problems of rural workers; co-operative movements and the health of rural population groups.
Principles of organization of rural health protection as part of an integrated system of health protection; relations with urban health institutions.
Character and scope of health protection of the rural population; tasks of the commune curative and preventive health units.

Special health problems (2 weeks)
Tuberculosis, venereal diseases, and neoplasms, and the organization of special services; organization of psychoneurological services; alcoholism; organization of services for chronic diseases; socio-medical problems of old age, and the socio-medical protection of the aged.
Other health services (2 weeks)
Stomatological services; climatic resorts, spas, convalescent homes; medical supervision of physical education.

Problems of the sanitary defence of the country (1 month)
Organization of health education (2 weeks)
Organization of pharmaceutical services (2 weeks)
Administrative and economic problems of health protection (2 weeks)
Finance, supplies, capital expenditure.

Practical training
Preparation of plans for health protection in urban and rural curative institutions.
Compilation of graphs representing activities of staff in health institutions.
Assessment of the activities of health institutions, hospitals, health units, crèches, etc.
Evaluation of the quality of work (statistical indicators) of health institutions.
Analysis of morbidity data.
Solution of health statistics problems.
Graphical presentation of statistical data.
Preparation of plans for the activities of health institutions.
Observation of work in urban and district health institutions.

In addition to this major course, the Institute organizes a series of short courses. Those held in 1964 are shown in Table 2.

Besides specializing, physicians can study for the degree of Candidate of Medical Sciences in the individual branches of public health. During the period of study they are known as “aspirants”. Preparation for this degree lasts three years at the Institute, or four years if carried out at the physician’s normal place of work in consultation with and under the supervision of the Institute. Successful candidates can subsequently study for the degree of Doctor of Medical Sciences. For both degrees the physician must submit and defend a thesis.

Research

The Postgraduate Medical Institute engages in a wide range of research programmes, including research in public health practice.

Alone, or in collaboration with other institutes, it conducts an active programme of research and surveys on various aspects of the health services. Jointly with the Ministry of Health and Social Welfare and the Central Institute of Medicine in Sofia, for instance, investigations have been made into the demand for medical care, with a view to revising the staffing of health services. Other projects include a study of the demand for polyclinic care, and providing the means of meeting it; a study of the demand for medical care by schoolchildren; a study of the demand for medical care in a combined urban hospital district, and providing services to meet
TABLE 2
SHORT POSTGRADUATE COURSES IN PUBLIC HEALTH, BULGARIA, 1964

<table>
<thead>
<tr>
<th>Course</th>
<th>Number of participants</th>
<th>Duration</th>
<th>Persons eligible for admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurological infections</td>
<td>12</td>
<td>1 month</td>
<td>Specialists and heads of infectious disease hospitals and departments</td>
</tr>
<tr>
<td>Infectious diseases : teaching, methodological problems, and recent advances</td>
<td>8</td>
<td>1 month</td>
<td>Heads of infectious disease departments of district hospitals</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>20</td>
<td>2 months</td>
<td>Candidates chosen by Ministry of Health</td>
</tr>
<tr>
<td>Refresher course for teachers in health institutions</td>
<td>15</td>
<td>1 month</td>
<td>Candidates chosen by Ministry of Health</td>
</tr>
<tr>
<td>Refresher course for teachers in hospitals</td>
<td>15</td>
<td>1 month</td>
<td>Candidates chosen by Ministry of Health</td>
</tr>
<tr>
<td>Microbiology</td>
<td>20</td>
<td>2 months</td>
<td>Candidates chosen by Ministry of Health</td>
</tr>
<tr>
<td>Virology</td>
<td>8</td>
<td>4 months</td>
<td>Specialists in microbiology or physicians with 3 years' experience</td>
</tr>
<tr>
<td>New methods of work in social hygiene</td>
<td>30</td>
<td>1 month</td>
<td>Heads of statistics departments in hygiene and epidemiology institutes</td>
</tr>
<tr>
<td>Problems of polyclinic services. Use of statistical methods in clinical and experimental studies</td>
<td>15</td>
<td>20 days</td>
<td>Senior staff of polyclinic units &quot;Aspirants&quot;</td>
</tr>
<tr>
<td>Occupational pathology (special course)</td>
<td>20</td>
<td>1 month</td>
<td></td>
</tr>
<tr>
<td>Radiation protection</td>
<td>12</td>
<td>4 months</td>
<td>Industrial physicians</td>
</tr>
<tr>
<td>Food control, with particular reference to pesticides</td>
<td>15</td>
<td>20 days</td>
<td>Physicists in hygiene and epidemiology institutes</td>
</tr>
<tr>
<td>Medical supervision of physical education in schools</td>
<td>15</td>
<td>1 month</td>
<td>Chemists in the nutrition departments of hygiene and epidemiology institutes</td>
</tr>
<tr>
<td>Nutritional problems</td>
<td>12</td>
<td>1 month</td>
<td>School physicians</td>
</tr>
</tbody>
</table>

it; and a study of some social hygiene aspects of the population structure of a village.
Many of these studies will be used as the basis for a thesis by degree candidates.

CZECHOSLOVAKIA
Population (1965) 14 194 158

Since 1945 Czechoslovakia’s health services have been completely reorganized, and their aims and principles have been brought into general conformity with those in other socialist European countries. The right
to health is guaranteed to every citizen in the Constitution, and the integrated State health services have a social, preventive, and curative approach. All State health services, including medical care and drugs, are free and available to all.

The Ministry of Health exercises technical control over the whole health service, although the health services of Slovakia are directly administered by the Slovak National Council and its organs. The health services operate at three interlocking levels, regional, district, and local.

The local health unit serves a population of some 3,800 persons and is run by a “community doctor”, a grade I specialist in internal medicine who is in fact leader of a team responsible for all aspects of the community’s health. The other members of the team are a paediatrician (one for 2–3 local units), a gynaecologist (one for 5–6 local units) a stomatologist or dentist (one for each local unit), and a number of paramedical staff and auxiliary health workers, such as the health community nurse, the paediatric nurse, the midwife, the dental assistant, etc. This team is responsible not only for treatment of the sick but also for health protection and for the systematic implementation of preventive measures and good hygiene. Specialist consultation and guidance is available at district level.

Each local health unit is included in a district institute of national health, which also contains a “sanepid” station. Similarly, all the district institutes in a region are united in the regional institute of national health. In addition, there is a three-tier system of hospitals, with polyclinics, which are integrated into the appropriate institute.

Particular attention is paid to protection of the workers’ health. Factories and mines have local health units that are integral parts of the district institutes. Very large undertakings have independent institutes, with additional hospitals, polyclinics, etc., for their employees.

Undergraduate medical studies

The universities are responsible for all undergraduate teaching, under the supervision of the Ministry of Education and Culture. The nine faculties of medicine train four types of physician: general physicians (therapists), paediatricians, hygienists, and stomatologists. Prague has three faculties (general medicine, paediatrics, and hygiene). The paediatrics departments of the Medical Faculties of Brno and Bratislava train paediatricians in the same way as the Faculty of Paediatrics in Prague. All faculties of medicine have stomatology departments. Each faculty is headed by a Dean, who is assisted by several Pro-Deans. Professors are responsible for teaching and research in their own fields.

In accordance with the principles and organizational pattern of the health services, the curriculum aims at producing public-health-minded physicians capable of performing the various basic tasks in health insti-
tutions and of developing into specialists and subspecialists in their own fields. With Ministry of Health approval, however, graduates of a specialist faculty may work in a different field.

Conditions of admission and duration of study

The number of students is determined in accordance with a general plan. Admission is dependent on the results of secondary school examinations and an entrance interview. Each year about 1200 physicians complete their undergraduate studies.

At the faculties of general medicine, paediatrics and hygiene, the course lasts six years, the final year being largely devoted to practical clinical work. The stomatology course lasts only five years. The first two years of training are the same for all students.

Teaching of public health

All teachers in the medical faculties are required to stress the preventive aspects of their subjects. Faculties go to considerable lengths to permeate clinical medicine with preventive ideas. For example, conferences of medical faculty teachers are held to discuss the teaching of prevention, both in general and in individual branches of clinical medicine.

Politico-economic subjects are included in the first 10 semesters of the undergraduate course in order to develop the student’s understanding of the role of medicine in a socialist society.

<table>
<thead>
<tr>
<th>TABLE 3</th>
<th>SUBJECTS RELATED TO PUBLIC HEALTH IN THE CURRICULA OF THE FACULTIES OF GENERAL MEDICINE, CZECHOSLOVAKIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>Number of hours</td>
</tr>
<tr>
<td></td>
<td>Lectures</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Political economy</td>
<td>36</td>
</tr>
<tr>
<td>Dialectical and historical materialism</td>
<td>—</td>
</tr>
<tr>
<td>Scientific communism</td>
<td>—</td>
</tr>
<tr>
<td>Nursing</td>
<td>24</td>
</tr>
<tr>
<td>Medical psychology</td>
<td>12</td>
</tr>
<tr>
<td>Microbiology</td>
<td>36</td>
</tr>
<tr>
<td>Hygiene</td>
<td>24</td>
</tr>
<tr>
<td>Organization of health services</td>
<td>36</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>24</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>24</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>12</td>
</tr>
<tr>
<td>Sports medicine</td>
<td>24</td>
</tr>
</tbody>
</table>

* Not including 3 weeks' practical work during vacations.
Several subjects directly or indirectly related to hygiene and public health are included in the curricula of all faculties, but the extent of the teaching depends on the faculty. The subjects of this nature taught in the faculties of general medicine are shown in Table 3. It will be noted that 288 hours of lectures and seminars are devoted to political subjects. The subjects most directly related to public health are hygiene (72 hours) and the organization of health services (84 hours).

"Hygiene" includes special branches of hygiene and factors concerned with environmental health. Statistical methods (about 24 hours) and the principles of health statistics are included within the "organization of health services". "Epidemiology" deals with infectious diseases only. For examination purposes it is linked with internal and infectious diseases in general, but particular attention is paid to field practice. "Occupational health" (10 hours of lectures and 16 hours of practical work in the tenth semester) is taught as part of internal medicine.

Subjects covered by the practical work in the sixth year include infectious diseases and epidemiology (13 days), occupational health (2 days), and the organization of health services (3 weeks). The latter is carried out in "sanepid" stations and in social welfare units, and includes practical work in health education.

A somewhat different curriculum is followed in the faculties and departments of paediatrics. Paediatric physicians care for children up to the age of 14, and are trained at Prague, Brno, and Bratislava.

### TABLE 4
SUBJECTS RELATED TO PUBLIC HEALTH IN THE CURRICULUM FOR PAEDIATRIC PHYSICIANS, CZECHOSLOVAKIA

<table>
<thead>
<tr>
<th>Subject</th>
<th>Number of hours</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lectures</td>
<td>Seminars and practical work</td>
</tr>
<tr>
<td>Political economy</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Scientific communism</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Dialectical and historical materialism</td>
<td>72</td>
<td>36</td>
</tr>
<tr>
<td>Nursing</td>
<td>36</td>
<td>60a</td>
</tr>
<tr>
<td>Medical psychology</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Microbiology</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Hygiene</td>
<td>28</td>
<td>66a</td>
</tr>
<tr>
<td>Organization of health services and history of medicine</td>
<td>56</td>
<td>56a</td>
</tr>
<tr>
<td>Infectious diseases and epidemiology</td>
<td>56</td>
<td>70a</td>
</tr>
<tr>
<td>Sports medicine</td>
<td>28</td>
<td>28</td>
</tr>
</tbody>
</table>

a Not including 3 weeks' practical work during vacations.

In addition, students undertake field practice as follows:

Nursing: 2 weeks after completion of the third year.
Organization of health services: 4 weeks in the sixth year.
Infectious diseases and epidemiology: 4 weeks in the sixth year.
Items in the curriculum that are directly or indirectly related to public health are listed in Table 4. Tuberculosis and occupational health are dealt with under the heading of general medicine. Tuberculosis receives four hours of lectures and eight hours of practical work in the seventh semester, and occupational health four hours of lectures and four hours of practical work in the tenth semester.

In the Faculty of Hygiene in Prague, naturally, the bulk of the curriculum relates to public health and hygiene. Most of the graduates will work in "sanepid" stations and similar institutions, and if they become inspectors will eventually have considerable legal powers. They are therefore comparable to physicians elsewhere with a postgraduate qualification in public health.

