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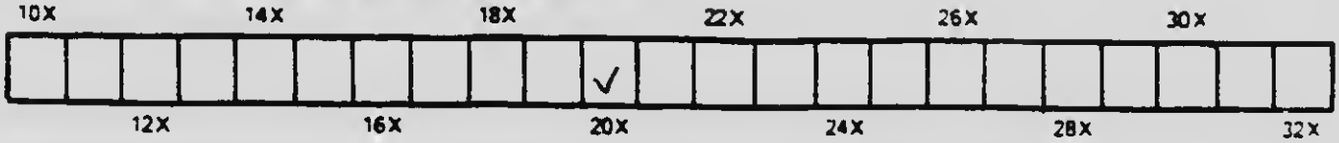

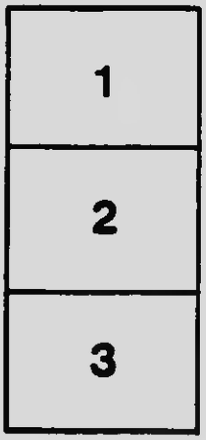

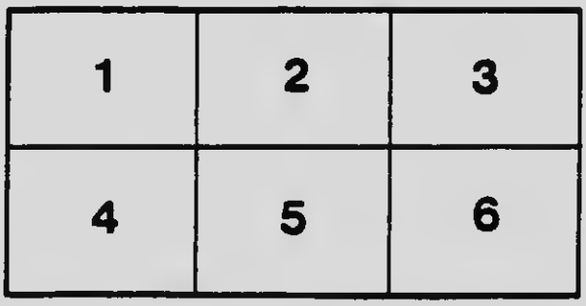

A STUDY

IN

HEALTH-SCIENCE

M. J. KEANE, M.D.

M.B. (Tor.); C.M. (Trin.)

Member of the College of Physicians and Surgeons, Ontario
Member of the College of Physicians and Surgeons, Alberta
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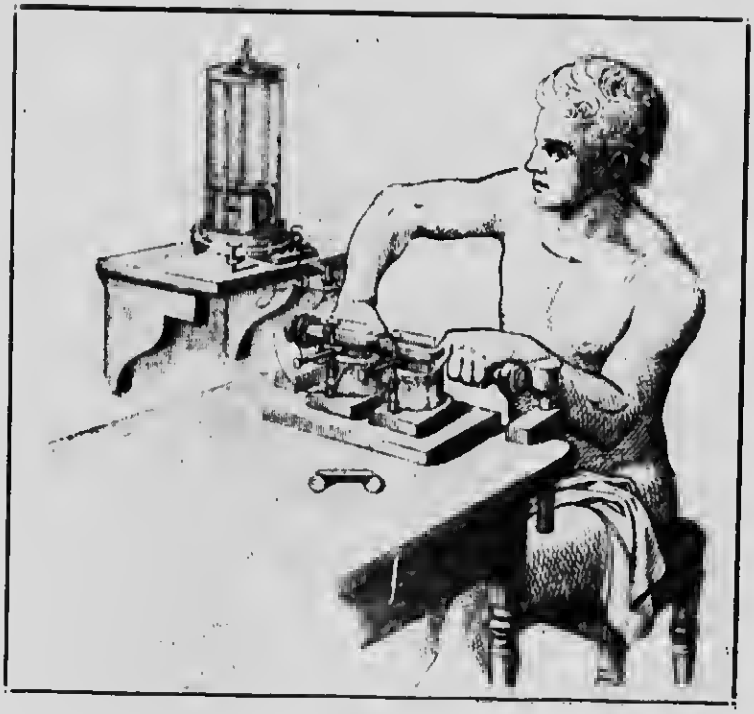


DEFLECTION OF THE MAGNETIC NEEDLE BY THE WILL

Contents

PREFACE

With the spread of education and enlightenment and the progress of science, the physician of the future not less than his other self, the priest or minister, who believes that he is set apart for the purpose of bringing men into communication with a supernatural power, must restate his "creed" and "confession of faith" in terms more acceptable to thinking minds and govern his practice accordingly. The age of miracles is past. The stage of the human mind which holds that disease is a test of faith or a visitation of Providence is passing. The universe is governed by law which, so far as we know, is never changed by superhuman caprice or in response to our "poor necessities."

The natural history of many bodily conditions as pneumonia, typhoid fever, and the continued fevers generally has been traced out, with the result that the "wise and skilful physician" may pose best as an upper nurse in the interest of his patient. "Let him bear the palm who deserves it." Thus may he take credit to himself for having "pulled the patient

through" a very severe illness, not envious of his confrere who dubs himself "surgeon", but whose patient, "though the operation was a brilliant one", "rests with his fathers." "The Lord gave and the Lord hath taken away, blessed be the name of the Lord!"

It seems hard to give up old superstitions; as Newman says; "Oh! that thy creed were sound—for thou dost soothe the soul by thy unwearied round in the Holy Place." As the drug superstition will have no place in the practice of the future, so there will be no need for platitude, nor the reproach of the . .st of the common type doctor, the pompous preter 'er, in his attitude towards his patient, who befuddles 'he mind of the "anxious father for his son" with what he calls a "prognosis." "If he continues in his present state for any considerable time, it will undoubtedly go hard with him; but if, on the other hand, he takes a turn for the better, he will probably get well." *Credat Judæus Apella.*

All men are said to be divided into three classes the learned, the learners and the reptiles. The learned are they who would base Knowledge upon Revelation, or blind Tradition, or blinder Authority. The learners are they who are guided by the Light of Reason, and who are satisfied "to pick up a pebble on the vast shore

of Science"—and the reptiles, "The Imbeciles", who crawl in the slime of Stygian darkness, herded by the Rod of Moses and the Snake of Aesculapius.

Thus the authority of a name has long weighed upon the human mind; and has been a great obstacle to progress. Athanasius and Galen bear about equal honors. True, Aristotle was high-priest of the Schoolmen, but to the Neo-Platonists we are indebted for the first efforts to reconcile the New Dispensation with a philosophical system. Scholasticism had its downfall in the Reformation but no reform, no vicissitude, not even the "Black Plague," nor the "sweating sickness," nor typhus, nor cholera has been quite able to dethrone the empiric Galen, with his drugs and medicaments; and the old heathen gods must have smiled unctuously as the religious devotee prayed the Lord "to stay the unaccountable affliction," "the visitation of His wrath," or "the machination of the Evil One."

We are now entering upon a mighty movement far-reaching in its influence and its bearing upon human progress. The superstition of the drug-treatment of disease is passing. Health-science or preventive medicine is the "physical renaissance" of a dawn of complete emancipation from all superstition, and this Twentieth Century may truly witness an advance with equal pace from personal health and virtue to a

broad fraternalism of conduct which is the watchword of progress. While there has been a great outcry for a better training of the medical profession in scientific knowledge, we are hopeful that the colleges of the future will by better appointments for instruction in physiological chemistry and physics supply the deficiency. The study of health-science or preventive medicine must however appeal to the "thinking man" —the learner, who alone has an open and receptive mind for truth.

We need strong, vigorous men at 60 years. Men of stamina and courage and will. We need men who from boyhood up have been clean, orderly, and temperate; and whose outlook on life is sane and healthy; not morbid or blasé; not yet fit for the Euthanasia.

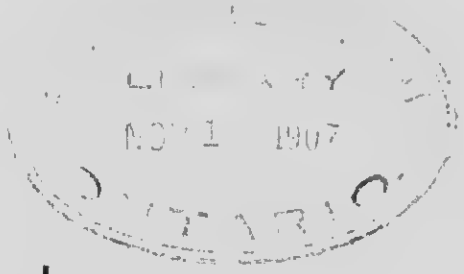
The human body is an organism of wonderful adaptability, as well as of recuperative power; with stores of energy within for emergency and repair. This is our Capital account, which we must conserve by right living and by the observance of the laws of hygiene. This is the physical conscience. We should do right because it is right. Every transgression has its penalty, as consequent follows antecedent. We are told "a burnt child avoids the fire", but life is too short to learn from our own individual experience: we must learn that, in the universal experience of man,

fire burns; whether the act is voluntary or involuntary, whether on the one hand the motive be malice, foolhardiness or fanaticism; or on the other, devotion, heroism or self-sacrifice. Knowledge, which is universal experience, leads to physical righteousness, and this is the ideal of conduct.

There is one act in our lives over which we have had no control: We were not even consulted in our birth into this fierce struggle; but we were not born "naked", being surrounded by the accumulated experiences of the race. The race needs us in the battle and we are a necessary step in the evolution of Supreme Energy. We are conscious of our own existence, and consciousness implies personality, to do and to act in accordance with immanent law. This is our destiny.

"A sense of law and beauty
And a face turned from the clod,
Some call it Evolution
And others call it God."

INTRODUCTORY



I

INTRODUCTORY

"Only what is true will persist. Out of the merciless fire of modern criticism truth, like asbestos, will come forth purified; but vain theories, gaseous, will be dissipated among the waste winds forever."—Carlyle.

In this study we may with advantage glance into the history of medicine, and note the parallel between it and religious development. In the earliest times the offices of priest or minister and of the medicine-man were united. Social evolution had progressed so far during Roman civilization that we note a distinct cleavage in the two systems; still the snake of Aesculapius is not far removed from the rod of Moses. On the advent of Christianity a still further demarkation is noted; but both crafts have the same basic idea, viz., the essential nature of evil, which was personified in the supernatural order as "Devil", but which was called "Disease" in the natural order. Indeed mediaeval sectaries as the Manichæans, conceived of two supreme self-existent principles—one good, the other

evil. The great disturbing cataclysm, the Reformation, which overwhelmed old beliefs and time-honored cults which marked the Sixteenth Century, still finds medicine groping with the idea of disease or ill-health being an entity which must be expelled by drugs, as the priest sought to expel the Evil Spirit by exorcism. The erudite D'Aubigne tells us in his history that Luther threw an ink bottle at the Devil. "Paradise Lost" reflects the same idea of a material entity of disease, and of a personal devil who wages material warfare with the Absolute.

As a heritage of Jewish times and a code of ethics fit only for the dwellers in tents, the epileptic, the choreic and other neurotics were thought to be possessed of one or more devils. The practice of medicine was primitive and retained the fetish worship of drugs down to recent times; indeed, the modern votary of the healing art maintains the same attitude as to the nature and cause of disease, as that held in the days of mediaeval gloom, and is only now casting off the swaddling clothes of primitive superstition, and assuming the garb of science.

About the end of the Eighteenth Century, Hahnemann brought forward a new interpretation of the medical scriptures—the doctrine of "similars"; and by a method analogous to the "higher criticism" of our

own days, utterly demolished the pretensions of the drug-healers of his day. The panacea he offered humanity for its various bodily ills was based upon triturations of the old time materia medica, in which the "simples" were attenuated to a vanishing point; the result was a medicament of high potency: thus a grain of chalk, mercury, sulphur, arsenic, etc. was mixed with some medium such as milk sugar, and the quotient represented a fractional amount of the original activity. A similar reduction was made with liquid drugs with alcohol as the medium.

By this time much progress had been made in the printing art, and the modern italic type had been designed by "Aldus Manutius", but it was found that numerals were recalcitrant to the obliquity given the old Roman alphabet. Hence originated, it is said, the proverb, "Figures will not lie"; if indeed we may pin our faith to statistics, the results were without question in favor of this new heresy. Hahnemann's procedure was certainly to be preferred to the orthodox dosage of maximum and minimum; so a hundred years elapsed to the days of Lister, and the anti-septic foible, with a huge machine set up like that on the plains of Dura, by Nebuchadnezzar—a great copper kettle it was, with hot steam charged with the vile fumes of carbolic acid to poison the germs. Good old Hahnemann did a

valuable service to humanity when he insisted upon sanitary conditions (absolute cleanliness) being carried out in the conduct of his system. With clean air, food and water and cleanliness of person, clothing, and surroundings, he anticipated aseptic surgery, but Hahnemann was possessed of the dominant idea of his times, that disease was an obsession by the spirit of Evil. He writes in the Organon (Am'n Translation) "It is only by means of the spiritual influence of a morbific Agent that our spiritual vital power can be diseased, and in like manner only by the Spiritual operation of medicine be restored."

On the advent of microscopic technique, structural change of tissue was given precedence (as opposed to change of function) as the efficient cause of disease. Thus, when *post mortem*, certain structural changes were found, these were assumed to be the cause of the symptom-complex noted during life. A man guilty of physical sins, of excess of food, or of the abuse of stimulants, had in consequence a "bilious attack", though the symptoms of which he complained were evidences of functional disturbance, and called for reform in his way of living. According to the "structuralists" the trouble was laid upon the liver; hence, accordingly he was dosed with calomel, or blue pill and black draught, etc. The symptoms were ut-

terly disregarded as indicating that outrage and injury had been offered the hepatic functions, but when the patient had become a persistent sinner, with cellular and inter-cellular changes in the liver these were said to form the chronic disease called hepatitis, or cirrhosis. The poor liver was blamed for the sins of the "Free Liver"; hence heroic doses of calomel and other "cholagogues" were "indicated." They were frequently given to the limit of tolerance, and the patient died in his sins. ***De mortuis nil nisi bonum.*** The theory of this practice was derived from looking into a piece of ***dead*** tissue that had been hardened by freezing or by immersion in alcohol, and stained by varied dyes, and mounted upon a "slide" under the microscope, and is the pathological concept of disease —the orthodox doctrine in the past, and still almost universally regarded by the profession. Our theories must be comprehensive enough to include all known facts. We must unlearn that Disease is an entity, a ***Materies Morbi*** that must be driven out by drugs.

In the evolution of the human mind and of those conditions of progress that make for the health and conservation of the individual as of the community, Medical Science is seen to be a laggard. The air is rife with every species of cult and school; in the form-

er flourish, Vegetarians, Water Curists, etc. In the latter, the every day orthodox Allopath with his Drug fetish set up for stupid worship; the Hahnemmanian with his Homeopathic shibboleth "like cures like", and innumerable small fry — the Eclectic, the Botanic, the Osteopath, etc.; not to name the "unspeakable" Christian Scientists, Faith Healers, and like spawn of pseudo-science. The most pretentious as the most intolerant is the modern Allopath, who is usually ignorant of the history of the vagaries and contradictions of his craft. He assumes to look after the welfare of the body as the orthodox minister or priest looks after the soul of poor benighted man — the one gives him Galenical drugs, tinctures, extracts, elixirs and other alcoholic concoctions and abominations; the other gives him the "essence of things", theological refinings, creeds, dogmas, mysteries, pious beliefs, ghostly ministrations, and worn out legends of the saints. Science has no part with these. It must of course be conceded that many brilliant names stand out in the canvas of the past who have urged more rational considerations as a basis of healing the sick, (physically and mentally). In the days when the world was young, even jurisprudence stepped in to protect these arrant superstitions by a code of special privileges. True Science needs no such cloak nor staff

to help the inefficient to get bread by the weakness or misfortunes of their fellow beings.

While there is much wisdom to be had from a perusal of the past, much in the history of medicine at one time unquestioned, may with greater advantage be relegated to the oblivion of the "lost arts." Some progress however was made both in anatomy and surgery, but physiology still remained the Cinderella of the sciences. The practice of medicine through the ages has been an empiricism, based upon experience — often a "fallax experientia", a false experience, vitiated by professional bias; upon inference not warranted by the facts; and upon fallacious reasoning, or special pleading to meet the requirements of assumption, doctrine, code or convention.

That we may not be charged with heresy by those who cry all day; "Great is Diana of the Ephesians, for by this craft have we our living," we add the words of a few of the best teachers who have been outspoken in their denunciation of the prevailing beliefs; B. W. Richardson, F. R. C. P. says:—"All the learned professions are bordering on a state of discontinuity. Men and women of all classes are beginning to know and think for themselves without the aid of any professional advis- " "It cannot be denied", says Dr. Ramage, of London; "that the present system of medicine

is a burning reproach to the Profession—if, indeed, a series of vague and uncertain incongruities deserves to be called by that name. How rarely do our medicines do good? How often do they make our patients really worse? I fearlessly assert that in most cases the sufferer would be safer without a physician than with one." Have we advanced since the days of the anatomist, Bichat, who says (Vol. 1. Page 17), "Medicine is an incoherent assemblage of incoherent ideas, and is perhaps of all the physiological sciences that which best shows the caprice of the human mind. It is a shapeless assemblage of inaccurate ideas, of observations often puerile, and of formulae as fantastically conceived as they are tediously arranged."

Look down through the ages. Blood-letting, Cupping, Leeches, the Jennerian Rite, Calomel, purging, sweating, the Opium-Splint for inflammation, the protective Serums of beasts for the poisonous products of germs or "Beasties"—a modern instance of "*Similia Similibus Curantur.*" Of Dr. Bennett is the legend "He fed fevers"; his confreres "starved fever", but the great Scottish Clinician deserved a monument, as he refused to bleed in Pneumonia, and was none too favorable to the whiskey treatment of disease, current in his day, which latter gave place to the German treatment of fever by heroic

doses of quinine, to be followed in turn by the present-day exploitation of the by-products of coal-tar, as if fever and inflammation were forces of evil that must be knocked out by Drugs, hurled at the enemy with a view of dislodging it. Sir William Gull and Dr. Sutton prescribed "Dill Water" with a view of studying the natural course of disease and found that many affections were self-limited; and that the duration of these diseases so treated, was shorter than the case-histories would indicate in similar cases treated *Secundum Artem*.

Both the experimental results in innumerable cases treated by such placebos as above, and the inference drawn therefrom, have led many of the ablest teachers to adopt an attitude of therapeutic nihilism so far as the use of drugs is concerned in the cure of disease. We have to *unlearn* much. The fundamental conception of the living body as a physical mechanism is not compatible with an assumed healing power in poisonous drugs. "The modern conception of the living body, whether plant or animal, as essentially a physical mechanism, is largely the result of discoveries in the domain of physics and chemistry, begun indeed, but not perfected, before the recent century. With the single exception of the change effected by the acceptance of the theory of organic evolution, there

has probably been no modification of human opinion within the Nineteenth Century more wonderful, or more profoundly affecting the general conduct of human life than that in our attitude towards the nature, the causation, and the prevention of disease." Prof. Sedgwick.

The history of medicine is the history of Empiricism. Science demonstrates that both the body and mind of man are the effects of organic evolution; that the physical differentiation having reached its acme in the nervo-motor organism, the final step of ascent must be along the line of education—to perfect health of mind and body, "*Mens sana in corpore sano.*"

For ages the profession of medicine has prescribed symptomatically: Calomel is good for jaundice; quinine for the chills; iron for anaemia; digitalis for palpitation of the heart; bitters for the appetite; opium for pain; aconite for fever, bromide for "nerves" etc. Can we wonder therefore that the laity find "specifics" made-to-hand in the innumerable "patents" for all the ills to which flesh is heir? Let the people once understand by due process of education that ill-health is largely a condition of heredity, environment and their own physical sins; then may we hope that the people in their enlightened self-interest, if from no higher motive will relegate all drugs to the

limbo "innocuous desuetude". We have faith in the Democracy. There is a substantial basis of common sense still as a birthright.

It is not so very long ago that the profession prescribed with the concurrence of judges and statesmen caps of hot tar for the insane; as dull-witted people say; "if it did them no good it did them no harm!" But they were beaten, starved and exposed to cold of days' duration to expel the evil principle of disease. The doctors held the dominant Christian belief "once delivered to the saints" by which an insane person was regarded as possessed of the devil. In a chronicle of those times (a generation ago) we read that many "died cured"—not unlike the victims of Appendicitis, "The-get-you-some-how" of our own enlightened days.

We are passing from the dominance of priestly and medical superstition and the shadow of ignorance and fear into the light of science and Hope.

DEFINITIONS

II

DEFINITIONS

"A sound mind in a sound body" has been the ideal of the wise man in all the ages; and it is a self-evident fact that a healthy mind in a healthy body is the highest physical perfection; and that happiness is the only end or destiny worth effort. Many have worshipped pleasure and beauty—there is a false pleasure and a false beauty—but the greatest pleasure, as the greatest beauty, is of the healthy mind and body. The sage has well said "Look within thyself for the *source of life*, and all else that can bring happiness to thy soul."

The source of life is the Supreme Energy of the Universe manifest in phenomena. Life is an expression of that energy in Animated Nature which reaches its supreme aeme in conscious thought in man. