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PRESIDENT'S ADDRESS

BY

H. B. ALLEN, M.D.

Professor of Pathology in the University of Melbourne.

Pathologist to the Melbourne Hospital.

Delivered before the AUSTRALASIAN MEDICAL CONGRESS

(Eighth Session, Melbourne 1908).

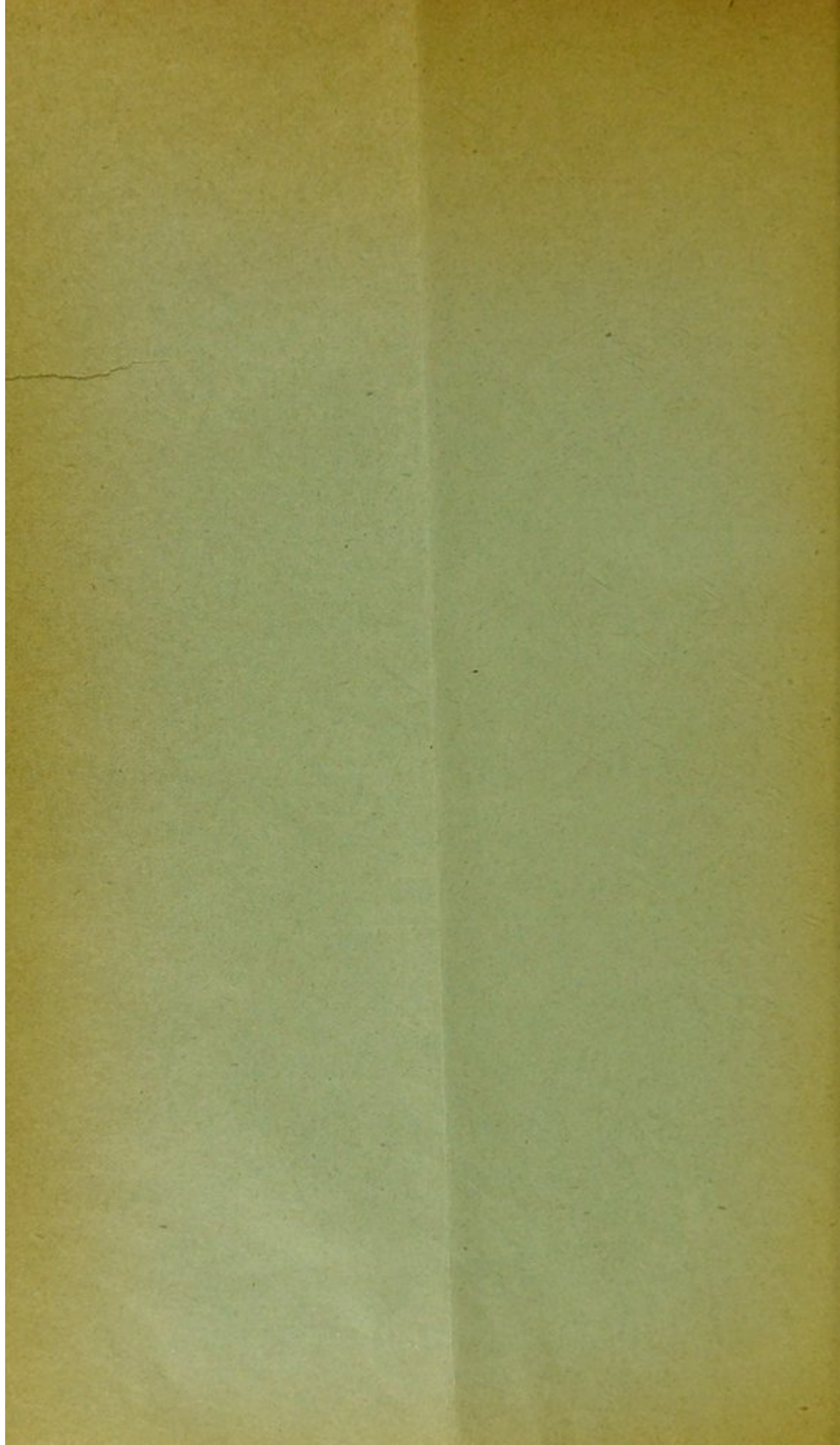
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Australasian Medical Congress.

(EIGHTH SESSION, MELBOURNE, 1908).

PRESIDENT'S ADDRESS.

By H. B. ALLEN, M.D.

Professor of Pathology in the University of Melbourne.

Pathologist to the Melbourne Hospital.

YOUR EXCELLENCY, MEMBERS OF THE CONGRESS, LADIES AND GENTLEMEN,—

My first duty is to express my heart-felt thanks to the members of Congress for making me their President. The honour is great, perhaps the greatest the medical profession can confer, and it is the more welcome as it came at the primary instance of the heads of the various medical associations of my own State. The responsibility is great, for it is no light matter, when medical men have gathered from all parts of Australasia, to provide that their deliberations shall produce the greatest possible good to the public and the profession. Experience gained in past Congresses has removed some difficulties; the collective wisdom of the various committees has solved others; the executive officers have been unsparing in their efforts; and for what has been left imperfect, we trust to the kind indulgence and the co-operation of the Congress itself.