As can be seen from Table 5, four special branches of hygiene are included in the curriculum: communal, child and youth, food, and occupational hygiene. After graduation, hygienists may specialize in one of these branches.

<table>
<thead>
<tr>
<th>TABLE 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBJECTS RELATED TO PUBLIC HEALTH IN THE CURRICULUM OF THE FACULTY OF HYGIENE, PRAGUE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject</th>
<th>Lectures</th>
<th>Seminars and practical work</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to sociology</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Political economy</td>
<td>48</td>
<td>24</td>
<td>72</td>
</tr>
<tr>
<td>Scientific communism</td>
<td>36</td>
<td>72</td>
<td>108</td>
</tr>
<tr>
<td>Dialectical and historical materialism</td>
<td>36</td>
<td>36</td>
<td>72</td>
</tr>
<tr>
<td>Marxism-Leninism</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Nursing</td>
<td>24</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Microbiology</td>
<td>24</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Laboratory and sanitary techniques</td>
<td>24</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Microbiology, with introduction to epidemiology</td>
<td>36</td>
<td>36</td>
<td>72</td>
</tr>
<tr>
<td>Introduction to hygiene</td>
<td>24</td>
<td>48</td>
<td>72</td>
</tr>
<tr>
<td>Hygiene, with introduction to epidemiology</td>
<td>36</td>
<td>48</td>
<td>96</td>
</tr>
<tr>
<td>Food hygiene</td>
<td>36</td>
<td>60</td>
<td>96</td>
</tr>
<tr>
<td>Communal hygiene</td>
<td>36</td>
<td>60</td>
<td>96</td>
</tr>
<tr>
<td>Occupational hygiene</td>
<td>48</td>
<td>72</td>
<td>120</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>48</td>
<td>72</td>
<td>120</td>
</tr>
<tr>
<td>Public health</td>
<td>48</td>
<td>60</td>
<td>108</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>48</td>
<td>60</td>
<td>108</td>
</tr>
<tr>
<td>Sports medicine</td>
<td>12</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Child and youth hygiene</td>
<td>24</td>
<td>48</td>
<td>72</td>
</tr>
<tr>
<td>History of medicine</td>
<td>12</td>
<td>--</td>
<td>12</td>
</tr>
</tbody>
</table>

*Not including 3 weeks' practical work during vacations. In addition, students undertake field practice as follows: Laboratory and sanitary techniques: 8 weeks in the second and third year. Practice in polyclinic: 8 weeks in the fourth year. Practice in hygiene: 5 weeks in the fifth year. Special branches of hygiene and epidemiology: 18 weeks in the sixth year.*

An interesting feature of the teaching at the Faculty of Hygiene in Prague is the seminars organized at the end of the seventh, eighth, ninth, and tenth semesters. These seminars, which last a week, and in which the
Faculty's clinical and hygiene departments take part, emphasize the preventive aspects of medicine and the role of clinical medicine in health protection.

Teaching methods

In all the faculties heads of departments are free to develop the teaching as they consider best, within the over-all programme laid down. Consequently there are some differences in teaching between faculties, but to avoid major differences the heads of departments meet every second year to discuss the curricula and other matters.

Postgraduate teaching

All postgraduate training in both clinical and public health subjects is the responsibility of the Ministry of Health. Such training is organized and supervised on the Ministry's behalf by two institutes of postgraduate medical training, one in Prague, the other in Slovakia at Bratislava. All doctors graduating from these institutes work in institutions (hospitals and hygiene stations), not in the field (outpatient and domiciliary clinics).

The requirements for postgraduate training are embodied in the Medical Profession Act and its regulations. All health workers, physicians in particular, must undergo continuing systematic training to widen their knowledge and keep up with the advances of medical science and practice.

Most of this training is carried out in local medical institutions and co-ordinated by the institutes, which themselves undertake more advanced and special training. The various specialized technical institutes, such as the Institute of Industrial Hygiene and Occupational Diseases in Prague, are also important training bodies.

There are four types of training:
(1) specialization;
(2) subspecialization;
(3) study for advanced degrees;
(4) ad hoc and refresher courses.

Specialization in public health and hygiene

There are four basic specialties, in microbiology, health education, hygiene and epidemiology, and health services organization. Sports medicine could be regarded as a fifth. A physician trained in any of the three basic faculties (medicine, paediatrics or hygiene) may select any of the four basic specialties, but the training programme for graduates of the hygiene faculty lasts only two years, compared with three years for those from other faculties.
For all four specialties the institutes for postgraduate medical training have drawn up programmes covering the theoretical and practical knowledge required, and compiled lists of basic literature. The examinations require a knowledge of two world languages, one of which must be Russian. The examining commission is presided over by a representative of the institute concerned, and includes the chief or regional expert in the technical subject of the examination.

In most cases specialization programmes take the form of organized in-service training, but for specialization in the organization of health services, supplementary courses are run by the institutes. Specialization in this subject or in health education is usually combined with some other basic specialty. Hygiene and epidemiology and the organization of health services are the two most important specialties.

Specialization in hygiene and epidemiology

Training, which is mainly "in-service", has theoretical and practical sections.

Part 1. Theoretical

Students are required to have a wide knowledge of:

Hygiene

General hygiene: human ecology; housing and town planning; environmental sanitation; hygiene and transport; hygiene of medical institutions; personal hygiene; physical education and training.

Youth hygiene: Fundamentals of morphology of childhood and youth; health protection of children; children's institutes, group meals, recreation; control of infectious diseases; collaboration between schools and health services.

Occupational hygiene: Principles of physiology of work; health criteria and hygiene standards for industrial buildings; physical and chemical factors; dust, gases and vapours; safety at work; personal protection; feeding in industry; safety in agriculture; occupational pathology (diagnosis, prevention, and treatment).

Epidemiology of communicable diseases

Scope and methods; infection and immunity; control of infectious diseases in practice; fever hospitals; chemotherapy, antibiotics, vaccination; immunity and sensitization; alimentary, air-borne, venereal, and zoonotic infections, etc.; fundamentals of general and special microbiology; disinfection and disinfection.

Organization of hygiene and epidemiological services

Organization of "sanepid" stations; legislation; programmes of work; co-ordination with other health services.

Part 2. Practical

Work in the field and the laboratory; execution of hygiene measures; supervision of work in hygiene and epidemiology; basic laboratory methods (physical, chemical, biological, and microbiological analysis); recording and statistical analysis.
Specialization in the organization of health services

Before specializing in this field, physicians are required to work for two and a half years in prevention, hygiene, and epidemiology, including six months in administrative posts, and to complete successfully a 12-month course at an institute for postgraduate medical training. This course need not be followed continuously, but can be interrupted for periods of employment. Practical knowledge of the organization and methods of the main branches of clinical medicine is required.

The main subjects of study are:

- History of medicine from the standpoint of materialism, with particular reference to the USSR and Czechoslovakia; medicine in capitalist societies.
- Theoretical basis and scientific principles of social medicine; its history and organization.
- Theory and methods of vital and health statistics; demography, morbidity statistics.
- Organization of health services in Czechoslovakia.
- Health administration; health legislation; insurance against disease and infirmity; administrative methods, planning and supervision.
- Health personnel.
- Organization of health protection and medical care.
- Organization of hygiene and epidemiological services.
- Health education.
- Organization of scientific research societies and medical publications.

Subspecialization

In the public health field it is possible to specialize further ("subspecialize") in the following subjects:

- School hygiene
- Community hygiene
- Industrial (work) hygiene
- Epidemiology.
- Food hygiene.

In addition, physicians who have followed the general medicine course may specialize in occupational diseases or infectious diseases.

Advanced degrees

Advanced degrees in hygiene and public health are subject to the same law and regulations as any other branch of medicine. They are conferred on physicians who have shown by their research work that they have attained the required scientific level and who have passed a Bachelor of Sciences examination, which covers the special subject of study, Marxist philosophy, and two foreign languages, including Russian. In addition, the candidate must submit a thesis on a subject selected by the department training him, and usually after consultation with him. Graduates can go on to work for the degree of Doctor of Sciences.
Degrees are conferred by the universities and the Czechoslovak Academy of Sciences, after approval by the State Commission for Scientific Degrees. The Ministry of Health's public health research institutes, the Institute of Industrial Hygiene and Occupational Diseases, and the Institute of Epidemiology and Microbiology are not entitled to confer degrees, but in some cases theses can be defended there. The period of preparation for a thesis, as part of the organized training of new research workers, can be spent in two ways:

1. in a three-year scientific training course for research work. The candidate receives a scholarship and is not employed. Certain departments are authorized to train candidates under the guidance of a tutor.

2. in "external" training for employed scientists, which lasts five years.

Ad hoc and refresher training

Refresher training, in the form of short courses and seminars, is provided in appropriate institutions at local, district, and regional level. The plans and programmes are prepared by the institutes of postgraduate medical training in collaboration with local health authorities. This system of continuing refresher training enables physicians to keep up with recent advances in medical science and with new working techniques and methods.

Besides the postgraduate courses organized by the institutes for postgraduate medical training and the regional institutes, the system includes short educational programmes, particularly those organized by the J.E. Purkyné Medical Association, which consist mainly of seminars, conferences, meetings, etc. The most important of the courses are those for senior doctors of all branches, held regularly every three years. These senior doctors are expected to pass on to their colleagues the knowledge they have gained. There are also courses on special topics for selected physicians.

This extensive interlocking system of postgraduate training is one of the most important features of Czechoslovak medical life.

Research

A large amount of research in public health is conducted in Czechoslovakia, especially at the Research Institute for Public Health Practice, which co-ordinates all work in this field.

Wide areas of public health and medical care are covered, with considerable emphasis on their social and economic aspects. Current research projects include: specific analyses of different types of medical care and of the work of different categories and types of medical service, e.g., analysis
DENMARK

of medical care for selected disorders, its actual and optimum content, time spent on it, and its efficient organization; specific analysis of the work of certain categories of workers, based on a variety of work study methods; study of relationships between the cost of medicaments, prescription by doctors, and the development of the pharmaceuticals industry; the use of mathematical models to study and improve the network of health services.

DENMARK

Population (1963) 4 675 000

The National Health Service, a quasi-independent body, is responsible through the Ministry of the Interior for the administration of Denmark’s health services. It advises the Ministry of the Interior and all other ministries and public authorities on health matters. It supervises the health services, sees that public health legislation is observed, and exercises general administrative control over medical staff, hospitals, laboratories, etc.

It is also responsible for medical supervision of social institutions, such as children’s homes and old people’s homes. It collects and collates health statistics, and these are published annually.

The executive work is carried out locally by county and district medical officers appointed by the National Health Service. Hitherto they have often been part-time general practitioners, but there is a trend towards full-time medical officers. District health officers may also be required to act as police surgeons, to advise on unexpected deaths, and to provide psychiatric certification.

General practitioners are largely responsible for the health of children under school age. Every child is entitled to a total of nine free preventive health examinations before he enters school, three of them in the first year of life.

Health conditions in local government areas are the responsibility of local health committees appointed by the elected local government councils. These committees are advised by their local health officer, who is an ex officio member. They are mainly responsible for environmental sanitation, communicable diseases, food hygiene and control, children’s institutions, some aspects of maternal and child health, including supervision at home by nurses, and midwifery. Denmark has a well developed public health
and home nursing system, and is experimenting with a combined preventive
and curative home nursing service. Medical care is outside the scope of
the health committees.

Hospitals, apart from mental hospitals, are the responsibility of local
authorities. However, the City of Copenhagen has its own mental hospital
service, and the National Hospital in Copenhagen, the main teaching
hospital for Copenhagen University, is run by the State. The National
Health Service exercises direct supervision over the hospitals, and adjudicates
on the qualifications of applicants for senior hospital appointments.

One or more central hospitals with specialist services are situated in
each county; most hospitals for rural areas comprise a medical and surgical
department.

School health services are the responsibility of the Ministry of Education,
but the National Health Service must be consulted on all matters affecting
them; similarly, local education committees must consult with the local
health officer. The appointment of school health staff, physicians, and
nurses is subject to the approval of the National Health Service.

Industrial health and hygiene is a responsibility of the Ministry of
Social Affairs, which employs a corps of inspectors, including some
medical inspectors. This Ministry is also required to consult with the
National Health Service.

Denmark has a national health insurance system available to all, and
at present about 90% of the population are active members. There are two
main classes of membership, depending on income. Class A members
(78% of the population) are entitled to free medical attention and hospital
care, and receive a contribution towards the cost of important medicines.
Class B members pay a somewhat higher contribution and also pay a
proportion of medical fees.

