

Occupational Health in Coming Decades

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MANY PERSONS in the field of occupational health have tried to trace its future configuration. Hatch (1) has spoken for a system of measurement refined enough to provide methods of detection and control of low-level environmental stress agents, which may produce subtle or subclinical changes in the human organism at the work scene. He envisions a possibly demonstrable relationship between occupational challenges (in the drug-trial sense) and the development or modification of the chronic degenerative diseases that epidemiologic techniques will be able to uncover. Clayton (2), in the light of new problems in environmental control, has voiced the need for more trained industrial hygiene specialists and for a strong, positive occupational health program at the Federal Government level.

Norman (3), in his Mackenzie Industrial Health Lecture, has pointed up as some of tomorrow's needs an integration rather than a fragmentation of the disciplines concerned with health in industry; a wider acceptance and application of the science of ergonomics; a central information service in toxicology; and a greater personal investment in research by the physician in industry. Through a critical view of the historical past, Meiklejohn (4) has stressed the need for more extensive medical coverage in industrial installations in the future and for insertion into the medical school curriculum of clinical teaching of the relationship between the patient's employment and his physical and mental status.

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Boucot (5) has predicted more medical therapy by industrial health departments (not just first aid and occasional medication), an increase in automated evaluative activities in occupational health, facilitated homemaking for the working wife, care for the children of working mothers, short-duration jobs for teenagers, broadened health insurance coverage, and financially feasible medical services. Congressman Fogarty (6), long identified with progressive health legislation, has identified the need for a comprehensive occupational disease reporting system which would serve better to correlate occupation with morbidity and mortality. Central health units offering service to many industries are proposed, as well as moves to bring occupational health into the "mainstream of American health protection" to make it "part of the dynamic movement we can call environmental health."

In an essay that won the first annual Industrial Medicine and Surgery award, Shepard (7) expressed the opinion that the teaching of occupational health in the medical schools must be improved; that medical specialty board requirements in industrial medicine need to be eased to permit the practicing industrial physician an opportunity for specialized preparation, through shorter but repeated periods of intramural training; that industry's physicians should serve as part-time faculty members in medical schools; and that schools with graduate programs in occupational medicine need to broaden their curriculums to include medical economics, the behavioral sciences, and research planning.

Persons not immediately concerned with occupational health also have criticized aspects

of our medical system and our medical education. Page (8) has emphasized the structural inadequacy of professional medical societies to do today's job: to cooperate with government and offer it consultative assistance; to review problems presented by study sections and councils composed of both medical and lay persons; to carry out continuing education instead of the universities and private institutions (places where, he believes, education has been "capriciously handled"); to further research, one example being the need for a uniform method of manuscript and bibliographic presentation.

In March 1963, the California Medical Association voted to study the role of medicine in society (9). Several of that study's objectives fit occupational health needs: study and explore the nature of existing relationships between the medical profession and society; delineate the mutual obligations and responsibilities of the medical profession and society and the communication of ideas and ideals between them; re-evaluate programs and policies in the light of medical advances and technological and social changes which affect medicine's relationships to the individual, the community and its subgroups, and society as a whole; explore the findings of other disciplines, particularly those in the behavioral sciences, to ascertain how the products of other research can be used by the medical profession. This type of self-searching could well be applied to occupational health.

Dimensions of the Future

The future will bring changes in the workers, the work environment, and the work methodology. The total personality and culture of the work setting will be different. In 1970, according to the demographers, the labor force will reach 86 million; great numbers of workers under 25 years of age will move into both clerical work and production. Women will account for 35 percent of the work force in 1970. One of eight persons will be a Negro; the Negro and nonwhite population of 33 million will be concentrated in the major metropolitan areas. As these Americans obtain learning, they will move from unskilled and service work to higher levels.

Not only is automation eliminating jobs, but also time and motion studies have increased, mergers and consolidations continue, and industries are diversifying, dispersing, and relocating. As a result, work force reductions, job displacements, elevations in rates of absences, of dispensary visits, and of injuries, a depression of morale, and a generally pervasive sense of disquietude and frustration have become more common.