In the midst of our preparations, we have been called upon to deplore the loss of one universally honoured by the medical profession throughout Australasia, the President of the last Session of Congress held in Melbourne, Sir Thomas Naghten Fitzgerald. Endowed by nature with every gift that goes to the making of a great surgeon, appointed full surgeon to the Melbourne Hospital when only twenty-two, soon engaged in a very

extensive private practice, Sir Thomas had unparalleled opportunities, of which he made noble use. We mourn him as our leader in this State, as a man of lofty professional ideals, as a great social force, as a public benefactor, as a friend who never wavered, a great surgeon and a great man.

We have reached the second session of the second cycle of our Congress, and can look back with some pride on the records of our doings. The first great problem undertaken by Congress was the treatment of hydatid disease, and though the last word on that subject has not been spoken, the proceedings of Congress constituted a great advance in the right direction. The discussions concerning typhoid fever aided to clear away the remains of ignorance concerning its nature and causation, and materially assisted the great preventive movement, in the success of which we now rejoice. The debates on tubercle did much to spread sounder views of the causation, treatment and prevention of the disease. The work of the Congress on cancer was recognised by high authority as ranking with the most suggestive contributions of its time. Surgical operations, first proposed at our meetings, have been universally accepted, and diagrams illustrating them have been copied from our transactions into the various text books. Such observations might be multiplied indefinitely, but probably the two most far-reaching results of Congress have been less direct. The first consists in the uplifting of the plane of work in the profession, and the promotion of research. The second lies in the general stimulus to preventive medicine, as manifested in progressive legislation, in the activities of the various Boards of Health, and in every State and Municipal and private enterprise forming part of the great contest with death and disease. On another side, the Congress has done much to establish better relations within the profession, to disseminate finer ideals of co-operation, to favour union of practitioners, not only within each State, but throughout Australasia, for the promotion of medical science, and the welfare of those who devote their lives to it.

Nearly twenty years have passed since we last assembled in Melbourne, and within that time the change already in progress in the popular attitude towards Science has become more and

more marked. The great generalisations of the conservation of energy and of inorganic and organic evolution have little by little exercised their leavening influence; and experience has begotten a new regard for Truth, not as something unstable, needing blind defence at all hazards, but as a glorious certainty that error cannot touch, that can only be revealed in greater grandeur and clearer vision by the deepest research, the most unfettered thought. We have now no hesitation in viewing the living body as a machine, never generating energy, but ever transforming it, using the hidden force of food for the maintenance of bodily heat and for all the manifold activities of life, till it escapes in degraded form as radiated heat. The engines of the latest greyhound of the Atlantic cannot compare in efficiency with the wing-muscle of a bird. As the astronomer resolves the starry world largely into two great streams of stars moving in opposite directions, yet all made up of similar elements, so the physicist contemplates life in its two great divisions, so like, yet so unlike,—the vegetable world by wondrous acts of synthesis creating stores of energy, that animal life may set free for its own purposes, unloosing the bonds so strenuously tightened, converting the secret tensions into the energy of new growth and work.

Life is a chemistry, a bundle of fermentations, a complex of cyclical actions and reactions; and how close is the correspondence between the physics and chemistry of life and not-life. Witness the saturated chemical solution that is inactive till a microscopic crystal is added, when in a few moments the germinal impulse towards specific form spreads through the whole mass; or the injured crystal that heals itself in the mother liquid; or the metallic wire that under repeated tension strengthens itself in point after point that tended to give way; or the finely divided platinum, that by its colloid tension has power like a ferment to cause indefinite oxidation, a power that may be destroyed by processes akin to sterilisation, that may sicken, that may be inhibited by infinitesimal doses of poison. How marvellous, too, are the results the chemist has attained in studying the constitution of the actual life stuff. Serum albumin and egg albumin have both been crystallised. Albumose

has recently been broken up, by means of water, alcohol and salts, into five different bodies, each obtainable in fairly pure state, with characteristic physical properties, solubilities and reactions. Emil Fischer tells us how, from the amino-acids, a hundred different substances have been manufactured nearly related to peptone. Dimly we begin to discern vague chemical forms of infinite intricacy, where proteid and carbohydrate and hydrocarbon are linked together in loose associations, the partners swaying in and out in endless rhythmical figures, each dissolution followed by a new integration. Such a conception corresponds only too faithfully with the enormous difficulties of biochemical study.