Undergraduate medical studies

There are two old-established medical schools in Denmark, faculties of
the Universities of Copenhagen and Aarhus. A third school, recently
established at Odense, had its first student intake in the 1966-67 academic
year.

A new medical curriculum came into force for the academic year 1967-68.
The undergraduate teaching programme will give a broad education in
preventive and social medicine, but detailed instruction on its application
will be held back for postgraduate courses.

During their first year of study medical students, like all students in all
other faculties in Denmark, follow an introductory course in psychology,
history of philosophy, and logic.

Each medical faculty is headed by a Dean, who is elected yearly by the
faculty and is eligible for re-election.
Conditions of admission and duration of study

The only requirement for admission is possession of the certificate showing that the student has passed the secondary school examination (studentereksamen). Most medical students followed science courses at their secondary school, and those who did not take Latin must also pass an elementary test in that language. Conversely, students who followed classics or modern language courses must pass an additional examination in chemistry at studentereksamen level and attend a course in mathematics, followed by a test. There is no numerus clausus.

The course, which lasts about seven years, is divided into two stages. The pre-clinical stage lasts two and a half to three and a half years, depending on whether the student is required to take extra science courses, and the clinical stage three and a half years. These are minimum figures, and in fact the average student takes about eight and a half years to complete the course.\(^1\)

Examinations are held twice a year and the student presents himself for examination when he considers he is ready. A student who passes the final examination receives the university degree of Candidatus Medicinae et Chirurgiae, which entitles him to a certificate from the National Health Service admitting him to supervised medical practice and service as ship's doctor. One year of internship is required before a certificate authorizing independent medical practice is issued. These arrangements may be modified when the new compulsory course on general practice is finally approved.

Teaching of public health

At present public health is taught by one of the departments or institutes of hygiene. Some aspects of the subject, such as the State care of physically, sensorially, and mentally handicapped persons, national health insurance, and workers' compensation and pension systems, as well as normal medical jurisprudence, are covered in the course on forensic medicine. In addition, this course deals very fully with the writing of death certificates, and students are required to complete death certificates on the basis of case descriptions and autopsy findings.

For many years the teaching of hygiene in Denmark has included elements of public health and preventive and social medicine. It has attempted to integrate all matters relating to personal and social health (which are only dealt with in a disconnected fashion in other medical departments) into a system of "general medicine", the science of health and its application to man and the community (P. Bonnevie—personal communication).

Under the new curriculum, teaching in public health and allied subjects will be expanded and, in Copenhagen at least, will be spread more evenly over the course.

In view of this expansion of teaching and the growing number of students, the present Chair of Hygiene is to be supplemented by a Chair of Social Medicine, and later a third Chair dealing mainly with postgraduate instruction may be created. It must be stressed, however, that the aim is for the two sections and their staff to work in a unified manner within the same department. Like other Scandinavian countries, Copenhagen will have a Chair of Hygiene and a Chair of Social Medicine, but in this case they will work within the same institute, not as separate units.

Some of the teaching at present given in the Department of Forensic Medicine may be taken over by the new Department of Social Medicine. This would allow the former to concentrate on conventional forensic medicine and medical legislation. It is also intended to attach one or more general practitioners to the joint department, in order to assist with the organization of an optional course in general practice in the fourth clinical semester, to take part in integrated teaching at joint symposia and conferences, and to assist with postgraduate courses.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logic and philosophy</td>
<td>96</td>
<td>1,2 pre-clinical</td>
</tr>
<tr>
<td>Medical psychology</td>
<td>40</td>
<td>2 pre-clinical</td>
</tr>
<tr>
<td>Genetics and statistics</td>
<td>84</td>
<td>1,2 pre-clinical</td>
</tr>
<tr>
<td>General introduction to medicine</td>
<td>10</td>
<td>1 clinical</td>
</tr>
<tr>
<td>Microbiology</td>
<td>60 + practical</td>
<td>1,2 clinical</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>16</td>
<td>1 clinical</td>
</tr>
<tr>
<td>Genetic diseases</td>
<td>18</td>
<td>2 clinical</td>
</tr>
<tr>
<td>Hygiene</td>
<td>45 + visits</td>
<td>4 clinical</td>
</tr>
<tr>
<td>General practice (elective)</td>
<td>one month</td>
<td>6,7 clinical</td>
</tr>
<tr>
<td>Social medicine</td>
<td>30</td>
<td>6,7 clinical</td>
</tr>
<tr>
<td>Forensic and legal medicine</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

The teaching in public health and allied subjects proposed in the new curriculum is shown in Table 6. The general introduction to medicine includes three topics related to the courses in hygiene and social medicine:

1. historical review;
2. specialized medicine and general practice;
3. organization of preventive and curative medicine in Denmark.

Hygiene. The hygiene course will stress the epidemiology and control of environmental conditions, and it is hoped to teach these from the very start of the clinical curriculum. The subjects covered are:
1. Methods of epidemiology and biometrics;
2. Communicable diseases: general aspects, disinfection and vector control, sanitation (water, sewage, garbage), food hygiene, veterinary hygiene, tuberculosis, venereal diseases, etc.;
3. Intoxications, allergic states, accidents, general occupational hygiene, air pollution, food additives, pesticide residues;
4. Radiation protection;
5. Housing, climate, town planning;
6. Nutrition;
7. Personal and physical hygiene.

Topics 2–4 are to be integrated with the courses in microbiology, pharmacology, and infectious and genetic diseases. Topics 5–7 are for the most part extensions of earlier physiology courses. To show the subject within its practical context, visits will be paid to sanitary establishments, food plants, factories, housing estates, slum quarters, dispensaries, etc. The written examination at the end of the course will include questions on practical genetics.

Social medicine. This is to be taught towards the end of the clinical course, and will include the following subjects:

- Definition of health and sickness
- Sociological aspects of medicine
- Demography and health statistics: topical problems
- Medical institutions and practice, legislation, ethics, etc.
- Social institutions relating to occupation, rehabilitation, family, children, old people, housing, nutrition, physical training, recreation
- Social security: the role of the doctor
- Socio-medical problems of special groups; health supervision in pregnancy, childhood, and adolescence; birth control, abortions, physical and mental handicaps, chronic illness, old age.

It is also intended to teach the social aspects of clinical medicine in the various clinical departments; moreover, alcoholism, drug addiction, and criminality, for example, will be discussed in the courses on psychiatry and legal medicine.

The examination at the end of the course will be combined with the one in forensic and legal medicine.

Postgraduate teaching

The Institute of Hygiene in Copenhagen is a department of the University Medical School, and is responsible for postgraduate teaching in public health as well as for undergraduate teaching.
The present postgraduate course builds on undergraduate instruction. It is a full-time course lasting four months (from February to May) and is held in alternate years. A maximum of 20 students are selected for the course on the basis of their showing in the final degree examination and their subsequent medical experience.

Employment as a medical officer of health is conditional on completing this course and attaining the diploma of “Examined Medical Officer of Health”. Most of the teaching is given by full-time university staff, and there are a few external lecturers. Table 7 shows the main subjects in the course.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygiene, public health, and preventive medicine</td>
<td>98</td>
</tr>
<tr>
<td>Infectious diseases and microbiology</td>
<td>22</td>
</tr>
<tr>
<td>Venereal diseases</td>
<td>90</td>
</tr>
<tr>
<td>Forensic medicine</td>
<td>64</td>
</tr>
<tr>
<td>Forensic psychiatry</td>
<td>33</td>
</tr>
<tr>
<td>Public health legislation and administration</td>
<td>88</td>
</tr>
<tr>
<td>Social security and assistance</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>11–12</td>
</tr>
</tbody>
</table>

The first subject, hygiene, public health, and preventive medicine, comprises:

Vital and health statistics
Prevention of communicable diseases
Health services (care of pregnant women, infants, children under school age, handicapped children, the chronically sick, elderly persons, etc.)
Sanitary control of water supplies; sewage and refuse disposal
Food hygiene and control
Environmental hygiene
Occupational hygiene
Housing hygiene, with particular reference to slum clearance.

At the end of the course there is a 6-hour written examination and an oral examination in hygiene. In forensic medicine there is an oral examination, and also a 4-hour written examination at which candidates may consult reference material. There are oral examinations in microbiology, forensic psychiatry, and public health law and administration.

Most students taking this general course in public health also take part in two shorter courses, in industrial hygiene and school hygiene.

Course for general practice

As from 1969, physicians wishing to enter general practice will have to take a special 4-week course, after two years of postgraduate clinical training in different branches of medicine, including internal medicine,
surgery, gynaecology and obstetrics, and psychiatry. The course will include the following non-clinical subjects:

Applied physiology (nutrition, housing, personal hygiene, etc.)
Mental hygiene, educational problems
Occupational diseases and hygiene
Vocational and personal rehabilitation
Health examinations
Health education
General practice and its relations with medical and social institutions
Organization of a practice.

Research

In Denmark, research in social medicine has largely been conducted by sociologists and other non-medical scientists. The health authorities, however, are strongly convinced that a larger contribution should be made by the medical faculties and their medical science departments. It is hoped that the establishment of chairs of social medicine will allow more time for research in this field, and serve as a further stimulus to the university departments and institutes.

The Institute of Hygiene in Copenhagen is at present organizing an interesting study to ascertain the value of routine examinations of old people and the importance of social factors in the morbidity and mortality of the elderly. This study is being carried out in collaboration with a district hospital and, at a later stage, rural and urban general practitioners will be called in.

FEDERAL REPUBLIC OF GERMANY

Population (1966) 59 793 000

The Federal Republic of Germany is divided into Länder and "city states". These are responsible for the general supervision of public health work within their territory, but most executive authority is exercised at local level.

Under the Constitution the Bundestag is responsible for enacting law in specific areas of public health, but if it does not use these rights the individual Land is entitled to introduce its own legislation.

The Bundestag is responsible for enacting measures against communicable diseases and zoonoses that are a danger to the community, for measures governing admission to medical and other health professions, for supervising the handling of medicines, drugs, narcotics, and poisons, for protective measures regarding the handling of foodstuffs, semi-luxuries and essential
commodities, for health care, and for protection against hazards connected with nuclear energy and ionizing radiation. The Ministry of Health deals with statutory limitation of fees, and the Ministry of Labour with social security legislation.

The Federal Ministry of Health has three General Directorates: the first deals with medicine, drugs, and pharmacies (including medical care and many public health matters), the second with food and veterinary medicine as related to health, and the third with water management, air pollution, and noise abatement.

Executive authority rests partly with the Länder, but mainly with regional, city, and local administrations. Each local authority has its own health department, headed by a medical officer of health. He is the medical adviser to the administration, but can take immediate action in the event of public danger and has executive responsibilities for various matters concerning health protection. These local health departments are responsible for sanitary inspection, health education of the public, school health, maternal and child health, control of tuberculosis, supervision of drug addicts, and for advising on services for the physically handicapped. They also promote personal hygiene and physical exercise, and exercise general supervision over district and similar hospitals. Some local authorities are grouped into regions for purposes of supervision.

There are three types of hospital: public hospitals maintained by Land administrations and local authorities; independent non-profit-making hospitals maintained by foundations, or by religious or secular associations; and private hospitals.

Approximately 85% of the total population are compulsorily insured. There is a contractual arrangement between the health insurance funds and the associations of panel doctors.

Welfare workers, or Fürsorgerinnen, receive some health training and carry out some of the duties undertaken by public health nurses or health visitors in other countries. There are also a number of "disinfectors", mainly concerned with environmental sanitation. The appointment of better trained public health inspectors is being considered.

Undergraduate medical studies

In 1964 there were 19 schools of medicine in the Federal Republic, all faculties of State universities. They are administered and financially supported by the government of the Land in which they are situated, through the Land ministry of education. In their curricula they all follow the very broad federal regulations. Consequently, the teaching in all schools is very similar, and students can move freely from school to school.

Since 1964, 11 new schools have opened or are in an advanced stage of planning. Some of these are known to be planning the use of new and
modern teaching methods and curriculum arrangements. At Ulm, for
instance, the faculties of natural sciences and mathematics, of theoretical
medicine, and of clinical medicine will work in close collaboration within
a single school of medicine and natural sciences. The teaching of clinical
medicine will be linked with basic and medical sciences at all stages, and
as far as feasible teaching will be integrated by use of the "topic system",
whereby all aspects of a specific subject are dealt with in the same week by
a team of specialists. This proposal to give different types of medical
training is arousing considerable controversy.