Often superimposed on these events are such environmental problems as "booming populations, housing shortages, failing septic tanks, detergents in water supplies, mass pollution of waterways, fallout and other radiological hazards, air pollution, pesticides, chemical additives to foods, untested drugs, accidental injury and death, noise from jets, and countless additional problems . . ." (10).

Further, the number of engineers, accountants, auditors, and others connected with record maintenance has risen. This segment of white-collar workers has increased more than five times as much as the white-collar group as a whole. Many in this segment have been and will continue to be advanced into supervisory, managerial, and administrative positions. These persons are accustomed to manipulate materials, quantify concepts, and document data. They are, by personality, ill-fitted for the skilled initiation or execution of sensitive interpersonal functions. Some observers perceive the supervisor of the decades ahead as an administrator of certain command functions or standardized procedures; the workers would view themselves as specialists or professionals capable of self-supervision. Other theorists argue, however, that because of the self-regulation of automated operations, workers will have more time for concern with their own needs and therefore will require supervisors whose tasks will consist solely of handling people.

Industrial Physician's New Role

The total system of medical care in industry will be redesigned in the future, and the pattern of delivering health services in the community is certain to change. The physician in industry will need many new skills in addition to his functions as plant doctor, toxicologist, and environmentalist.

Physician as Social Scientist

Since the actual performance of work will diminish in significance, there will be a gap in the sense of fulfillment which normally would accrue to the worker. Fashioning a useful product from a variety of raw materials is satisfying to an artisan. But the jobs requiring creative effort, and even those entailing expenditure of physical energy, are becoming fewer. Work, in many cases, has become a task of monitoring a process which, after being programmed and started, continues automatically. Tasks which formerly provided gratification to those who used their muscles have become minor finger or hand movements. Little personal investment is demanded in jobs like these and almost no decision-making and, because of the absence of tension, the worker finds it difficult to remain alert, attentive, or interested. In many trades with a rich heritage of expected behavior characteristics, the mechanization and automation which replace personal effort will bring deep frustration and an absence of identification.

The increase in the number of married working women will occasion a rise in problems incident to the pursuance of two careers. In one or both careers something may have to be sacrificed.

As industries have grown and relocated, opening branch plants in areas often distant from the company's headquarters, many of the executives and engineers have had to move cross country. Thus a disturbing element of family dislocation has been added to other stresses.

More common potential contributors to the emotional input in a plant's work force are the genetically ill-equipped, the neurosis-laden, the single daughter trapped in life by invalidated parents, the unmarried mother, and the philanderer. That such persons may lower efficiency in production and service has been documented fully since 1928 when Dr. V. V. Anderson first focused attention on the relationship of personal problems to work effectiveness.

The stresses brought by changes in the concept and actualization of work will mean that the physician's primal task will be the resolution of impairments in interactive behavior that great numbers of employees may manifest. The industrial physician will need more than a minor interest in psychodynamics. He will re-

quire solid planking in sociology and social psychology so that he will be able to anticipate fractures in both interpersonal and intergroup relations before they appear as full-blown clinical syndromes.

The industrial medical director of the future will be skilled in attentive, intelligent listening, so that the troubled worker can unload his concerns in an accepting, empathic milieu. As many manual workers are reluctant to take their difficulties to ministers, social workers, and family relations counselors for review and are often inarticulate in areas involving disruptions in adaptive behavior, their problems go unheard and unhelped. The more literate, managerial person frequently believes that he himself can resolve any difficulties that arise in his social interchange and so seeks no assistance.

This capacity to help the worker solve his problems will be the most highly marketable skill the medical director of the future can offer to industry. In companies where ideas and creativity are paramount, where the problems of equipment have become almost insignificant, the mission facing the physician will be that of studying, diagnosing, understanding, and rectifying the wounds of interworker conflict. The ability to do this and to train the full medical team to recognize these impediments to fruitful productivity, as well as his ability to orient management to the worth of such an undertaking, will be one of the functions of the future physician in industry. Skill in performance of such functions will be the mark of true medical statesmanship.