Yet the ultimate contrast between life and not-life remains as sharp as ever. In every chemical union, whether in life or not-life, a new substance is created; but for not-life here the matter ends, whereas every living being continually assimilates dissimilar things to itself, and multiplies in its own likeness. This contrast holds for the simplest unicellular plant or animal as fully as for the highest and most complicate type. It is difficult to realise the magnitude of the power to assimilate and multiply. One observer has estimated that, in the breeding of rotifers, if all the possible progeny could be preserved, there would be in the course of a year a mass of organic matter as large as the known universe. In the transplantation of cancer from one mouse to another, the cells introduced in the first tiny graft have multiplied by continuous division in different animals till the total tissue produced was as large as a St. Bernard dog. The continuity of life is still more wonderful. Apart from the question of the ultimate origin of life from not-life, of which we know nothing, every cell now alive, no matter in what plant or animal, has come down in unbroken living chain from the beginning. Untold myriads of cells have perished, but in the direct line there has been no death. Each cell divides, and its parts again divide; death may end any particular chain; but the life that abides is continuous. This fact is easily grasped in the history of unicellular organisms, such as the lower forms of bacteria, where multiplication by division is simple, without apparent formation of spore, without conjugation of sex. In

the higher forms of bacteria, the spore is but a specialised part of the living cell, in which the continuity of descent is focussed. In the more complex forms of vegetable and animal life, the body perishes, but in the reproductive cells, with their wonderful reductions to unsatisfied forms and their subsequent conjugation, with all the multiplication that follows till the new individual is complete, with the new specialisation of germ cells by reduction and the new conjugation, here, as truly though more abstrusely, life that abides is unbroken. In this sense, parents and offspring are one.

In contrast with this essential continuity, is the constant tendency to individualisation. The chemistry of immunity, with the history of precipitins and lysins, indicates how profound and intimate is the difference between one animal and another, one individual and another. Fundamentally, no two living cells can be exactly alike. Each is the product of a particular inheritance and a particular environment. In a bacterial culture, under laboratory conditions, the variations of environment may be reduced to a minimum, but can never be entirely suppressed. The more complex the organism, the greater the play of environment. With bacteria, such as those of anthrax, brief changes in environment may affect the individual, but not the generations that follow. More profound and continued changes in environment produce results of more permanent nature. If culture is continued for six weeks at 42° or 43° C., no spores form, and the virulence is attenuated, so that inoculation does not produce any outward symptoms even in baby mice or baby guinea pigs. If the altered bacilli are now grown at the most favourable temperature, 37° to 38° C., spores form, but the culture retains the same degree of attenuation. Chemical agencies may act in the same way, as when transmissible variation is produced by culture in carbolised media. The reverse process is even more instructive. Pasteur showed that the weak vaccinal culture may be restored to full toxicity by transfer through very young animals to older animals, and from less resistant to more resistant species. Here the change occurs in successive generations of bacterial cells multiplying within the body, and nourished by the body fluids. Transmissible variation is not

limited to such qualities as the power to form virus. The mode of life may be much more profoundly changed. Neisser and Massini have succeeded in so cultivating the *Bacterium Coli Mutabile*, that some individuals in a culture acquired the power to ferment milk sugar, and this power was transmitted through several generations, and was retained when the organisms were sown on other media.

In higher forms of life, only those acquired properties can be inherited which affect the reproductive cells. But these cells obey the law that all protoplasm bathed by the same lymph must have the same colloid equivalence. They are affected in greater or less degree by toxic conditions of the general tissue fluid. In fact, we are only beginning to understand how the whole body, including germ cells as well as somatic cells, is nourished in full communion of parts. Sir James Paget long ago taught that every organ in its nutrition is complementary to the rest of the body. The history of the evolution of sexual character is the most striking illustration of this doctrine. Recent experiment shows us a little of the underlying chemistry of the process, though our knowledge is still comparatively superficial, and still "one deep calleth unto another." If some of the old form of tuberculin is inoculated into the arms of infants, a local papule with special characters will appear in those who have any form of active tubercle, and even in those who have traces of healed tubercle. If a drop of one per cent. watery solution of purified tuberculin is put under the lower lid of child or adult, inflammation of the conjunctiva follows in those with any form of active tubercle. With skin or eye, the non-tuberculous remain unaffected. This is a relatively simple instance of the mode in which local disease may produce subtle effects in far distant parts of the body. Ancient doctrines of mysterious sympathies have been replaced by knowledge of hormones, of inter-related digestive actions, of responsive leucocytosis, of the relation between the life of the organs and our conscious and unconscious mental life. Such remote actions are in every case the product of a long series of cumulating acquirements, each step being an adaptation to the demands of the environment on the living organism. While, therefore, it is cer-

tain that acquired characters are heritable only in proportion as they affect the germ cells, we must remember that no cells, not even germ cells, have a life wholly apart. Those who believe with Lamarck in the inheritance of acquired qualities have been asked if they think that, when a man develops his muscles by exercise, his brother's children will thereby be modified in like manner. Somatic cells and germ cells are brothers in a very different sense, nourished by the same body fluid, through which they act and react upon each other. This is not mere hypothesis, but has a firm foundation in the facts of inherited immunity.