At Hanover, a very full programme in community medicine is planned
in association with a new institute of public health. The medical school
will have four branches:

1. pre-clinical branch
2. clinical branch
3. clinical/theoretical branch
4. institute of public health.

Much integrated teaching is intended, and general practitioners will be
brought in to teach in the out-patient departments. New subjects of
importance to public health will include biomathematics and social sciences,
including social anthropology and human genetics.

Each faculty, and each hospital attached to a university, prepares its
own budget, which is then submitted with that of the university as a whole
to the Land ministry, and eventually to the Land parliament. Professors
are appointed by the Land ministers on the recommendation of the faculties
concerned.

Conditions of admission and duration of study

Students must have successfully completed secondary education at a
Gymnasium and have a satisfactory knowledge of Latin. There is no
numerus clausus. Candidates are also required to undertake at least
eight weeks in nursing practice before admission to the course.

The course lasts five and a half years, made up of a pre-clinical period
of two and a half years and a clinical period of three years. Before taking
the final examination, the student must spend at least three months as a
clinical clerk (Familius) in an approved hospital. This must be done
outside the academic term.

A student who passes the final examination may use the title
Medizinalassistent and must complete a two-year internship before a licence
to practise (Bestallung als Arzt) is granted. Six months of this internship
must be devoted to medicine and, as a rule, four months each to surgery
and obstetrics. Within certain limits the candidate may choose how to
spend the remaining 10 months; part of that time may be devoted to working with a general practitioner or in a health department, though the latter is rarely selected.

Teaching of public health

The teaching of public health and hygiene in German universities is based on a series of rules for admission to the medical register (Bestallungsordnung für Ärzte) which stipulate in fairly broad outline the subjects in which students must be examined. Teaching is carried out in a department of hygiene headed by a professor. Usually the professor is also director of a university institute of hygiene, largely concerned with the day-to-day microbiological and chemical aspects of environmental hygiene.

At the end of the course, the student must take an oral examination in hygiene, medical microbiology, and social medicine during a single day. There is also some pressure for the inclusion of written examinations. The rules state:

"The candidate must prove that he possesses the knowledge needed by a general practitioner in the field of hygiene, i.e., the most important methods of examination in hygiene, especially bacteriological and serological methods; the principles and techniques of vaccination; production and storage of vaccines.

"In the examination in general hygiene, special regard shall be paid to the fields of practical importance in occupational health, occupational diseases, and industrial medicine. In the examination in public health care, the candidate shall demonstrate sufficient knowledge of the scientific principles and methods of work in public health care and of the organization of public health services."¹

As an example of undergraduate public health education in the Federal Republic, the relevant subjects taught at Kiel are outlined in Table 8.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours per week</th>
<th>Clinical semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteriology and serology</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Hygiene I (environmental hygiene)</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Hygiene II (epidemiology and applied hygiene)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Public health care</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Industrial hygiene</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Immunization, including smallpox vaccination</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Medical jurisprudence and professional ethics</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Details of the topics taught under some of the subjects are given below.²

² This information is based largely on: Gartner, H. & Reploh, H. (1964) Lehrbuch der Hygiene Stuttgart, Gustav Fischer.
Hygiene I (environmental hygiene)

Introduction: basic principles
Air, weather and climate
Soil and water, including water supplies (sewage and garbage disposal)
Nutrition (alcohol, tea, coffee, tobacco, etc.)
Personal hygiene: hygiene of clothing, physical exercise
Sports hygiene, including sports grounds and premises
Dwellings and town planning, schools and hospitals
Disposal of corpses, burials
Noise; air pollution; radiation hazards
Geomedicine and medical topography
Tropical hygiene.

Hygiene II (epidemiology and applied hygiene)

Epidemiology of communicable diseases
The concept of infectious disease
The different manifestations of infectious diseases
The concept of epidemiology
The role of pathogenic organisms in outbreaks; their dissemination
The role of the host organism in the course of an infectious disease
Methods by which infectious diseases spread
Epidemiological analysis
The causes of change in infectious diseases; their present-day significance.

Principles of control and prevention of infectious diseases
Special measures: notification, isolation, disinfection, etc.
General prophylactic measures: water, food, zoonoses, immunization, etc.
National and international laws and regulations.

Social hygiene
Structure and movement of populations
Human reproduction and its problems
Mortality and morbidity statistics
Non-infectious diseases of public health importance (heart disease, cancer, diabetes, accidents, misuse of drugs, etc.)
Public health aspects of housing
Health education
Fatigue and recreation, use of leisure
Mental hygiene.

Public health care
Historical aspects and relation with social insurance
Antenatal care; care of infants and toddlers
School health services (adolescence and youth services)
Geriatric services
Care of handicapped persons, including those with sensory handicaps
Psychiatric services
Tuberculosis, venereal diseases, epidemiology; social factors and control
Social work in hospitals.
It should be noted that the teaching of social aspects of clinical medicine in individual cases is regarded as the responsibility of the clinical teachers; there is no combined teaching of social and clinical medicine, nor is the student normally introduced to general practice or other aspects of medicine "outside the hospital", or to "community" medicine.

**Industrial hygiene**
- People at work, including women and young persons
- Mental hygiene at work
- Working environment
- Accommodation for welfare and hygiene services
- Protective measures in industry
- Industrial health services.

At Kiel there is also an optional course in statistics, organized by the Institute for Medical Documentation and Statistics. It consists of two parts:

1. **Documentation** (recording of medical material in relation to automatic data processing)

2. **Statistical methodology for physicians.**

**Documentation**
- Documentation in connexion with statistics as a first step (collection of data, quantitative and qualitative data with regard to specific medical findings).
- Punch cards as a source of information, in particular machine punch cards; other sources of information (paper tape, magnetic tape, magnetic disc).
- Technical possibilities of automatic data processing (punch card machines, electronic data processing, review of programming techniques and programming languages).
- Selection and definition of criteria for surveys and evaluation (parallel with the lecture on design of experiments in the Methodology course).
- Principles of classifying quantitative and qualitative criteria (variables).
- Input control.
- Presentation of statistical data in tables and diagrams.
- Problems of documentation of the development of diseases (particularly control of the development of malignant tumours).
- Documentation and automatic processing of technical medical data (data derived from laboratory work, analogous data such as ECG and EEG, and presentation in digital form of X-ray results).

**Methodology**
- The importance of statistics in medicine (including mortality statistics and epidemiology); statistical conclusions as regards clinical problems, particularly the assessment of therapeutic results.
- Elementary statistical concepts, introduction to sampling theory.
- Design of experiments (medical and statistical models, interpretation of statistical results in clinical medicine, selection of appropriate statistical tests, formulation of the null hypothesis, establishment of probability level for errors of the first and second kind).
- Test of frequency, qualitative data.
Theoretical and empirical distributions (binomial, Poisson, normal, and hypergeometric distributions).
Binomial law and direct method according to R.A. Fisher.
Chi-squared distribution in $2 \times 2$ contingency tables.
Correlation in $2 \times 2$ tables.
Wilcoxon test, sign test, and other non-parametric tests.
Means of quantitative variables (arithmetic, geometric, and harmonic mean, central value).
Variance, skewness, flatness.
Variance and standard deviation, confidence interval.
Testing of differences in means ($t$-test in connexion with $F$-test).
Simple and twofold analysis of variance.
Tests for bivariate distribution (linear regression, correlation, testing of correlation coefficient against null hypothesis).
Testing of difference of correlation coefficient.
Partial correlations.

The medical course at Giessen is broadly similar, but there is a six-week course of “topic” teaching in the out-patient department, which includes a socio-ethical course of six sessions on “behaviour at the bedside”. This covers such subjects as confidentiality, health education, premature discharge, the situation of the in-patient, and the ethics of experimentation on human subjects. These sessions are voluntary, but they are well attended since they form part of the course of topic teaching.

There is also a voluntary course on statistics, mainly attended by postgraduate students and interns, but with an occasional undergraduate medical student.

Finally, Giessen has a course of some 30 hours in medical sociology, attended mainly by sociology students but also by a few clinical assistants.

Greater emphasis on social medicine and modern epidemiology is found only at the new schools; Hanover only admitted its first students in 1965, and the course is as yet experimental. In the pre-clinical year there are two related courses of 30 hours each on the sociology of medicine and, more broadly, on medical sociology. Human genetics and an introduction to hygiene are also included in the last part of the pre-clinical year, together with a compulsory course on statistics as part of biomathematics. This is in accordance with the modern trend to introduce students to some aspects of public health right at the start of the course.

The teaching of epidemiology and social medicine is to be partially integrated into the general clinical courses, but 50 hours have been reserved for a separate course in these subjects. Social medicine will receive much attention in that part of the general medical course that is run by general practitioners.

Postgraduate education

In the Federal Republic of Germany, medical public health officers are required to undergo three months’ training in psychiatry, to work for five
months in the public health service, and to complete successfully a 4–5 month course in public health. The study in psychiatry is necessary to fit the health officer for his work in connexion with mental illness and admissions to mental hospitals. A considerable percentage of patients in mental hospitals require legal certification, and this is often a duty of the public health officer.

Public health officers also have certain responsibilities in forensic medicine, and are required to be present at or to perform autopsies made for legal purposes. However, there is now a tendency to appoint specialists in forensic medicine, and relieve health officers of these duties.

Public health courses are organized separately or jointly by the various Länder. Such courses are given by the public health schools at Hamburg, Düsseldorf, and Munich. At present the possibility of establishing a central school of public health is being examined, and the Standing Conference of Länder Ministers of Health has requested a study of the desirability and feasibility of setting up a single school.

The teaching programme of the Hamburg School is given in Table 9 as an example of postgraduate teaching. This course is undergoing continual evolution to make it better adapted to present-day conditions. The last column of the table shows, for comparison, the number of hours devoted to the various subjects in 1954.

**Table 9**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th>1965</th>
<th>1954</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures, seminars, and practical work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General legal and administrative background</td>
<td></td>
<td>81</td>
<td>32</td>
</tr>
<tr>
<td>Health legislation and administration; daily work of a public health office.</td>
<td></td>
<td>92</td>
<td>94</td>
</tr>
<tr>
<td>Statistics</td>
<td></td>
<td>16</td>
<td>38</td>
</tr>
<tr>
<td>Epidemiology, bacteriology, virology, vaccination</td>
<td></td>
<td>71</td>
<td>13</td>
</tr>
<tr>
<td>Epidemiology, bacteriology, tuberculosis, venereal diseases, poliomyelitis</td>
<td></td>
<td>-</td>
<td>41</td>
</tr>
<tr>
<td>General hygiene, rural sanitation</td>
<td></td>
<td>50</td>
<td>106</td>
</tr>
<tr>
<td>Industrial hygiene and protection against atomic radiation</td>
<td></td>
<td>15</td>
<td>78</td>
</tr>
<tr>
<td>Food hygiene</td>
<td></td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Medical care and social welfare*</td>
<td></td>
<td>70</td>
<td>45</td>
</tr>
<tr>
<td>Services for mothers, children and young people</td>
<td></td>
<td>33</td>
<td>27</td>
</tr>
<tr>
<td>Social and forensic psychiatry</td>
<td></td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td>Forensic medicine</td>
<td></td>
<td>40</td>
<td>19</td>
</tr>
<tr>
<td>Medical compensation and drafting of medical reports</td>
<td></td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>Sociology</td>
<td></td>
<td>-</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>525</td>
<td></td>
</tr>
<tr>
<td>Excursions and inspections</td>
<td></td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>Grand total</td>
<td></td>
<td>659</td>
<td></td>
</tr>
</tbody>
</table>

* See also following item.

There have been considerable changes in content during the past 12 years. These include reductions in the number of hours devoted to forensic medicine.
and forensic autopsies (before 1954, even more time was given to this subject) and to general and food hygiene. On the other hand, there has been a large increase in the time devoted to basic principles of legislation and administration, and sociology has been introduced.

Considerable use is made of seminars, at which a student reports for 20 minutes on a specific subject.

Lectures are given by local government administrators and lawyers as well as by public health administrators. The School’s Board of Trustees consists of the senior medical officers of the sponsoring Länder, and it is hoped that in future they will carry out more organized teaching themselves. Since the Director of the School also occupies the Chair of Hygiene at Hamburg University, and other university lecturers are on the staff, the School is subjected on the one hand to academic influences and on the other to the influence of practical public health specialists.

