by cordite. My own work in this field of surgery has largely concerned the young and I should like before concluding to touch briefly on this aspect of the matter.

The pictures I show are merely illustrations of the fascinating sideline which we call plastic surgery, a branch of our art which owes much to the patience and skill of Sir Harold Gillies. Opportunities are considerable even though the difficulties in small patients are greater than in adults. Moreover, it is possible that tannic acid will increase their number in much the same way as the introduction of diphtheria antitoxin increased the frequency of post-diphtheritic paralysis by saving the lives of many severely stricken children who would otherwise have died.

CONCLUSION

In conclusion, I return to our main theme and you will have gathered from my preceding remarks that I regard the introduction of tannic acid as an important event. Perhaps in the past there has been a tendency to forget the excellent adage that we must treat the patient and not the disease. The general treatment of the burned and scalded will always remain of paramount importance and I have failed signally in my task if I have not brought this home to you. It does, however, seem from our growing experience with tannic acid that we have in it a substance which treats both disease and patient inasmuch as it forms a local application of first-rate efficacy and, when applied early, goes far towards preventing the onset of those calamitous symptoms which we call toxæmia.

Time has not permitted me to cover the whole ground and though I am highly conscious of the honour of being allowed to open this discussion, I am very well aware that much remains to be said. In particular, I hope to hear from subsequent speakers whether they find it possible to treat these patients in their private homes; to what extent those who have used tannic acid find sepsis difficult to combat, and how far they use it successfully in late cases as well as early.

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INDUSTRIAL PROBLEMS FROM THE STANDPOINT OF GENERAL PRACTICE *

BY

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The practice of Industrial Medicine is not limited to the problem of occupational diseases. Its frontiers include within them a large area of clinical study common alike to it and to general practice. In order, however, to appreciate these common interests to the full and to devise suitable methods of investigation and study it is necessary to consider not only industrial processes but to an even greater extent to review the whole phenomenon of modern industrialism and the effects which this strange new growth has had, and is having, on the population as a whole. Only in this way can certain otherwise obscure factors be properly evaluated. If the remarks which follow appear in places to be somewhat in the nature of digres-

sions I must ask indulgence for an attempt to outline what I believe to be some important etiological agents in the clinical problems which confront the general practitioner in dealing with industrial incapacity.

Human evolution is the resultant of a continual battle between emerging biological factors and environmental conditions. No history of man; no study of his successes or failures, his health or disease, his hopes or his fears or his mental or physical attributes can be of any value if it ignores the evolutionary value of environment. There have been phases in which the conditions of life have remained more or less constant for long periods, and during these man has been able to adjust himself gradually and on the whole successfully; there have been other phases in which rapid alterations have taken place to which groups of humanity, both large and small, have either failed to adapt or have done so with an inadequate measure of success.

In the last 200 years a wholly new phenomenon has appeared. Man has entered the age of applied science in which for the first time he has deliberately set out not so much to adapt himself to changing environment but by means of his acquired knowledge to modify environment to suit himself. This constitutes an epoch-making break with the past, and the present industrial age is but a stage of this new development. In a bare 150 years man has so changed the face of Western Europe that today in this country over 80% of the population are town dwellers removed from the necessity of direct struggle with nature, relying for their living on industry and commerce and comparatively unmindful of the precariousness and essential instability of their position. Thus the population of Britain is almost entirely dependent on the smooth functioning of a still immature economic system. It is not only surrounded by a mechanised environment of an entirely novel kind but inherited racial memories form no reserve of experience on which man can draw for support in times of difficulty, since biologically the time available for adaptation to new circumstances has in many respects been inadequate as yet to permit of the necessary mental and physical adjustments.

Health, mental and physical, is the measure of successful adaptation to environment and it is therefore less dependent on pathological hazards than we have hitherto been led to believe. Once we get outside the individual, and begin to study the external forces at work on him, we see how important it is to form clear impressions of mental processes; and we see, too, how very subservient physical conditions are to the influences of the mind by means of which alone full personal adaptation can be attained.

When the science of medicine began to supplant the practice of magic its first concern was the body of the sufferer; later the study of community health led to the formation of the public health service which was until recently concerned almost exclusively with physical conditions. As an offshoot of public health administration there has arisen the subsidiary branch of industrial medicine which, by studying and improving the hygiene of factories, workshops and industrial processes, has conferred a great measure of increased health and happiness.

These services are indispensable for the health and well-being of the community and the progress of the past few years must not only be encouraged but in many spheres advances must be accelerated, though the possibility of success along traditional lines is definite and in fact limited, since the psychological factors at work in the community far transcend the purely physical.

The general practitioner has watched official public health activities with much interest even if at times he

* Read in opening a discussion in the Section of Public Health (including Tuberculosis and Occupation Diseases) at the Annual Meeting of the British Medical Association, Eastbourne, 1931.

has begun to wonder where, in a not far distant future, his own sphere of usefulness will lie, ground as he feels he is between the upper millstone of clinical specialism and the nether one of administrative medicine. The day of the general practitioner is, however, not waning but only dawning. In his hands lies the ultimate responsibility for co-operating with the public health services in extending the boundaries of their mutual spheres in order to produce the harmonious integration of those mental, physical and spiritual factors whose combination forms the only possible basis for the intellectual growth and adaptive development of the industrial West.

Health is essentially bipolar, it has a physical pole and a mental pole and only in a correctly balanced appreciation of both can we truly assess the biological problems of man as a whole and see them in proper focus against the background of modern western mechanistic, or industrial, civilization. This constitutes a field of study of supreme importance to the general practitioner.

We must consider briefly three aspects of this new orientation of medicine. First, the chief phenomena of cultural and environmental development; secondly, the reactions of man to these forces; and, thirdly, the means necessary in order to achieve a greater measure of individual and community health which is, as we have seen, nothing more than a proper system of adaptation, resulting in the fully integrated man at home in his environment and endowed with adequate means for modifying it to his needs and where this is impossible modifying himself to it.

Without doubt the outstanding element in a mechanistic civilization is the power that lies in human hands for modifying and controlling the forces of nature. This is the direct result of the application of scientific knowledge to economic problems. It has developed rapidly into an immense power quite beyond the ability of single individuals to control, and as a result an intricate and highly complex system of co-ordinated action has been evolved in which in innumerable ways the individual is subordinated to the community, the man is merged in the citizen and the personal is incorporated in the impersonal. In the agricultural and pre-agricultural age the terrifying forces of nature necessitated rationalizing explanations based on the assumption that the tribal god was by such means manifesting a power of arbitrary interference which could be averted only by propitiation and sacrifice. In the industrial age these natural forces do not affect the town dweller to any marked degree and he has been taught to look upon them for what they really are—namely, effects produced by causative agents operating under immutable natural laws; and since, too, he has been endowed with means of dealing with them by economic, scientific and material weapons the old claims of instinctive and primitive theology have to a large extent ceased to exert their influence over him. Nevertheless racial memory dies hard and in our modern world there are countless relics of primitive magic—charms and taboos—which have no claim in reason but which exert their influence through the operation of inherited feeling states. The fear of nature as an instrument of divine wrath has, however, been replaced by a new fear—that of the complex mechanism of modern life which crushes remorselessly those who fail to pay it homage. Fear, sense of inferiority and sense of guilt (not to be confused with rational conscience), relics of primitive religion throughout the ages, are still amongst the potent influences at work in our western culture. They lead, under modern conditions to neurosis, warped judgement, loss of individuality, and to a tendency on the part of most of us to clutch fearfully at the *status quo* as it slips inevitably from our grasp.

Industrialism has affected the physical environment of man in a remarkable way. At first it led to the terrible

congestion of the towns which bequeathed to us a legacy of slums and human damage, but of recent years the power of industry has been directed towards a progressive amelioration of the physical conditions of life. We find our people better fed, housed and clothed than ever before; science has tackled disease and the economic conditions of the wage earner have been greatly improved. Such eloquent figures as those for expectation of life, infant mortality and tuberculosis indicate most forcibly that physical improvements have reacted favourably on the health of the community. When, however, we come to study the *cost* of sickness and the *amount of time* lost due to it, we find a very serious state of affairs. Sir Walter Kinnear has recently referred to the "almost inexplicable increase in the rate of sickness" and in point of fact at first sight it certainly does appear inexplicable that in the ten years 1920-1929 the increase in lost time should have been so great. During this period for an increase of but 10.2% in the number of insured persons, from 13,579,000 to 14,963,500, there has been steady and progressive increase in lost time as follows:

Year	Lost Time in Weeks (approx.)		
	Sickness	Disablement	Total
1920	9,988,500	4,077,500	14,066,000
1929	16,000,000	13,500,000	29,500,000
Increase ...	60.2 %	231.1 %	109.7 %

Long absences absorb more time than formerly by 231.1%, while absences of less than 26 weeks account for the much smaller but still very large increase of 60.2%. It is impossible to believe that the physical condition of our population has deteriorated at this alarming pace and I suggest as explanation that the increased sickness is largely psychogenic and reveals the existence of a state of mind which must be more widespread and productive of a vastly greater amount of latent incapacity than is manifest in the figures for actual absenteeism, since it must be remembered that these figures take no account of sickness of less than three days' duration nor of the periods of relative inefficiency preceding and following absence from work. The figures with which we are now dealing represent actual incapacity which must always be looked on as an end-result of a failure of preventive or therapeutic measures. The blame for this rests as I think largely with a system of education which still pays far too little attention to the mental and intellectual growth of the child and far too much to the mere inculcation of knowledge.

When one reviews medical certificates it is impossible not to be struck by the number of such conditions as "nerves," "neurasthenia," "debility," and "anaemia," while clinical observation shows an increase in intractable dyspepsias, many dermatoses, enteroptosis, cardiac irregularity, neuralgias and countless other symptoms for which on careful physical examination no organic basis can be found, and it is, I think, impossible to resist the conclusion that at least a *prima facie* case has been made out for reviewing the whole matter *de novo* from a psychological standpoint.

It is my object to suggest certain etiological factors for this serious medico-economic problem and to offer tentative proposals for a method of dealing with it, because if this widespread increase of sickness is due to psychogenic causes, then as a nation we are suffering from neurosis on the grand scale and if we wish to hold our own in the modern industrial world we must do something about it not only effectively but at once.

It may be helpful to enumerate some of the possible causative agents of community ill-health and by placing our patients against the background not of individual industries but of industrial civilization to see how man tends to react to it.

The vast machine of modern life is at times a terrifying thing. It even looms larger to many than did the old idea of a wrathful and avenging Deity, and I think there is little doubt that the present restless craving for sensation, pleasure and vicarious eroticism is no more than an over-compensation for a very widespread, if unconscious, appreciation of this fact. In the face of such forces as unemployment; mechanical displacement of labour; the competition of girls with men and the success of the former in handling machines and in executing small repetitive processes at lower cost; the economic difficulties of the home and the resulting problems of sexual adjustment, there is a tendency for many, and males especially, to develop a feeling of inadequacy to life which is liable to be rationalized in consciousness as illness rather than to be acknowledged frankly for what it really is—namely, a fear of the unknown and the intangible. The pressure at which modern business is conducted and the anxieties and worries of this very difficult time can produce nervous strain to a marked degree, and the very fear of being ill further tends to increase the difficulties of both doctor and patient even in respect of purely physical diseases.

In the homes we find economic difficulties in the way of early marriage leading to anxiety neuroses in the young; we find, owing partly to the competitive raising of the standard of living, married couples labouring under the most serious financial difficulties once their families exceed a very definite maximum number; and we find, too, that in the absence of proper teaching on sex hygiene and contraception there are very serious disorders of the love-life—the basis on which the well-being of any community must ultimately rest.

In industry compensation for accident and disease is being sought as an end in itself rather than as a means towards restored function, and the result is not only to burden the employer unduly but to militate against the best interests of the workman. Owing to a failure to appreciate the full significance of personal idiosyncrasy, in which the mental factor is a very large one, conditions are often ascribed to occupation which strictly speaking are no more than the hazards of an every-day life pregnant with vast possibilities for the development of such states.

In the sphere of health education there has been a very serious secondary effect which few could have foreseen. In addition to the increasingly sound teaching in elementary hygiene in schools, which is doing much to improve the physique of our adolescents, there is a spate of health propaganda in the lay press partly in the form of articles, partly masquerading as "news," which is having the effect of producing introspection and an undue concentration on bodily well-being.

Modern life is a great strain on man, not so much by what it is as by reason of the short time, biologically speaking, that has been available for him to make the necessary readjustments. The pace is fast and it is increasing, and we must face the whole problem frankly and ask ourselves what we can do to restore the balance. It seems as if we must include within the definition of public health a large tract of knowledge and study hitherto regarded as quite outside its scope, and it is along these lines that I believe the solution is to be found which shall lift our industrial civilization out of the swamp in which it is at present in danger of foundering.

In the face of the problems of modern life there appear to be two outstanding reactions of the mind—fear and the sense of inferiority. It is impossible to estimate to what

extent fear is present in the minds of the industrial masses but there can be no doubt that it is a most powerful factor. Machinery in this transitional period has without doubt contributed temporarily to the total of world unemployment. There is a surfeit of manufactured goods and of cheap raw materials, and while it is probable that this difficult phase will in time pass we are to-day faced with the paradox of millions in want largely because there is too much merchandise in the world, and, since no one really understands why this has all come about, fear of an inexplicable situation is widespread.

Fear is manifested *inter alia* as fear of mechanism, fear of economic forces, fear of war and an unreasoning fear of losing religion which too few are as yet either able or willing to dissociate from primitive and mediaeval systems of theology.

Inferiority, which in varying degrees is an attribute common to us all, is a relic of our racial reactions to the "Father-Image" which in present-day life is represented for us by Authority, be it ecclesiastical, governmental, educational or economic. The patriarchal system is by no means dead and it still operates to prevent individuals from working out their own destinies, thinking their own thoughts and standing on their own legs. It tends to produce in children a dull normality and in adults dependence on omniscient authority to protect us from the pitfalls of life, and it tends also to so prop us from cradle to grave that the vitalizing sparks of individual personality and responsibility are, among large classes of the community, in danger of being extinguished.

Unemployment is disastrous to the body and mind, not only among those who are actually out of work but among those who wonder whose turn it will be next. Whether we have 2½ millions entirely workless or 25 millions in work for shorter hours the inevitable result of mechanization is and will be an increase in non-working time. This can be styled unemployment or leisure—it all depends on how wide the process is spread. The use of machinery in modern economic life undoubtedly means less man-hours of work, not as a mere humanitarian stunt but as a necessary corollary to a situation which 25 years ago very few could have visualized, but the adjustment calls for concerted action on an international basis.

Education in the right use of leisure is therefore an urgent necessity unless leisure is to be allowed to degenerate into pathogenic idleness, a foretaste of which is already evident in our sickness statistics.

The present economic situation is producing a wholly novel set of problems which include *inter alia* anxiety and apprehension as to the stability and permanence of work which no system of mere monetary payment can alleviate; the need for the limitation of families; the difficulty of providing for old age and incapacity; a sense of inadequacy to the demands of a complex life; and a demand for a new set of values against which to place, compare and judge new needs, new satisfactions and new frustrations.

It is necessary at this point to consider what is, I believe, a vitally important matter. Scientific methods of investigation applied to formalized religions have exposed many theological fallacies, have in fact demolished countless spiritual props and left men wondering where it will all lead to. Many people fail to realize that religion and dogmatic theology are distinct and different and that natural intimate and personal religious experience, which is a supreme and vital human necessity, is unaffected by the demolition of theological dogma. Large numbers of men and women are afraid that in rejecting theology they must dispense with religion as well, and they thus tend to lose faith in the future because, being endowed with insufficient independence of judgement, they are unable to devise an individual and personal philosophy. To lose

faith in the future, to be unsure of oneself, and to doubt the sublime realities of spiritual experience are matters of grave importance as regards man's ability to integrate himself and adapt harmoniously to his environment. But the fact remains that while science has revolutionized the economic life of man it has also gravely disturbed his spiritual life, and in the latter case the disturbance is due to the fact that man has failed to appreciate the aims, methods and limitations of scientific investigation, and has confused its legitimate application to theology with its complete dissociation from personal religious experience.

All these factors are important not only as sociological phenomena but as fundamental issues in the question of individual and community health. I believe that in a study of human psychology along these lines we can discover the key to our industrial and commercial problems, remembering always that commerce, the mainstay of our lives, rests *au fond* on faith and credit which Sir Josiah Stamp believes to be mainly psychological phenomena. Careful interrogation of patients suffering from the conditions previously enumerated will bring to light case after case which exemplify the various points just mentioned. It would be foolish to press the point too far but if only a case is made out for further research along these lines my object will have been attained.

I believe that the future of the public health lies as much in the hands of general practitioners as it does in those of Medical Officers, and for this purpose both must make a study of industrialism and of human psychology—not so much in order to practise psychotherapy as to understand why men act and react as they do.

With regard to constructive proposals. The bulk of the general practitioner's time and effort must of necessity be concentrated on treating the sick though from the point of view of the community preventive medicine is of the utmost importance. Nobody can be indifferent to it, but if most of the doctor's time has to be spent in treatment how can he take a share in prevention? I believe it can be achieved by collaboration with those who have facilities for training the minds of both young and old but who are as yet outside the boundaries of preventive medicine. First and foremost, educationists, teachers and parents; secondly all who give spiritual guidance and will adapt their teaching to modern needs; and thirdly all who are engaged in the handling of men and women in industry. Stated in few words their task amounts to this: to teach, encourage and instruct everyone, especially the young, how to grow intellectually as individual men and women, self-dependent and, as Aristotle says, self-sufficient, solving their problems by constructive thought rather than by second-hand formulae. Dr. Charles Richet, the famous French physiologist, in his book *L'homme stupide* has shown how since the emergence of man he has generation after generation taken the beliefs of his forefathers, modified them but slightly and handed them on, so that to-day the mass of mankind acts and thinks not as rational beings reacting directly to their environment but as puppets of racial memory bound by tradition, shackled by prejudice and dependent on the good opinion of the mass of their fellows. It seems as though man has conspired against himself to close his eyes to truth. It is now possible, however, largely through the inspiring influence of science to blow a breath of fresh air through many ancient conceptions and to realize that nothing can save man but man himself.

Man has been propped by theology: dogma is collapsing and he finds himself in the dark, prey to fear and to neurosis. Here the Church can help to set him on his feet, show him the way to develop a dynamic religious philosophy of the simplest kind and by restoring his morale encourage him to spiritual growth and mental health.

Children have for too long been filled with information and their creative individuality allowed to wilt in the process of moulding them into model citizens and standardized types. The love of truth has been encouraged in them so little that the Headmaster of Harrow has recently been led to assert that accuracy of thought is an attribute of few outside the followers of the exact sciences.

In the face of ignorance we cannot deal adequately with great and pressing problems, ever increasing in complexity and ever changing in their appearances. It is necessary to go to the heart of our modern civilization and from our study to evolve stable judgements by which our people may be enabled to react more harmoniously and rhythmically to their environment. Out of such adaptations sound health alone can flow. Nothing, I submit, is more urgent than the widespread cultivation of a scientific conscience; namely, to observe honestly, classify carefully, evolve reasonable hypotheses and test these fearlessly against facts in the evolution of new laws of life. This is an ideal which can be modified to suit the most meagre intellects.

Since adequate treatment for psychoneuroses is economically impossible except for a minority of cases the future of medicine appears to me to rest largely in the therapeutic and preventive power of educational influences.

Of recent years much work has been done in studying the psychological problems of specific industries and occupations. The Industrial Health Research Board and the National Institute of Industrial Psychology have in many directions broken new ground, but the larger problem, that of industrial civilization and its effect on individual and corporate health, has so far been rather neglected. These matters concern the general practitioner but they also call for radical changes in our system of public education.

In industry steps are being taken slowly but surely to establish clinics within factories. These can not only treat industrial accidents and occupational illness but can do something to attack the mass of psychogenic incapacity which masquerades under such a large variety of labels. The industrial clinic either in a large factory or in connection with a group of smaller ones, can be a very important link in the chain of public health work, but it can only serve its true purpose by collaboration with general practitioners and educationists.

If there is one particular point that I would desire to emphasize in this paper, it is that the burden of sickness—which is not only causing vast loss of time and money by actual absence but which is also sapping the general vitality of a far greater number than those who actually "go sick"—is in the main a psychological problem, and it is necessary for us all, whether we consciously practise psychotherapy or not, to grasp some at least of the essential workings of the mind which modern psychopathological research has unfolded before us. Armed with this knowledge a vast amount of successful work can be accomplished on the very simplest lines without embarking on the dangerous and highly technical sea of analysis or the more difficult forms of psychotherapy. Working on simple lines my own sickness records for the past five years show a steady decline in lost time from psychogenic causes from 1921 working days per year per 1000 workers in 1926 to 822 working days per 1000 in 1930. The results are hopeful and I believe significant of what we can achieve.

Modern industry can be either the means towards our higher destiny or the agent by which western civilization is ultimately to be drowned in the sea of its own complexity. It rests with educational and medical science and especially with those engaged in general practice to direct the course which we are to pursue, relieve us of the great burdens of invalidity and incapacity, and so enable industrialized man to take his place as an integrated individual in the eternal scheme of things.