It is universally conceded that evolution is the response of the organism to the demands of environment. If this response does not increase from generation to generation, the weeding out of the irresponsive will be powerless to produce progress. It can at best only prevent retrogression. But if the response is progressive, natural selection, or in other words the elimination of the unfit, becomes a factor of the utmost importance.

Our knowledge of the laws that govern inheritance of parental qualities has been greatly enriched by the re-discovery of the experiments of the Abbé Mendel, and by the work of his followers, many a dark place being illuminated by the theory of dominant and recessive characters, a theory that accords remarkably with the latest observations of the actual process of fertilisation. De Vries, by his experiments on the breeding of *Oenothera*, has gone far to prove that, at least in many cases, development comes at a leap, and not by slow visible cumulation of characters, though doubtless behind the obvious leap there is a hidden cumulation of results, until a critical period of change supervenes. In descent, the family type is more potent than the individual, and the racial type more potent than the family; but the wave of scepticism concerning heredity has almost spent itself, leaving us with more sure knowledge, purged of ancient error or excess. The family histories of polydactylism, of hæmophilia, of gout, of cancer, have long been conspicuous. Recent research shows how far reaching is the hereditary tendency. Nettleship has added to his series of cases of hereditary coralliform cataract a most extraordinary history of congenital night-blindness in a family residing in the South of France near

Montpellier. The pedigree includes 2121 persons in ten generations since the year 1637, and 135 are known to have been night blind. Biometric methods tend to show that mental characters obey the same laws of descent as physical. But the doctrine of evolution has become independent of particular methods of interpretation. Whatever weight we may give to elimination of the unfit or to progressive adaptation, however we may view the struggle for existence, the central truth stands firm, and for us needs little further warrant than the fact that every living being in its embryonic development displays in brief the story of its evolution.

If there is still a radical division of opinion concerning the hereditary factor of individuality, there is full agreement concerning the other factor, which consists in the environment of each new life from its first inception. Before birth, after birth, streams of influence are flowing in upon it. Now it thrives in favouring conditions, now it is stunted by mal-nutrition, now it is poisoned by toxines that excite no countervailing reaction, now it adapts itself to conditions that at first promise disaster; every impression leaves its mark; so that the disciples of Weissmann, who deny the transmission of acquired qualities, proclaim the more forcibly the importance of physical, mental and moral culture. In proportion as man holds off from man the unsparing law of elimination of the unfit, there should be more constant, more intense, more enlightened education of every faculty, for if the whip of suffering is removed, the downward course is all too easy, all too sure.

When we attempt to grasp the nature of Life, we find ourselves in presence of a great mystery. Comte long ago remarked that living beings are better known by us in proportion as they are more complex. Our greatest certainties are those of our own consciousness. The imaginings of poet, musician, architect, shadowing forth tragedy, sonata, cathedral, are not mere transformations of physical energy. Bald materialism is possible only by abstraction of essential facts. As Gissing says in *Henry Ryecroft*, "rather I would think that despair at an insoluble problem, and perhaps impatience with those who pretend to solve it, bring about a resolute disregard of everything beyond

the physical fact, and so at length a self-deception which seems obtuseness." Hence it is cheering to find, as the motto of one of the most popular manuals of physiology, the saying of John Hunter that life produces organisation, but organisation cannot produce life. Nevertheless, the phenomena of mind are all based upon sensation and reaction to sensation, and these again on the primitive attractions and repulsions seen in the simplest unicellular organisms. Desire and will were foreshadowed in the first living element. Yet it is difficult, if not impossible, to avoid the belief that Life came out of Not-Life, or at least arose amidst Not-Life. Was Leibnitz then right in contending that nothing is dead, that life is universal? Is not Meredith nearer the truth when he sings of Earth

"She being Spirit in her clods."

The phenomena of radio-activity and the development of electrophysical theory have broken down the bounds between matter and energy. Philosophy long ago proclaimed that matter became nothing if all its qualities were abstracted, and now it is a wide-spread belief that matter is but focalised energy, so that the evolution of matter, inorganic or organic, becomes the evolution of symmetric foci of energy. Shall we shrink from this marvel of mathematics? What are all the glories of light and colour, in sunset and sunrise, and in all the wonders of earth and sea? Outside of living beings, they are vibrations of ether, which we interpret as colour according to the rate of vibration. What is music but our interpretation of aërial vibrations, which we appreciate as melody and harmony according to an exact mathematic. Let us rather hold that physical energy is in the last resort the expression of the Divine will, that the physical and the spiritual are not heterogeneous in the sense that one cannot act upon the other, that in every manifestation of energy the physical and the spiritual are both present, and that the history of the evolution of life has been the specialisation of organs through which the celestial mathematic is interpreted more and more fully in finite consciousness. If we believe in the Divine Immanence, we must hold that Immanence is perfect in all things in accordance with their power of containing it; and with growing capacity, who shall limit the new Synthesis? But we do well to remember that Meredith, who proclaims the

universality of the spiritual, tells us also as to the higher knowledge of Earth

"For the road to her soul is the Real,"

and how, in his vision, there is no room for superstition, or partial variation, or any of the vagaries of pseudo-science, for

"Around the ancient track marched rank on rank

The army of unalterable law."

With such conception of life, however shadowy it may be, we can base the ideal firmly on the real, or the real on the ideal, knowing that the one cannot be estranged from the other; and we may thus attain a more solid comprehension of the meaning of evolution, of individual development, and of personal, family, social and national duty.

The medical profession has for its special function the culture of human life, and it is well that from time to time we should seriously ask ourselves how this great trust is being discharged. Such a survey, however imperfect, must aid us to realise the vast extent of our responsibilities, entering into every part of life,—birth, infancy, childhood, adolescence, maturity, decline, old age and death. How many images these words evoke, how complex the problems that are involved. It is scarcely necessary to say that the medical profession is only one of the agencies concerned, and that, whether changes are for better or worse, only part of the praise or blame can attach to it.

The first question that fronts us is the unsatisfactory state of maternal mortalities. Professor von Herff states that, at his own hospital in Basle, among six thousand cases, not one death occurred from puerperal fever contracted in the hospital, and only five cases in all died from puerperal fever, every one of these being infected before admission. Nearly 82 per cent. of his cases had no rise of temperature. Australasian maternity hospitals in various degrees approach towards this record. The Sydney Women's Hospital in 1904 reported ten years' work, with nearly four thousand cases, and not one death from puerperal sepsis. It is not a question of fine homes or comfortable surroundings. In outpatient practice, amidst the squalor of East London, the British Lying-in Hospital recorded nearly thirty thousand cases with only three deaths from septic causes. Yet the cruel fact remains that, in England and Wales, there

has been practically no lessening of the combined mortality from puerperal fever and accidents of childbirth during the last forty years. Almost the same might be said of Victoria. Medical practitioners vary in their grip of aseptic methods; but the lack of progress depends chiefly on the nursing. In England and Wales, less than half of the births are attended by a medical practitioner. It is not too much to claim that out of every ten deaths from puerperal sepsis, nine are probably preventible. A Midwives' Bill, somewhat on the lines of the British Act, is urgently needed in Australasia, so that proper training and registration may be compulsory.

The fall in the birth-rate has been deplorable. In England and Wales, between 1870 and 1905, the crude rate fell 23 per cent., and among mothers in childbearing ages the fall was 29 per cent. The highest rate was 36.3 in 1876, and the lowest 27.2 in 1905. The Registrar-General believes that 73 per cent. of the fall is mainly due to deliberate restriction. The birth-rate of London for 1906 was the lowest on record. Sidney Webb quotes a Friendly Society, composed practically of thrifty artisans, in which the birth-rate during the decade ending 1905 showed a fall three times as great as that seen generally during that decade in England and Wales. Speaking generally, it may be said that the fall is not noted so much in the highest or the lowest ranks of society, but is strongly marked in the middle classes. Australasian statistics reflect only too faithfully this wide-spread tendency, though since 1903 the tide appears to be slowly turning. In New South Wales and New Zealand, the fall extended over 20 years, but in Victoria the loss was concentrated into the ten years ending 1902. As far as this downward movement represents an increased recognition of responsibility on the part of parents, some extenuation may be pleaded; but so far as it implies unwillingness to accept responsibility, it can only receive unqualified condemnation. It is not merely a question of limitation. In the United States, it is estimated that there are two millions of childless homes. In Massachusetts one-sixth of the homes are childless, so that a century ago children were one-third of the population, whereas now they are less than one-fourth. The childless home lacks the deepest source of joy, and those who think they can cheat the purpose

of marriage, without incurring risk of personal injury, simply deceive themselves.

In the saving of child-life, there is a far more cheering tale to be told. The mortality is greatest in the first year, and half of the mortality of the first year occurs within the first three months. The cities still show much more unfavourable results than the country districts, but the disparity is not so great as in former times. In Victoria, for example, the infantile mortality rate for the metropolitan district has fallen from 168.5 in the years 1873-80 to 112.6 in the years 1901-05, while in the extra-metropolitan districts the rates have fallen in the same time from 101.6 to 84.4. The Australasian rates for 1901-05 vary from 125.9 for West Australia to 74.8 for New Zealand. Apart from the complex questions concerning the so-called "natural" infants, among whom the death-rate is at least two or three times as great as among others, and apart from the appalling results of inherited taint, the chief factor that decides the life or death of infants is food. Nothing can adequately replace the natural food, and to multitudes of mothers the spiritual reproach of Meredith might be literally applied—

"Look, woman in the West, there wilt thou see
An amber cradle near the sun's decline:
Within it, featured even in death divine,
Is lying a dead infant, slain by thee."

When the natural food is not available, no substitute can compare with cow's milk. But in great towns, how difficult the milk question becomes. In New York, milk is usually 48 hours old before it reaches the consumer, and during hot weather the resulting evil is intensified. In the poorer streets in New York, it has been estimated that even in midwinter the milk contains nearly two million bacteria per cubic centimetre, whereas in a warm month the number rises to over thirteen million. Even in fashionable streets, the corresponding numbers were over three hundred thousand and over a million. In bad streets, the numbers rise rapidly from morning to evening, a count at 9 a.m. perhaps giving thirty to forty millions, and at 7 p.m. ninety to a hundred and thirty millions. A federal text book on the milk question has recently been prepared by a conference of experts in the United States, and it recommends a definite programme

under which milk would be classified as "certified" or "inspected" or pasteurised. Certified milk would come from dairies periodically inspected, the milk being frequently analysed, the cows tested by tuberculin, etc., and found free from communicable disease, the milk handled only by persons free from infective disease, the milk containing not more than ten thousand bacteria per cubic centimetre, and being not more than twelve hours old when delivered to the customer. Inspected milk would be somewhat lower in standard, but would be produced under similar conditions, from cows tested with tuberculin, the milk not containing more than a hundred thousand bacteria per cubic centimetre. No other milk would be sold raw. All inferior milk, or milk of unknown origin, would be pasteurised. The question of adopting this programme is now under serious consideration. In any scheme for the supply of uncooked milk, immediate refrigeration at the dairy is the prime necessity. Municipal milk depôts have been established in Liverpool, Glasgow, Bradford and other places, but they are not a success financially. Kenwood voices a large body of opinion in preferring a system of "Infant Consultations," such as was inaugurated by the late Professor Budin, the directors recommending milk vendors who comply with their regulations. Excellent results have been attained in Philadelphia through the action of a Milk Commission of five medical men appointed by the Pediatric Society, a high standard of purity being fixed, certificates given to dairymen conforming to it, and all milk delivered in hermetically sealed bottles, with a slip certifying that the milk had been examined and found satisfactory within the last month. Pasteurisation may be replaced by the Budde process of sterilising by peroxide of hydrogen at 50° Centigrade, so that taste and flavour are unchanged, and the natural ferments are preserved or restored.

Public opinion is awakening very slowly to the importance of the early training of little children. The main features of character are fairly defined before a child is three years old. Hence the levity with which many well-to-do parents leave their children during these years largely to the tender mercies of ignorant inexperienced servants is most deplorable. This is the time in which habits should be carefully formed, to constitute

the basis of steady character. I would also appeal for the culture of the imagination of children, beginning with the simplest modes and proceeding to the highest. We are familiar with Mr. Gadgrind's Philosophy of Fact in "Hard Times." Edmond About, in his *Roman d'un Brave Homme*, speaks of the excellent education given to the hero by his father; but Positivism was already at work, and in the nursery of the next generation, the hero "pitilessly proscribed the most accredited legends, the most convenient hypotheses, the most official historic lies. The watch-word of the little class was to teach nothing to children that you cannot prove or explain." Poor baby positivists, is not this an over-true version of a wide-spread system, under which the imagination is stunted, the mental power shackled, the joy of life undeveloped.

We rejoice in the progressive legislation for infants and young children, especially for those most subject to neglect and cruelty; in the Acts for early notification of birth, for infant life protection, for children's courts, for inspection of schools and school-children; and in all the forms of philanthropic work for the little ones that kind hearts have prompted. But how much remains to be done! How much permanent loss of sight might be prevented merely by disinfection of babies' eyes. The President of the American Medical Association, in his address last year, stated that unrestrained ophthalmia caused over 25 per cent. of blindness from disease; that over 30 per cent. of the school-children of New York suffered from defective vision, and that in 75 per cent. their mentality was impaired by causes yielding to curative measures of a simple and permanent nature. Does this statement seem exaggerated, or would you confine its truth to children who have grown up under unfavourable conditions? The answer is not far to seek. Clement Dukes examined a thousand boys on their entrance to Rugby between the ages of 13 and 15. Here are some extracts from his report. Lateral curvature of the spine in 445 out of the 1000; pigeon breast in 126; bowlegs 64; knock-knees 526; flat feet 329; stammering 70; hypermetropia 40; myopia 128; astigmatism 27; colourblindness 12; mouth-breathing 112; chilblains 437; varicocele, right 4, left 92; albuminuria 157. He adds that in no instance were slight defects registered. On the whole, though the results of

the enquiries already begun in Australia will doubtless be much more favourable, I cannot but conclude that we are only at the beginning of our task in the conservation of health during childhood and youth.