The examinations at Hamburg are in two parts. The first is a series of oral examinations on the subjects taught. The second part consists of two written dissertations. One is on a subject relating to public health administration selected by the Dean, and may take the form of a report on a specific subject or region. The other dissertation may be more narrowly technical. Recent subjects include:

Problems of early registration and care of mentally deranged children, as experienced by the Lübeck public health office.

Present and future proportion of infirm aged persons in Berlin and the number of hospital beds required.

Medical topography of the Eutin district.

Plans are far advanced to set up a new Institute of Health Care for postgraduate teaching in Hanover. This Institute is to have five departments:

Epidemiology
Social medicine
General public hygiene
Sports medicine and physiology of peak effort
Applied nutritional science.

Research

Besides conducting a great deal of research in the technical subjects concerned with hygiene, the schools of public health are interested in research into aspects of public health practice. For instance, the School at Hamburg has conducted a study of the demographic structure, living conditions, and integration problems of homeless foreigners in Germany. It is also conducting a study on socially handicapped families, the influence of family size, influences leading to large families, and resulting handicaps
and possible remedies. The students' dissertations are also building up a
body of research into the present-day public health situation in the Federal
Republic.

The Institute of Social Medicine at Giessen is developing its interest
in research on medical care and public health practice, and is conducting
epidemiological studies on the etiology of non-communicable diseases.
There is also a very active department of experimental physiology in the
Institute of Social Medicine at Heidelberg, which is carrying out research
on, inter alia, the physical activity of Heidelberg Municipal Council
employees in relation to coronary heart disease.

FINLAND
Population (1964) 4 579 819

Finland has a three-tier system of health administration at national,
provincial and commune level. At the national level is the National
Board of Health, presided over by a Director-General of Health. This
Board is responsible to the Ministry of the Interior, and has general powers
to supervise and control the whole health service. It is also responsible
for laboratory services, for collecting statistics for medico-legal purposes,
for international contacts, and for training medical personnel other than
doctors and dentists.

The country is divided into 12 provinces; in each there are one or two
provincial health officers, responsible to the National Board of Health for
the general oversight of health matters in their province. They supervise
the work of the local health officers in both public health and medical care
(general practice and local hospitals). On his staff the provincial health
officer has provincial nursing and midwifery officers, and also a non-medical
provincial health inspector mainly concerned with environmental hygiene.
There are plans to relate the work of the provincial health officers more
closely to that of the provincial civil administration.

At commune level the local health officer or commune physician is
responsible for both medical care and public health services. He is an
ex officio member of the local Board of Health.

There is also a three-tier hospital system, and responsibility for the
establishment and operation of hospitals has been almost entirely delegated
to local government bodies at the appropriate level. There are 21 central
hospital districts, each with a central hospital, a few intermediate hospitals,
and a number of local hospitals.
Since 1964 the entire population has been covered by a system of compulsory health insurance. Two per cent of the yearly contribution from insured persons is used for prevention of diseases and for rehabilitation.

Undergraduate medical studies

There are three schools of medicine in Finland, faculties of the Universities of Helsinki, Turku, and Oulu. Helsinki and Oulu are State universities. The University of Turku is supported only partly by State subsidies, but the Medical Faculty is wholly subsidized by the Government.

The Universities confer the degree of Licentiate in Medicine.

Conditions of admission and duration of study

Students are required to have a matriculation certificate, and must pass an entrance examination in physics, chemistry, and biology. As the number of applicants exceeds the number of vacancies, these requirements are tantamount to a selection process.

The course lasts six years, followed by a period of internship. It is in three parts: pre-medical (two semesters), pre-clinical (three semesters), and clinical (seven semesters). Upon passing the examination at the end of the two pre-clinical semesters the student obtains the title of Candidate in Medicine.

Teaching of public health

Each of the three medical faculties has a Chair of Hygiene and Social Medicine, although there are differences in the extent to which hygiene and social medicine are taught as separate subjects.

As in the other Scandinavian countries, considerable emphasis is given to hygiene; the term mainly covers environmental hygiene, but may include occupational diseases and epidemiology. Partly, perhaps, this is because the local health officer is often responsible for both medical care and public health and hygiene in a large district with low population density and difficult communications. Under the circumstances, it has been necessary to adapt the teaching to the demands that will be made of the local health officer.

In accordance with recommendations made by a committee in 1949, the Finnish medical student should devote three periods to the study of social medicine:

1. an introductory course during the first clinical year;
2. a course related to clinical studies throughout the entire clinical period;
3. a complementary course at the end of clinical studies.
Certain aspects of public health are covered by the departments of forensic medicine, e.g., death certification and aspects of health legislation.

The following programme from Turku is given as an example:

**Hygiene**

*Theoretical* (48–50 hours)

- History of hygiene, with special reference to Finland
- Hygiene, its tasks, limits, and aims
- Atmospheric and climatic hygiene; Finland as a suitable region for work
- Housing, lighting, heating, ventilation, vermin
- Soil and drinking water
- Contamination of water, protection of drinking water systems
- Garbage and sewage disposal, etc.
- Cemeteries and burial customs
- School hygiene, schools and pupils; physical activity; sexual hygiene
- Occupational diseases (mainly those encountered in Finland); prophylactic measures and legislation
- Disinfection, with a practical course spread over 14 days
- General epidemiology (epidemiology of communicable diseases is taught separately at the infectious diseases hospital)
- Epidemiology of the major tropical diseases
- Food hygiene; protective foodstuffs; milk and meat hygiene and control, parasites in meat; shop hygiene
- Duties and legal position of the Board of Health; public health legislation.

*Practical*

The practical work is in two parts. The first consists, in addition to training in disinfection, of some 18 days of laboratory work covering a variety of techniques related to hygiene and sanitation, such as analyses of water, sewage, milk, and air, tests of lighting, etc. There are excursions to waterworks, slaughter-houses, purification plants, and the like. The students also visit the provincial health office to become acquainted with its work. Many senior Candidates in Medicine gain practical experience as substitutes for commune health officers in rural areas during their summer vacation.

The second form of practical work is a very interesting feature of the Finnish medical course. The students, in pairs, spend five weeks doing specialized research work on a subject in hygiene or medicine. The subject is usually chosen by the students themselves, and eventually one of the two gives the whole class a short account of the project.

**Social medicine**

*Introductory course* (12 one-hour lectures)

- Definitions of social medicine, its aims and its limits; research methods in social medicine
- Ethics of the medical profession
- Structure of Finnish society
- Illness and disablement as social problems; accidents, rehabilitation; morbidity, mortality, and invalidity statistics
- Problems in the education of children
- Social assistance; administration of the Finnish system of medical assistance.
Social aspects of clinical medicine

This part of the course is left to the clinical teachers, who should point out to the students the important social aspects of cases under their care. The extent of the instruction varies according to the interests of the different teachers.

Complementary course (12 two-hour sessions)

Mental health: the mentally ill and the feeble-minded
Sterilization and demographic policy; legislation on sterilization and marriage
Sexual assaults, especially on minors, and sexual offenders; castration and related legislation
Prevention of crime, particularly juvenile delinquency, by medical procedures; medical treatment of criminals
Legislation on vagabondage, medical treatment of vagabonds
Legislation on alcoholism, care of alcoholics
Suicide and its prevention
Methods of abortion; abortionists
Legislation on abortion; abortion from the viewpoint of social medicine
Work of midwives, and the framework in which they function
"Girl" mothers, legislation on illegitimate children, regulations on adoption; artificial insemination
Care for old persons; work of community health visitors (some of whom are employed by the church), and the framework in which they function.

Statistics

This is taught by the mathematics department.

In Helsinki, instruction in statistics is given by the Department of Hygiene and Social Medicine, in a course of lectures covering the following subjects:

Vital statistics and statistical terminology
Mortality rates and ratios
Age distributions
Estimation of trends
Standardization of populations
Life expectancy, etc.

In addition, a university lecturer in statistics gives a short course on statistical methods, comprising:

<table>
<thead>
<tr>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts of statistics; general principles</td>
</tr>
<tr>
<td>Main steps in statistical analysis</td>
</tr>
<tr>
<td>Measures of central tendency and dispersion</td>
</tr>
<tr>
<td>Applications of normal distribution and t-distribution</td>
</tr>
<tr>
<td>Application of $\chi^2$ distribution</td>
</tr>
<tr>
<td>Calculation of probability</td>
</tr>
<tr>
<td>Combinatorial analysis</td>
</tr>
<tr>
<td>Applications of binomial, hypergeometric, and Poisson distributions</td>
</tr>
<tr>
<td>Analysis of variance</td>
</tr>
<tr>
<td>Regression analysis</td>
</tr>
</tbody>
</table>
In each lecture students are given tasks to carry out, and these are discussed during a subsequent lecture.

Epidemiological theory is taught in connexion with vital statistics, which makes it possible to use appropriate examples: morbidity, incidence, prevalence, population, epidemic, etc.

Seminars are organized by the students on the epidemiology of both infectious and non-infectious diseases. Each student has 30-45 minutes to read his paper, which is then open to general discussion.

Final examinations are held in hygiene, in social medicine, and in public health legislation; there are intermediate examinations as well. In Helsinki, the final marks are affected by performance in seminars, research exercises, and laboratory work. In addition to academic teaching, students are expected to be familiar with the contents of a standard textbook of hygiene, such as the Swedish work by Friberg & Ronge.\textsuperscript{1} Plans are being considered to permit candidates to spend four months of the compulsory 10-month pre-registration internship in a theoretical institute. It is believed that some candidates would wish to spend this period in the university departments of hygiene.

**Postgraduate teaching**

There are no courses in Finland leading to a postgraduate academic degree or diploma in public health or hygiene. Public health, however, is a recognized specialty.

All specialization studies in Finland consist of two years' general training and four years' training in the field of the intended specialty. For specialization in public health the latter studies are divided into two parts: 2–3 years of specialization studies proper, and 1–2 years of additional specialization studies.

Training at the Gothenburg School of Public Health (see p. 184) may be accepted as specialization studies, subject to separate consideration of each individual case by the Specialization Commission. The practice has been to regard all three courses at Gothenburg as corresponding to one year of specialization studies proper.

**General training**

A maximum of one year's service prior to licensing can count towards general training. The major part of the general training must be performed before study of the specialty concerned begins. General training is in three parts:

1. One year's service at a hospital, including at least four months in the field of internal medicine and at least two months in the field of surgery.

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\textsuperscript{1} Friberg, L.T. & Ronge, H., ed. (1964) *Hygiene*, Copenhagen, Munksgaard.
(2) Six months' service as a general practitioner (commune health officer, army medical officer, physician at an undivided general hospital, industrial health officer, etc.).

(3) Six months' training in one of the following:
Hospital work under the supervision of a specialist, in a field other than the trainee's own intended specialty;
Full-time work as a health officer in the civil service or in the service of local authorities;
Service in a medical or theoretical institute of a university;
Service in a State medical institute;
Full-time work as a research fellow in a field accepted by the Specialization Commission;
Subject to the approval of the Specialization Commission, any other service for which a physician's qualifications are required.

Specialization studies proper

(1) One to two years at a university institute of hygiene or social medicine, plus

(2) One year's hospital service in any two of the following departments: dermatology and venereal diseases, lung diseases, surgery, paediatrics, gynaecology and obstetrics, psychiatry, internal diseases, communicable diseases, occupational medicine.

Additional specialist training

One to two years' service as commune health officer or in some other corresponding position.

Examinations

Specialist rights are granted by the National Board of Health to applicants who have passed an accepted examination. The examiners are university professors.

Refresher training

Refresher courses for commune health officers are arranged by the Public Health Training and Research Centre of the National Board of Health (former Uusimaa Training and Demonstration Area). As a rule, 1–2 courses of 2–3 weeks' duration are arranged yearly. The topics are concerned with new developments in public health in general, or with some specific problem such as geriatrics, maternal and child health, etc. These courses are regarded as a kind of in-service training, and not as
specialization studies proper. In addition, several international courses in public health practice have been arranged by the Centre, under the sponsorship of WHO. Each course has had 2–4 Finnish participants.

Research

Research in public health is conducted by the university institutes of hygiene, the Statistical Department of the National Board of Health, the Public Health Training and Research Centre of the National Board of Health, the National Pensions Institute, the Institute of Occupational Health, the State Serum Institute, and the Institute of Radiation Physics.

The Institute of Hygiene of the University of Helsinki is currently engaged in studies on the need for and use of spectacles among primary and secondary school populations in Helsinki, and on the health problems of adopted children.