Physician as Epidemiologist-Computer

A company may be concerned with any of the four physical types of automation: automatic transfer machinery, feedback control devices, numerical control, and the electronic computer; the physician will be concerned with the fourth variety, the electronic computer, which can record, store, compare, and analyze information at microsecond speeds.

Fewer facilities offer a better source of human measurements than the health departments of industrial plants. An increased capability for entering data, the diminished need for handwritten documents, and the ability instantly to retrieve a composite record will surmount the

common disinclination to complete numerous blank forms.

In the medical departments of industry, the most informative kinds of health records can be developed. If labor turnover can be minimized so that an employee remains in one company for the greater period of his work life, data can be obtained to structure the natural history of nearly all of the chronic degenerative diseases. Conceivably, medical records can even one day be centralized so that a clearing-house will serve as a living repository, with data input coming from a great number of remote industrial medical departments, as charges come from multiple points in a hospital using a random access, machine accounting system.

Coincident with this recording of clinical data will be the entering of environmental measurements so that the more refined mensuration desired by Hatch (1) can become a reality. Through telemetry it would be possible to record an employee's activities and the atmospheric chemical stresses to which he would be subjected, whether at work, en route home, or while at home.

If the data collected are to prove of worth, however, an epidemiologic capacity is required, an ability to identify and apply host-agent-environment relationships to the measurement of the health of the worker. The development of codes sufficient to cover all numerical observations and of programing to permit a useful computer printout will be essential. As most industrial organizations are now computer-equipped, medical applications can be added, provided the physician can and will undertake the interdisciplinary cooperation necessary to make this method of health-record maintenance succeed.

Physician as Student

Commencement speakers often voice the hackneyed phrase that graduation is only the beginning. Yet great numbers of graduates in all fields, including medicine, welcome their diplomas as signifying a release from the arduous task of systematized learning. They often fail to realize that the period of life ahead needs to be filled with a system of learning more intensive than that just completed. An editorialist (11) recently pointed out that con-

tinued education is now necessary to life. Contributing to this state of affairs, he believes, are at least four influences: "1. what is going on in the world has implications for every individual, not merely for nations, statesmen, and politicians; 2. automation demands wide knowledge, resiliency, and adaptation; 3. the social flux has taken adults by surprise, and their unpreparedness embarrasses them; 4. increased leisure threatens to ruin the essential humanness of human beings."

As the bulk of all knowledge grows, a person needs to remain aware of the accruelements in his own field. This becomes increasingly difficult, however, as pertinent journals multiply and abstracting journals and even mere listings must struggle to keep the time lag short between publication of a paper and its précis notification.

To compound the dilemma, the active practitioner in occupational health has been as shorn of free time as the academician. The demands of a busy service do not allow "a reflective man time to ponder," any more than modern universities offer the "cloistered atmosphere of academic life so properly treasured in the past . . ." (12).

Recognizing these roadblocks, we must construct systems of continuing education for physicians and all others engaged in occupational health so that they will learn new facts and concepts and revise or discard outmoded ones. It seems logical, as Page (8) suggests, that this educational function should be the new role of the professional society. The Industrial Medical Association and the American Industrial Hygiene Association initiated this kind of undertaking in continuing education several years ago. More recently the American Association of Industrial Nurses offered such an opportunity through workshops at their annual meeting. More than once-a-year sessions, however, are needed. It seems reasonable to foresee a truly cooperative effort in the future among the Public Health Service, the professional societies, the State departments of public health, and the universities that will result in frequent offerings of courses in the main industrial or metropolitan areas for all the disciplines of occupational health. Use of closed circuit television for teaching in occupational medicine remains almost totally unexplored. Noontime

televised programs from schools of public health to medical departments of industrial plants could, in the decades to come, bring the rich satisfaction of acquisition of new knowledge to all those engaged in health services for the worker.