In adolescence and early adult life, enormous evil is wrought, especially in the upper classes, by a too restless excited life. Steady work, however hard, seldom injures health. Adequate sleep is a full corrective. But unsteadiness and restlessness, with irregular meals, irregular sleep and continual excitement, induce the neurasthenia that is so common. People are worn out long before their time. Unfortunately it is precisely those of unstable neurotic type who are most liable to such worry of the nerves, and to the degeneracy that follows. There is, however, another form of neurasthenia, that Dr. Hellpach laid stress upon in his inaugural address to the Technical High School of Karlsruhe in 1907, the factory neurosis begotten by mechanical thought-killing monotony. Readers of Dickens will not need to be reminded of the remedial philosophy of Mr. Sleary in "Hard Times." Let machinery and routine have full sway in all things, and, as Dickens says, the heart of infancy will wither up, the sturdiest physical manhood will be morally stark death, and the plainest national prosperity that figures can show will be the Writing on the Wall.

Concerning middle life, added experience serves but to emphasise the disastrous results of over-strain, whether mental or physical. Too strenuous a life reacts on the whole metabolism of the body, with inevitable auto-intoxication, gastro-intestinal, muscular, articular, cerebral. Hence come dyspepsia, muscle pain, gout, migraine; but more insidiously come all the troubles of kidneys, heart and arteries that are associated with high vascular tension. Excesses in flesh food, whether in red meat or in white, commonly attend the strenuous life, while Chittenden's researches have proved how little proteid food is necessary. Excesses in alcohol are almost as common, especially when brain and heart begin to weary with the constant strain. The moral is obvious, but obedience so often comes too late. Many books have been written with elaborate directions for the management of old age and the decline of life, but the secret of happy old age lies in sound family history, healthy joyous childhood, active

temperate manhood and womanhood, recreation following work, imagination redeeming routine. These are the simple but essential antecedents that no special regimen, no quack nostrum can ever replace.

On questions of disease, only a very brief comment can be made. Bacteriological laboratories have not only reconstituted our notions of pathology, but have supplied us with new and potent weapons of defence. Antitoxin has robbed diphtheria of its terrors. Hydrophobia can be prevented even after the bite. Chantemesse claims that acute dysentery, if treated early, yields with certainty to his serum. Koch's discovery of the specific comma bacillus and of its life habits has brought cholera under comparatively easy control. In the relations between disease in man and disease in the lower animals, a whole world of new knowledge has arisen. The proved fact that the bacillus of plague comes to man through the rat and the rat flea has placed *pestis major*, for European communities, within the list of manageable diseases. Recognition of the fact that yellow fever like malaria is transmitted by the mosquito enabled the Americans in ninety days to convert Havana into practically a clean city. In the Panama Canal works in 1882, 1900 men were employed, and the mortality was 112 per 1000; whereas in 1905, under American control, twenty-five thousand men were at work, with a mortality of less than 1 per 1000; but no less than 4000 men were engaged in exterminating mosquitoes. In 1907, the Chief Sanitary Officer told the graduating class of Cornell that there had been no yellow fever on the isthmus for over a year; that malarious fevers had been reduced to a minimum; that the special mosquito of yellow fever had been so reduced in numbers that yellow fever would not spread even if it were introduced; that among the six thousand Americans connected with the Canal work, including 1200 women and children, there was very little sickness of any kind, and the general appearance was fully as vigorous and robust as among a similar number of people in the United States. In Ismailia in 1897 there were 2089 cases of malaria; in September 1902, Professor Ross was placed in charge of operations; in 1905, there were only 37 cases, and nearly all of these were relapses. Here also I may remind you that Colonel Sir David Bruce, the hero of Malta

fever, of tsetse-fly disease, and of sleeping sickness, was a native of Melbourne, born in Prahran.

The work of the health departments, civil and military, shows many records of glorious achievement. In rapid sequence upon improved dietary, Beri-beri has been banished from the Japanese navy, and reduced to small proportions in the army. In Oku's army, Seaman tells us, there were less than 200 cases of enteric fever and less than 400 of dysentery, and only 40 deaths; whereas in the Boer war, certainly under worse seasonal conditions, Britain lost more than thirteen thousand men by preventible disease. In civil practice, the mortality from enteric fever in England and Wales has fallen from 384 per million in 1869 to 89 per million in 1905; and this is in addition to the immense decrease in the mortality from so-called simple continued fever, which was mainly enteric fever in disguise. Similarly in Victoria, the mortality from typhoid fever has fallen from 369 per million of the population in 1890-92 to 132 per million in 1906. In 1905 the rate was only 100. But defective drainage and water supply in the country districts still produce the inevitable results. Thus in 1906 the rate for the Metropolitan District of Sydney was 118, while that of the Country Districts of New South Wales was 212. If the mortality from typhoid fever throughout the Commonwealth were brought down to the level that obtains in England and Wales, 270 lives would have been saved in 1906 alone.

The great reduction in the death-rate from tubercle (the mortality from phthisis in England and Wales has fallen 50 per cent. within forty years) must be attributed mainly to the steady influence of the hygienic measures that have been quietly and persistently pushed forward by the various Boards of Health. The work of the British Royal Commission on Tuberculosis has established the unity of the disease. We have learnt that bovine and human bacilli are different strains of one organism; the bovine more toxic, shorter, growing slowly on culture media, broth cultures tending to remain alkaline; the human less toxic, longer, growing more rapidly, broth cultures tending to become acid; these distinctions, with other minor points, serving fairly well as tests to determine the origin of any strain. The experts employed by the Commission reported that, out of sixty cases

of human tuberculosis, fourteen belonged to the bovine type. Of 28 cases of alimentary origin, 13 were of bovine type. Among these 28, the glands of the neck were studied in nine, and three gave the bovine type. Of 19 with abdominal lesions, ten gave the bovine type. On the other hand, in three cases, bacilli of human type, after repeated passage through the calf and the guinea pig, took the bovine type. It was also discovered that, when human bacilli are introduced into calves by subcutaneous injection, the bacilli become widely diffused, and may persist for months in organs that appear healthy to the naked eye. These results are extremely serious, in view of such records as those of the Leipzig abattoirs, where of 9303 cows slaughtered, 43.51 per cent. were tuberculous, or the estimate of the late Professor MacFadyean that in English cowhouses 30 per cent. were infected. Gilruth, reporting in New Zealand for the three years ending March 1905, found over ten per cent. of 45,742 cows tuberculous. Something however may be said on the other side. Findel of Breslau found that with guinea pigs, using Reichenbach's apparatus for respiration, if at least 62 bacilli were inhaled, tuberculosis followed in every case; but by the digestive way, a dose six million times as large was necessary to be sure of producing tubercle in every case, and a dose nineteen thousand times as large always failed. It must also be remembered that, in England and Wales, pulmonary tuberculosis causes 69 per cent. of the total mortality from tubercle. Hence, notwithstanding the experiments of Calmette and the theory of Behring, the frequency of the alimentary conveyance of tubercle may easily be exaggerated. Another aspect of the whole question is given by Newsholme's statement that the phthisis death-rate varies very closely with the total poverty-rate. Apart from poverty, Newsholme finds that the rates in the chief European countries vary chiefly with the degree of segregation of phthisical patients in general institutions. For the individual consumptive in the early stages, sanatorium treatment is full of hope. When the disease is far advanced, the main objective must be to prevent the spread of infection, either by adequate precautions in the home, or by segregation in suitable institutions. In Victoria, a notable step forward was taken at the end of 1907, when the most populous centres were declared by the Board of Public

Health to be affected with the dangerous infectious or contagious disease, pulmonary tuberculosis, with the consequence that notification of all cases became compulsory. Enforcement of this notice is still contingent on the provision of adequate hospital accommodation for necessitous cases. The full development of these measures, coupled with more general appreciation of the value of fresh air and sunlight, should make possible at no distant date another reduction by one-half of the deadly toll levied by the Great White Plague.

Concerning the general progress of Medicine and Surgery, there is much cause for gratitude. Increasing knowledge of anæsthesia and continued developments of antiseptic and aseptic methods have made possible the addition of wide kingdoms to the domain of Surgery. Improved methods of diagnosis have made our knowledge of disease more precise, and have opened the way for more scientific treatment. New theories of chemical solution and of electrolytic dissociation have thrown great light on the action of drugs. A huge department of physical therapeutics has been created, and is already being threatened by the evils of excessive specialisation. More attention is being paid to the adjustment of the individual, the care of the unfit, the neurotic, the insane. An enlightened press is doing much to quicken the public conscience in matters of public health. The standard of professional education is rising. The spirit of research is becoming more and more wide-spread. But so much remains undone or imperfect. We are still weighed down by ignorance and prejudice. When shall we be free from traces of the incubus that Wells so finely depicted in the *Story of a Simple Soul*:—"Above them, brooding over them, I tell you there is a monster, a lumpish monster, like some great clumsy griffin thing . . . like pride, like indolence, like all that is darkening and heavy and obstructive in life. It is matter and darkness, it is the anti-soul, it is the ruling power of this land, Stupidity. . . . But for that monster they might not be groping among false ideas to hurt one another so sorely; but for that, the glowing promise of childhood and youth might have had a happier fruition; thought might have awakened in them to meet the thought of the world, the quickening sunshine of literature pierced to the substance of their souls; their lives

might not have been divorced, as now they are divorced, from the apprehension of beauty that we favoured ones are given,—the vision of the Grail that makes life fine for ever." Translate these burning words of the spirit into the humbler phrases of the body, and we have the aspiration that animates the medical profession, an aspiration that must surely realise itself step by step in actual fact.

In this mood I would bring my address to an end. The medical profession owes to the public a service of thought as well as a service of action. We shall not fail in the service of action. Let us see that we fail not in the service of thought. And now we go to our Sections, there to rejoice together over our successes, there to take counsel in our difficulties, there to hearten one another for all that lies before us; and so back to our various spheres of duty, made stronger by our fellowship, humbly striving to have more adequate answer to the questions,—what hast thou done, what hast thou thought.