The research carried out by the Public Health Training and Research Centre is concerned with various kinds of public health problems, and includes such projects as surveys of the work of commune health officers, factors involved in perinatal mortality, the morbidity of rural populations, and the utilization of medical and health services.

A special fund consisting of the 2% of health insurance contributions mentioned earlier is at the disposal of the National Pensions Institute. Part of it is used for morbidity surveys, for research on the utilization of medical and health services, and for experiments in methods of health screening.

A large number of publications on public health are produced by the Institute of Occupational Health. In addition to technical studies in industrial medicine, in psychological abilities and in ergonomics, the Institute has conducted research on diseases of wide public health interest such as coronary heart disease, on rehabilitation, on sports and physical fitness, and on environmental air pollution.

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FRANCE

Population (1962) 46,243,000

The Ministry of Public Health and Population and the Ministry of Labour and Social Security have recently been amalgamated in a new Ministry of Social Affairs, which is responsible for all health matters.
Within the Ministry is a General Directorate of Health, with three sub-directorates responsible respectively for maternal and child health and school health, for medico-social affairs (including prevention, care, after-care and rehabilitation), and for environmental hygiene.

The General Directorate has a division of programming, planning and co-ordination, and also a number of sections responsible for research and medical education, for the supervision of agencies for health and social education, for liaison with professional bodies and the practice of medicine generally, and for the education and further training of paramedical staff.

The Director-General of Public Health is responsible for proposing all measures of health policy, both those concerning the technical organization and operation of public and private establishments and services, and those concerning prevention and medical care, medical education, and research.

Health services in France are organized on four levels, national (see above), regional, departmental and communal. The regional administration comprises a number of départements, and is mainly responsible for planning, co-ordination, and technical supervision under the over-all supervision of a Regional Prefect. Under the Prefect there is a director (chef de service) of health and welfare, responsible for co-ordinating the administrative and financial control of hospitals, etc., and for planning region-wide socio-medical services. A regional inspector-general of health is attached to the Prefect's staff. He is responsible for advising the Prefect and the director of the regional health and social services. Besides having important technical co-ordinating and advisory functions, he is responsible for the technical operation of the regional university hospital centre.

At département level the executive authority rests with a director of health and social services, who has on his staff a number of physicians responsible for:

(1) Environmental sanitation
(2) Preventive work on both communicable and non-communicable diseases, including mental diseases and alcoholism
(3) Maternal and child health, and school health
(4) Blood transfusion and civil defence services.

As at regional level, there is a medical inspector of health on the Prefect's staff, responsible for advising him and the director of health and welfare on health matters and for exercising technical control and supervision over all the health work in the département.

At commune level, the mayor is responsible for public health, under the administrative authority of the Prefect. Towns with more than 20,000 inhabitants, and certain smaller towns, are required to set up a health office, run by a full-time or part-time medical officer technically responsible to the medical inspector of health for the département.
Occupational health, formerly within the province of the Ministry of Labour, is now the responsibility of the General Directorate of Labour and Employment.

In addition to specialized establishments, the public hospital service links four main classes of hospital, from rural hospitals to the university hospital centres jointly organized by the regional hospital centres and medical faculties.

France has a very extensive system of social security. This used to cover some 86% of the population, and has recently been extended to cover the professional and business classes and self-employed manual workers.

The spirit and intention of recent administrative reforms in France is to make a clear distinction between administrative and management functions on the one hand and advisory and supervisory functions on the other. Thus, the medical inspectors devote themselves to advisory functions and technical inspection, while the director of health and welfare at département level is responsible, under the authority of the Prefect, for implementing all aspects of the Ministry’s policy and for the day-to-day operation of the service.

A National Institute of Health and Medical Research is responsible for keeping the Government informed on the country’s state of health, for conducting studies and research on pressing health problems, for keeping up-to-date information, and for encouraging all important medical research.

In general, there is growing interest in France in the role of the family doctor in the community and in the teaching he should receive as a student to fit him for this role. Efforts are being made:

1. to surmount the barriers of specialty and form therapeutic activities into a coherent whole, adapted to local conditions and living habits;
2. to extend the family doctor’s responsibilities in the direction of preventive medicine and social medicine;
3. to broaden medical practice, so that it aims not only to reduce illness but also to safeguard health and to educate the family in right ways of living.

These concepts correspond closely to the idea of "community medicine" emerging in a number of other European countries.

Undergraduate medical studies

In France there are 18 faculties of medicine (or of medicine and pharmacy), attached to State universities, and five national schools of medicine, some of which do not yet offer a full course. Each of these is attached for administrative purposes to a university, and is academically affiliated with a faculty of medicine. At Lille there is a non-governmental or "free" Faculty of Medicine and Pharmacy, which provides a full medical course, although examinations must be taken at a State faculty.
Ultimately all universities, and therefore the faculties and schools attached to them, are under the jurisdiction of the Ministry of Education.

There are detailed legal provisions governing the teaching and examination of medical students. The system of studies was drastically overhauled and reformed in 1960. This reform is in fact still in progress, for there have since been a number of modifications.

The main objectives of the original reform were to increase the practical and clinical aspects of medical teaching; to introduce students to clinical medicine at an earlier stage (as early as the first medical year the student is introduced to medical symptomatology); to introduce "integrated" teaching, in which teachers from various disciplines take part; and to give greater emphasis to the teaching of social medicine. The spirit of the reform is illustrated by a quotation from the arrêté (order) of 27 July 1966, referring to the third year of medical studies: "Clinical: work in the wards and tutorial instruction; clinico-biological and clinico-social conferences; integrated instruction in pathology (with participation of teachers of the basic sciences); five periods a week during the entire academic year". Particular emphasis is placed on bedside teaching.

The reformed system of teaching retains the traditional French student categories of externat and internat, and the corresponding titles. The reforms are still at an early stage, and have not yet been fully implemented, but the "integrated" teaching will provide an opportunity to introduce preventive medicine more effectively into the different clinical disciplines.

Conditions of admission and duration of study

To register as medical students, candidates must produce evidence that they have obtained the baccalauréat (secondary school certificate) or certain State (university) diplomas in other approved disciplines. In certain cases prospective students may be exempted from the baccalauréat, provided that they pass a special entrance examination.

All medical students are required to undergo a physical examination, including a chest X-ray and a tuberculin test, on admission, and annually thereafter.

The course lasts seven years in all, including a preparatory year, five years of medical studies, and a final year of practical work in approved hospital services. Students who have been internes or externes at university hospital centres are exempted from the final year.

The course leads to the degree of Doctor of Medicine. Examinations are held and marks are awarded throughout the course. At the end of the practical period students must take three clinical examinations in medicine, surgery, and obstetrics, and after passing these they must defend a thesis written on a subject approved by the Dean.
Teaching of public health

As in some schools in the United Kingdom and the new schools in Turkey, the use of an integrated curriculum provides an opportunity to introduce social medicine and hygiene into the teaching of many clinical subjects, and it is not possible to assess accurately the time devoted to this. Systematic teaching in social medicine is given during the fifth medical year. Table 10 shows the teaching of public health and allied subjects that is required by law.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
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<td>Haematology, parasitology</td>
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<td>Clinico-social conferences</td>
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<td>4th (3rd medical); 5th (4th medical); 6th (5th medical)</td>
</tr>
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<td>Preventive medicine and hygiene</td>
<td>60</td>
<td>6th (5th medical)</td>
</tr>
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<td>Occupational medicine and rehabilitation</td>
<td>60</td>
<td>6th (5th medical)</td>
</tr>
<tr>
<td>Applied genetics</td>
<td>15</td>
<td>6th (5th medical)</td>
</tr>
<tr>
<td>Applied psychology</td>
<td>25</td>
<td>6th (5th medical)</td>
</tr>
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</table>

The examinations at the end of the fifth medical year include written papers, each of one hour’s duration, in preventive medicine and occupational medicine, and oral examinations in each subject.

The detailed curriculum of the course in social medicine and hygiene in the Faculty of Medicine at Nancy is given below. In general it corresponds to the curriculum at other French medical schools, although it lays greater stress on nutrition and food hygiene. It should also be noted that at Nancy, even before the reformed curriculum was introduced, collaboration was established between certain clinical departments and the Department of Hygiene and Social Medicine. The teaching team at these medico-social clinics includes the clinician in charge of the case, the hospital almoner, the district nurse/welfare worker, and the teaching staff of the Department of Hygiene and Social Medicine. The aim is to show students the social repercussions of illness, and how to solve the medico-social problems it presents.

Curriculum for Social Medicine and Hygiene at Nancy (abridged)

Individual hygiene

Nutrition

Normal nutrition of an individual: needs, etc., resources, utilization, domestic economy
Nutritional pathology: quantitative variations, qualitative variations, toxic and infective foodstuffs
World nutrition
Personal hygiene
Hygiene of physiological systems; climate and thermoregulation; mental hygiene
Hygiene of vulnerable groups (pregnant women, infants, children, old people, etc.)

Housing
Preventive aspects: technical and administrative measures before, during and after building
Curative aspects: control of nuisances, ventilation, parasites, etc.

Hygiene of the human environment
Natural environment: effects of climate, etc.
Working environment: hygiene of work places; occupational diseases and toxicology,
accidents, etc.: orientation towards prevention
Transport: Hygiene of principal means of transport
Leisure: physical culture, sports medicine, intellectual culture
Health and social education of the people

Environmental hygiene
Urban hygiene
Principal problems: water supplies; sewage and garbage disposal; hygiene of establish-
ments (bath-houses, swimming baths, etc.)
Town planning

Rural hygiene
Medico-social aspects of rural life, rural hygiene

Hygiene of industrial areas

Infectious diseases of communities
General epidemiology
General principles of epidemiology of communicable and non-communicable diseases;
epidemiological studies
General prophylaxis: principles
Epidemiology and prophylaxis of individual infectious diseases
National legislation: reporting, disinfection, compulsory immunization

International measures

Social medicine: health and social services
Statistical methods in social medicine
Demography
Prevention: preventive examinations, surveillance of health at different ages
Social security and social assistance
Social diseases (venereal diseases, tuberculosis, etc.) and social problems (alcoholism,
narcoses, cancer): combined health, economic, and social approach
Health and social protection (by age groups, by occupation, by need, including mental
defectives)
Care and rehabilitation of the physically and mentally handicapped

Organization of health and social services
Health administration at various levels (national, regional, departmental, local)
Organization of the medical profession
Specialization, etc.
Importance of preventive and social medicine to practising physicians

Training and use of paramedical staff and technicians

International co-operation in health and social protection

International health legislation and services; United Nations and related organizations, WHO, etc.
Non-governmental health organizations

Visits and practical work

Visits to public and private establishments: waterworks, slaughter-houses, markets, etc.
Visits to preventive and socio-medical services: MCH centres, tuberculosis and cancer services, school health services, etc.

Prior to the reform of the curriculum, some 180 hours were spent on theoretical teaching, divided as follows:

<table>
<thead>
<tr>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>Nutrition and food hygiene</td>
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<tr>
<td>Public health epidemiology, etc</td>
</tr>
<tr>
<td>Social medicine</td>
</tr>
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</table>

Since the reform the number of hours of theoretical teaching has been reduced to 60, and each of the major subjects now receives some 20 hours. Considerable additional time is devoted to seminars.

As shown in Table 10, “social medicine” is divided into “preventive medicine and hygiene” and “occupational medicine and rehabilitation”, each occupying some 60 hours. The courses given at Nancy in the latter subject are described in detail below.

Occupational medicine

This is a course of 20 lectures. The teaching is intentionally quite basic, suitable for future general practitioners in towns or countryside rather than for workers in occupational health. It may, however, encourage some students to specialize in the subject.

Introduction to occupational medicine: aims, history
Organization of occupational medicine in France
Medical examinations on employment
Periodic and special medical examinations
Hygiene of premises: atmosphere of workshops, lighting of workshops, work and high temperatures, noise
Safety at work: risk of accidents, prevention of accidents
Occupational diseases: general; pneumoconiosis, benzole poisoning, silicosis, occupational neoplasms, disease due to compressed air;
Physiology of work, metabolism of work
Kinesiology of work: working postures
Adaptation of work to man: ergonomics, fatigue
Relationship between the works doctor and the family doctor
Rehabilitation

The teaching comprises 15 2-hour clinical conferences. Each conference begins with an introductory talk of half an hour, after which cases are introduced to illustrate motor sequelae, the organization and control of their treatment, and relationships with paramedical staff.