Heckscher (13) deplored the slimness in contemporary education, stating that "the trade school has taken the place of the academy." No one, he says, . . . "can talk with the younger generation of doctors without sensing among them a discontent with the narrowness of their interests. Their minds have been sharpened, but not broadened, and they go out with a very meager feeling for the things of the world that lie beyond their sphere of specialization. . . . But surely there must also be provision for the doctor to absorb new knowledge as the times progress; to combine the career of practice with the career of learning; at every stage . . . to have his assumptions checked by intimate associations with his peers and his knowledge brought into line with the latest developments in various specialized fields." This type of ongoing process control can be built into a physician's career just as it is built into manufacturing.

In the process of learning, the spirit of inquiry seems to be lacking. Baker (14) criticizes the absence of historical sense in medical teaching. He observes: "The facts taught are usually dispensed by people quite well versed in their own field of study but who usually lack the ability [to provide the knowledge] or [who] disregard the knowledge of how and when the data they are teaching arose." This hiatus in the awareness of the fundamental growth of knowledge has led physicians to accept too readily all the new discoveries which constantly assail them.

The format of continuing education in occupational medicine should include a large segment of history so that the social reformation which underlay and still underlies occupational health can be understood and related to today's trends in this specialty area. With industry's great investment in health in employer contributions to medical insurance, will the occupational medical service become the sole site for preventive medical care? The voluntary health plans often do not provide or pay for this type of service. If the rising costs of health

insurance, however, can be controlled by preventive measures, industry is interested. An understanding of the history behind the development of today's industrial health programs—the social inequities, the needless occupational morbidity, the absence of workmen's compensation and rehabilitation—can bring a greater dimension to the effort of making the work scene not only safe but also a place where an employee's health will be better because he is working there. Without this retrospective view, current activities in health preservation lose some of their significance.

The industrial medical director will, of course, continue in the future in his old role as a physician—the trained healer, treator, and giver of assurance. As in the past, he will know the toxicological problems of his industry, its administrative protocols, the periodicity of examinations of its working force, and the worth of cooperative work with the industrial hygienist and the occupational health nurse. But in the future the industrial physician will do much more. On the old basic functions he will build the newer images of the social scientist, of the epidemiologist-computer scientist, and of the student-in-continuum. Thus he will be able to offer greater understanding of the problems in human interaction. It is these new arts and sciences that will aid in bringing about "the qualities of humane living and of a sane environment" (13).

This, then, is the desideratum for occupational health in the coming decades. The extent to which this hopeful expectation will become a reality and at what point in time defies prediction. Progress in all areas of human endeavor has been made, however, only by reaching out for goals that first seemed visionary. Certainly no goal for occupational health seems brighter than that expressed by Dr. Schereschewsky (15), the Public Health Service's first director of industrial hygiene, when he wrote that "work should prolong rather than shorten life."

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Effects of Noise on Job Performance

Human beings are more adaptable to noise than most people think, according to Dr. Alexander Cohen, Public Health Service, who has been studying effects of industrial noise on the worker.

His research shows that workers performing simple, repetitive operations do their work just as well in a noisy room as in a quiet one. Efficiency in more complex tasks may be initially decreased by excessive noise, Dr. Cohen says, but most of us soon forget the noise and then work as well as before. However, workers who monitor a control panel, inspect items on a conveyor belt, or must react quickly to infrequently presented visual stimuli may have difficulty in doing their jobs well in a noisy environment.

Investigators find less complaining about sounds associated with necessary or desirable operations, such as air conditioning, than, for example, noises produced by the neighbor's pets.

Research by the Division of Occupational Health into noise effects is primarily concerned with temporary or permanent hearing loss caused by excessive noise in the work place. Psychological factors are also under study since they can markedly affect man's ability to do his job. Dr. Cohen says that there may be more American workers exposed to potentially damaging noise than to any other occupational hazard which can produce irreversible disorders.