Introduction to rehabilitation: definition, limits, stages, means

The place of rehabilitation within the whole complex of aid to the physically handicapped in France: voluntary agencies, State and social aid, social security

Organization of rehabilitation in France: early functional rehabilitation in hospitals, medical rehabilitation centres, retraining and re-education centres

Massage and passive movement

Active movement (classic)

Modern methods of neuromuscular re-education: neurophysiological basis, motor function in hemiplegics; the methods of Kabat, Bobath and Brunnstrom

Occupational therapy

Retraining at work: workshops, occupational gymnastics

The return to work

Direct re-employment

Reclassification

Protected workshops

Psychological obstacles

Examples of rehabilitation of injured adults

Fractures of lower limbs

Brachial plexus paralyses

Amputation: levels, stumps, re-education

Prosthetic apparatus

Upper limbs (different types of apparatus and of hands)

Lower limbs (Canadian prosthesis, femoral, tibial)

Orthopaedic apparatus: provisional and final splints

Rehabilitation of poliomyelitis victims: medical, educational, and psychological aspects

Rehabilitation of cerebral palsy sufferers: medical, educational, and psychological aspects

A conference of professors of preventive medicine, hygiene and social medicine was held in Paris in 1965. They defined the general concept of their (unified) discipline, corresponding hospital activities for this discipline, and methods of recruiting and educating teachers. They considered that the educational programme for medical students in their discipline should include:

1. Epidemiology: infectious and non-infectious diseases

2. Human ecology: public hygiene, the environment, etc.

3. Preventive medicine and social hygiene: techniques of preventive medicine, health examinations, health education, etc.

4. Social medicine: general and medical sociology, medico-social institutions, interaction of medicine and everyday life.
Postgraduate teaching

In France there are two distinct systems of postgraduate education. Firstly, there are the courses given by certain approved university faculties of medicine (or mixed faculties), leading to a specialist certificate (Certificat d'Études spéciales) in hygiene and health and welfare work. These courses are governed by regulations of the Ministry of Education.

Secondly, there are the courses given by the National School of Public Health at Rennes, which is responsible to the Ministry of Social Affairs and its Directorate-General of Health. It is necessary to deal with these two systems separately.

Faculty courses for specialist certificates

Hygiene courses are given within the general framework of specialization in medical practice, and some 20 specialties are at present recognized. The courses are given in certain university faculties\(^1\) that have applied for and received authorization from the Minister of Education. In some cases the courses have been abandoned, or are only given every 2–3 years, mainly because of the small number of candidates. The Certificat d'Études spéciales is only very rarely required for a post in the health services, so it is of little practical use to those who acquire it.

The courses last a year, and are organized by heads of the departments of hygiene and their staff. Teachers from other disciplines are called in as required, e.g., engineers, architects, veterinarians, and members of the staffs of health and social services.

Students are admitted to the courses at any time after satisfactorily completing their sixth year of study, i.e., even before completing their thesis and graduating as Doctor of Medicine. The courses are also taken by general practitioners, medical officers in the armed forces, candidates for posts in the school health services, etc. Veterinarians, pharmacists, and engineers can only obtain a certificate of attendance.

The syllabus and the examination regulations are fixed in considerable detail by the Ministry. The syllabus is regarded as a guide, and each faculty is free to add any additional subjects it considers important and to develop its own teaching methods. In general the teaching is practical, detailed, and concrete. There is considerable emphasis on the control of communicable disease, on general hygiene, and on the health of special groups.

The main subject headings fixed for the courses are as follows (880 hours):

General hygiene

Generalities, such as the aim and purposes of modern hygiene, demography, health statistics, and health education

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\(^1\) At present at Bordeaux, Lille, Lyons, Marseilles, Montpellier, Nancy, Paris, Rennes, and Toulouse.
Environmental hygiene, including town planning and food hygiene
Housing hygiene
Personal hygiene and preventive medicine

Special hygiene
School and university health services
Other groups, such as urban and rural workers; military hygiene, tropical hygiene,
hygiene of thermal and climatic institutions

Social hygiene: control of social illnesses and problems
Communicable diseases: epidemiology and prophylaxis, general and special
Health and welfare services
Co-ordination of national and international services for health and social protection

In addition, there is an extensive laboratory course of 27 sessions, each
of some two and a half hours, dealing with the laboratory aspects of water
and milk control and the control of a large number of diseases, mainly
bacterial infections.

Practical work (stages) must be carried out in various units and
dispensaries for communicable diseases, in units for child health and mental
hygiene, in département inspectorates of health, in commune health offices,
and at different levels of the social security system.

Visits must be paid not only to the usual environmental sanitary institu-
tions but also to school medical centres, sanatoria and other antituber-
culosis institutions, centres of physical education, and town planning offices.

A dissertation is required on an appropriate subject approved by the
director of the university department. At Nancy an interesting variant of
the normal procedure has been introduced. The subject or subjects for
the dissertation are chosen after joint consultation between teaching staff
and students. The students are formed into groups, working under the
direction of a member of the teaching staff. Each student is responsible
for a section of the dissertation, in consultation with the rest of his group.
This group work continues throughout the course, and each group ultimately
has to present its contribution as part of the oral examination, before a
jury composed of members of the teaching staff.

Teaching methods. In general the teaching takes the form of didactic
lectures and practical work. At Lille, methods of tutorial teaching with
active student participation are highly developed. Students themselves
present various problems to the teachers and other class members, and
this is followed by general discussion.

Similar teaching methods are used at Nancy, where the student is given
the problem for discussion in broad outline 3–4 weeks before the session
so that he has plenty of time to analyse and study it, and to suggest solutions
in the light of his own knowledge. At Nancy, too, great stress is placed
on student participation in research, sometimes in collaboration with
departments of basic or other medical sciences. The practical aspects of
statistics are linked with the students' research efforts; they are shown how to use available data and build up a preventive strategy in a logical manner, step by step.

The National School of Public Health, Rennes

This School, originally located in Paris, and now established in Rennes, is a legally and financially independent institution responsible to the Ministry of Social Affairs. It provides courses in various public health subjects and in health and social administration for persons from different health disciplines: physicians, nurses, engineers, hospital administrators, and pharmacists.

At present seven basic courses are offered:

1. Public health for physicians
2. Public health for pharmacists
3. Public health for engineers or architects
4. Public health for paramedical staff (nurses, health and social workers, etc.)
5. Hospital administration
6. Social sciences and techniques for inspectors of health and social services
7. Three-year course for teachers in institutions for sensorially handicapped children.

Each course is supervised by the department chief whose discipline is preponderant (there are 12 teaching departments). A number of refresher and other short courses are also given.

It is the basic course in public health for physicians (Table 11) with which this section is mainly concerned. There are some "free" students, but most are physicians who have passed the examination for recruitment into Ministry service and are awaiting permanent appointments. Other students are from the public health section of the School of Military Medicine in Lyons.

The "free" students must either be Doctors of Medicine or have completed their sixth year of medical studies; they are selected by a special body appointed by the Administrative Council.

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1 In France the pharmacist is a recognized member of the public health services, and the course covers nutritional problems, protection against poisons, the pharmaceuticals industry, and public health administration, particularly State supervision of pharmacies.
2 There are two sections, one for hospital directors and one for hospital comptrollers.
3 At present restricted to teachers of deaf children.
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<th>Practical work</th>
<th>Group discussions</th>
<th>Visits</th>
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<td>126</td>
<td>54</td>
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The course lasts 12 months and consists of lectures, visits and practical work, including a month spent in the health and welfare unit of a region or département. Conventional lectures represent something less than half the total instruction, and questioning and discussion are encouraged.

The examinations are written, oral, and practical, and include a dissertation. Successful candidates are awarded the Diploma of Public Health. Physicians in the national public health services require this diploma before they can be permanently established.

Foreign students are encouraged to carry out additional practical work in one or more developing countries to assist them in adapting the instruction given at Rennes to conditions in such countries.

It will be seen that, as in the university courses, the programme is concrete, detailed, and encyclopaedic in its scope. There is detailed consideration of all facets of public health, with less stress on training in general methodology.

In the department of epidemiology, however, it is proposed to devote more attention to general principles, and the use of epidemiological techniques as problem-solving tools, with less concentration on the specific epidemiology of individual diseases.

There are no optional subjects as at some schools of public health, as it is thought these might lead to disintegrated and fragmentary teaching.

The course in public health for engineers and architects, which lasts 12 months, is also open to students at the National School of Rural Engineering at Strasbourg, who can take their third year at Rennes. If they do this, their diploma from the Strasbourg School of Rural Engineering includes a mention of "sanitary engineering". Graduate engineers who follow the course in public health for engineers and pass the final examination obtain a "certificate of sanitary engineering".

The course for hospital directors is open to administrators in the hospital services and those who have passed the entrance examination for this service. The course includes six months' theoretical instruction and five months' work in a hospital service. The examinations include a dissertation; the granting of a diploma is under consideration.

The course includes detailed study of techniques of hospital management, covering the functions of the hospital, administration and management, hospital supplies, accountancy and finance, and technical matters. In addition, students are given elementary instruction in medicine, hygiene and dietetics.

There is at present an elementary course for students from developing countries.

The course for comptrollers deals mainly with hospital economics and accountancy.

In all courses, the aim during practical work is to give students specific responsibilities and tasks, and their supervisors are asked to submit an
appreciation of their work to the School. Some of the teaching is given jointly to students from different sections, so that they learn to appreciate other members of the health team and work together with them.

Physicians holding a diploma of public health, pharmacists holding a certificate of public health, sanitary engineers holding the certificate of the National School of Public Health, and administrators holding the certificate of social sciences and techniques or the certificate of hospital administration, are entitled to attend special courses at the School in statistics and epidemiology, physiology and nutrition, health education, health administration, or hospital administration. Specialization in any of these subjects is recognized after a theoretical course lasting five to six months and personal work on a research topic for at least two years. The School issues a certificate of advanced studies in public health, stating the subject of specialization. This certificate is eventually to be replaced by a State diploma.

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GREECE

Population (1961) 8,500,000

A national Ministry of Hygiene was established in 1964 and took over the duties and responsibilities of the Directorate-General of Hygiene of the Ministry of Social Welfare.

The Hygiene Directorate-General of the new Ministry is responsible for the drafting and application of programmes for preventive and therapeutic medicine. It is advised by a Supreme Health Council and a considerable number of specialist committees. The Directorate-General is divided into 13 divisions and one service. Certain health responsibilities are exercised by other ministries: for example, the Ministry of Education is responsible for school health services, and PIKPA, the National Institution of Social Welfare and Relief, is supervised by the Ministry of Social Welfare, which also operates a large network of maternal and child health services (often mobile), children's dispensaries, and special institutes.

District health services are based on health centres at the chief town of each district or nomos. Broadly, the duties of the health centres are to inform the Ministry of the needs of their districts and to apply the plans and programmes drafted and approved by the Ministry; they therefore act as the Ministry's executive arm. In each district there is a health committee, presided over by the district medical officer. Finally, the district health centre exercises direct supervision over the communal and rural dispensaries and stations; its duties are therefore both preventive and curative.
About 85% of the population are covered by various forms of social insurance, and special arrangements have been made for rural areas, where the entire population is entitled to free consultations at dispensaries, etc., and hospital care is free to poorer sections of the community.

Hospitals are operated by national and local government authorities, voluntary bodies, and private individuals. The latter are licensed and inspected by the health authorities. In addition there are some 140 health stations, where a few beds are available, serving populations of around 5000 people.

Undergraduate medical studies

There are two schools of medicine, at Athens and at Thessaloniki. They are faculties of State universities responsible to the Ministry of National Education and Culture. The curricula and the form and standards of examinations are fixed by law.

Each faculty is administered by a Dean and a Faculty Council. The latter, composed of all the professors of the faculty, elects the Dean annually from amongst its members. He is eligible for re-election. Professors are elected by the Faculty Council, but receive their appointments from the Ministry of Education.

Conditions of admission and duration of study

Candidates for admission must have completed the six-year secondary school course, and have to take a special entrance examination. There is a *numerus clausus*, and the students who do best in the entrance examination are accepted. Successful candidates must undergo a physical examination.

The course lasts six years, and leads to the *Pyxhion iatrikes* (Diploma of Medicine) granted by the university. A graduate must serve one year as an intern at an accredited hospital before he is licensed to practise. After receiving the licence to practise, a doctor is required to work for at least one year in a hospital outside the Athens and Thessaloniki areas and for two years in a rural area, either in private practice or as a member of a health service. The universities award the degree of Doctor of Medicine to candidates who submit a thesis of acceptable standard on an original subject.

Teaching of public health

There are Chairs of Hygiene at both medical schools. Prior to 1965 Thessaloniki had a joint department of bacteriology and hygiene. The course in hygiene is given in the fourth year. To satisfy the legal requirements, the studies at Athens and Thessaloniki are similar, but there are
some optional additions to both the courses and the examinations. As an example some details are given of the course at Athens.

Microbiology is taught in the third year for three hours weekly, throughout the academic year (mid-October to 21 May). This theoretical teaching is complemented by 20–30 hours of practical work in groups of 50 students. The course includes immunology, medical bacteriology, virology, and protozoology. It also covers the prophylaxis and descriptive epidemiology of communicable diseases. Epidemiology as a discipline is covered by the Department of Hygiene.

Some 60–70 lectures in hygiene are given in the course of the academic year. In addition there are about 70 hours of practical work in groups of 30–40 students, and visits to hygiene institutions, to industrial health services, and to a health centre in Athens. The curriculum is as follows:

- Epidemiology of infectious and non-infectious diseases
- Physical environment: climate, housing, clothing
- Water, water supplies and sewage systems
- Food and nutrition, biological values and food hygiene
- Hygiene of different population groups: maternity and infancy, schoolchildren, workers, the elderly.
- Social adaptation and mental hygiene
- Human genetics: heredity, eugenics
- Industrial environment: air pollution, water pollution, ionizing radiation, industrial hygiene, accidents, intoxications
- Protection of those in need, the chronically sick and handicapped, rehabilitation
- Organization of health services in Greece, international health organizations
- Demography and statistical methods, sampling techniques, planning of biosocial research

Advanced optional courses in demography and statistical research methods are available to selected students.

Each student must prepare a thesis, based on group practical work. This thesis is presented to and discussed by the instructors and the group to which the student is attached. An oral or written examination is compulsory. At Athens there is also a written examination at the conclusion of the practical work, designed particularly to test the student’s powers of analysis and synthesis.

Postgraduate education

Postgraduate training is given at the Athens School of Hygiene, which is responsible to the Ministry of Hygiene. The School has eight departments, each headed by a professor, and a Dean is elected from among them every two years. Each professor has a staff consisting of a department head, one or more assistants, doctors, chemists or engineers, etc., depending on the department, and a number of part-time teachers. The School is
consulted by the Ministry on technical matters, and has an extensive programme of applied and scientific research.

The School's course leading to the Diploma in Public Health lasts a calendar year, but theoretical teaching is given only from 10 October to 2 July, the rest of the year being devoted to practical work.

Students must have held a medical licence or degree for at least two years, or other professional qualifications in engineering, pharmacy, or chemistry. At present there are no veterinary students. For students who do not hold an official post, there is an entrance examination that includes epidemiology, hygiene, bacteriology, and a foreign language.

Most students hold posts in the armed forces, civilian health services, or social security organizations, or are general practitioners. The Diploma in Public Health is a compulsory requirement for public health appointments in the Ministry and in regional health offices. The syllabus of the course is summarized below:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygiene, public and social</td>
<td>210²</td>
</tr>
<tr>
<td>Microbiology and immunology</td>
<td>105</td>
</tr>
<tr>
<td>Nutritional hygiene and biochemistry</td>
<td>124</td>
</tr>
<tr>
<td>Biostatistics and demography</td>
<td>75</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>150</td>
</tr>
<tr>
<td>Sanitary engineering</td>
<td>60</td>
</tr>
<tr>
<td>Malariology and tropical medicine (including medical entomology)</td>
<td>90³</td>
</tr>
<tr>
<td>School health</td>
<td>20</td>
</tr>
<tr>
<td>Parasitology</td>
<td>75</td>
</tr>
<tr>
<td>Health education</td>
<td>15</td>
</tr>
<tr>
<td>Meteorology (optional)</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>939</td>
</tr>
</tbody>
</table>

As in some other European countries, the emphasis is on hygiene rather than social medicine. The teaching is of classical type, based on the didactic lecture and laboratory work plus observation and field work, but in epidemiology there is wide use of seminars, where the subject is presented by a student and free group discussion follows. The laboratory exercises in epidemiology include a series of problems providing experience in methods of collecting and analysing field observations, beginning with the investigation of an epidemic and going on to special studies for the detection and interpretation of etiological factors, sources of infection, and the pathogenesis of both infectious and non-infectious diseases in general.

The examination for the Diploma in Public Health is in two parts. At the end of the first semester the students are examined in bacteriology and

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1 This course has a wide range. Public hygiene covers such matters as the hygiene of water, soil, and the atmosphere, systems of sanitation, contagious diseases, urban and rural hygiene, housing, food hygiene, sanitary inspection, and sanitary legislation and administration in Greece. Social hygiene deals with many topics known elsewhere as "social medicine", including the protection of vulnerable groups, social security and social assistance, the social aspects of clinical medicine, and industrial and mental hygiene.

2 This does not include some 160 hours of practical work and visits in the summer.

3 Plus a week in field work, making epidemiological and entomological surveys, etc.
immunology; sanitary engineering; biochemistry and nutrition; and parasitology. At the end of the second semester they take an examination in epidemiology and biostatistics; malariology and tropical medicine; and public health and social hygiene. No thesis is required.

Additional courses

The Athens School of Hygiene offers additional courses leading to the following qualifications:

Diploma in hospital administration (6 months)
Diploma in public health nursing¹ (3 years)
Certificate of sanitary inspection (8 months)

The course for the diploma in hospital administration is for selected candidates already serving as hospital administrators, both medical and non-medical, and for potential administrators, most of whom hold a university degree in law, economics, etc. The syllabus is as follows:

Part 1. Medical
Elementary physiology
Elements of forensic medicine
Epidemiology and statistics
Bacteriology and infectious diseases
Insect-borne diseases and vector control
Sanitary engineering
Pharmaceutical terminology and narcotics legislation
Health education of the public
Public hygiene.

Part 2. General
History and development of social welfare services
General principles of hospital organization and administration
Present organization of hospital care; relevant legislation
Organization and administration of the administrative services of hospitals
Organization and administration of the financial services of hospitals
Organization and administration of the medical services of hospitals
Organization and administration of the nursing services of hospitals
Organization and operation of technical services
The tasks of the hospital’s social services
Elements of legislation
Elements of psychology
Elements of sociology.

School of Rural Hygiene, Pharsala

With assistance from WHO and UNICEF, the Ministry of Hygiene established an experimental health unit in Thessaly in 1960. In this area an

¹ This diploma is given jointly with the School of Public Health Nursing.
experimental programme of preventive and curative medicine is in operation, and the methods applied there will gradually be extended to cover the whole country.

Within Thessaly, a school of rural hygiene has been established at Pharsala, designed to give theoretical and practical training in public health and preventive medicine in rural areas, to all types of health staff—physicians, nurses, sanitary inspectors, midwives, and students at schools of public health nursing. The programme is co-ordinated by the School of Public Health in Athens. There is a small permanent staff, and other lecturers are drawn from health staff in the region, the Athens School of Public Health, the Faculty of Medicine at Athens, and the Ministry of Hygiene.

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HUNGARY

Population (1962) 10 061 000

Since 1945 Hungary has had a socialist system of government, leading to extensive collectivization of farms and greatly increased industrialization. At the same time the health services have been reorganized in accordance with socialist principles. The State controls all aspects of the health services through the Ministry of Health, and has greatly expanded the network of hospitals and other health institutions, such as polyclinics, industrial health centres, rural health centres and “sanepid” stations.

This transformation of the health services has had much influence on recent developments in medical education and the pattern of training.

The country is divided administratively into the capital city, Budapest, 19 departments, and four municipalities. All local health services are run by the boards of health of the respective local authorities. Each board consists of a chief medical officer, his deputy, the physicians in charge of different services, and a head nurse.

It is also the responsibility of the boards of health to organize medical services in industrial enterprises. All such enterprises employing more than 500 persons must have an individual medical service headed by a physician.

Environmental health services are provided for by a network of “sanepid” stations. The station’s director is usually deputy director of the board of health, and has full authority to supervise the application of health
protection measures and regulations on sanitation and communicable
diseases.

There are also a large number of local specialized dispensaries, for
tuberculosis, skin and venereal diseases, and oncology. They are technically
supervised by the national institutes dealing with the conditions concerned.

Ninety-eight per cent of the population are covered by social insurance,
which provides free medical care and other benefits. Non-insured persons
may obtain treatment at a reduced rate fixed by the State.

Undergraduate medical studies

In Hungary there are four separate medical universities responsible for
the undergraduate teaching of physicians, dental physicians (stomatologists),
and pharmacists. They are supervised by the Ministry of Health, although
the Ministry of Education has some influence on teaching methods. The
Universities of Pécs and Debrecen have no stomatology faculty. Each
university is headed by a Rector, and each faculty by a Dean.

The medical universities aim at producing physicians who, after
completing their studies and two years of practical work, will be able to
assume the duties of general practitioners in rural and urban districts and
of industrial physicians in factories and mines.

Conditions of admission and duration of study

To be eligible for admission to the medical course students must be not
less than 18 years of age and must have obtained the certificate of secondary
studies. They must also pass an entrance examination and a medical
examination.

The course lasts six years and leads to the degree of Doctor of Medicine.
This should not be confused with the higher degree of Doctor of Medical
Sciences. The first two years are pre-clinical, when studies include philoso-
phy (Marxism-Leninism), physical culture, and the Russian language.
A course in Latin is given for those who have not studied it in secondary
school. The sixth year consists of clinical practice in medicine, surgery,
obstetrics and gynaecology, and paediatrics.

Teaching of public health

In Hungary a considerable effort is made to bring out preventive prin-
ciples in the teaching of all subjects, both in basic sciences and clinical subjects.
This principle is expressed in the teaching plan as a whole, as well as in the
teaching programmes of individual departments. Table 12 shows the sub-
jects directly or indirectly related to public health.
TABLE 12
SUBJECTS RELATED TO PUBLIC HEALTH IN THE UNDERGRADUATE CURRICULUM, HUNGARY

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lectures</td>
<td>Practical</td>
</tr>
<tr>
<td>Political economy</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Philosophy (Marxism-Leninism)</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Scientific socialism</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Microbiology and parasitology</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td>Hygiene and epidemiology</td>
<td>105</td>
<td>60</td>
</tr>
<tr>
<td>Organization of health services</td>
<td>37</td>
<td>15</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>

“Organization of health services” includes the history of public health, demography, health statistics, and an introduction to statistical method. Tuberculosis is considered as an independent subject, but other communicable diseases are taught in connexion with wider subjects such as medicine, paediatrics, and of course epidemiology. Although the teaching of epidemiology is mainly limited to communicable diseases, the student’s attention is drawn to the importance of using epidemiological methods in the study and control of chronic degenerative diseases. The subjects taught under the general heading of “hygiene and epidemiology” are shown below:

**Fifth year, first semester**

<table>
<thead>
<tr>
<th></th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>General epidemiology</td>
<td>6</td>
</tr>
<tr>
<td>Disinfection and disinfection</td>
<td>3</td>
</tr>
<tr>
<td>Special epidemiology</td>
<td>15</td>
</tr>
<tr>
<td>Duties of hygiene and epidemiological service</td>
<td>3</td>
</tr>
<tr>
<td>Atmosphere, with particular reference to communal hygiene</td>
<td>6</td>
</tr>
<tr>
<td>Water and water supplies</td>
<td>6</td>
</tr>
<tr>
<td>Soil</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>45</td>
</tr>
</tbody>
</table>

**Fifth year, second semester**

<table>
<thead>
<tr>
<th></th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewage disposal</td>
<td>4</td>
</tr>
<tr>
<td>Housing</td>
<td>4</td>
</tr>
<tr>
<td>Hygiene of public institutions; town planning</td>
<td>4</td>
</tr>
<tr>
<td>Care of the sick; health insurance</td>
<td>2</td>
</tr>
<tr>
<td>Food hygiene</td>
<td>16</td>
</tr>
<tr>
<td>Industrial hygiene</td>
<td>14</td>
</tr>
<tr>
<td>Radiation hygiene</td>
<td>4</td>
</tr>
<tr>
<td>Child and youth health</td>
<td>4</td>
</tr>
<tr>
<td>Health education</td>
<td>4</td>
</tr>
<tr>
<td>Personal hygiene</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>60</td>
</tr>
</tbody>
</table>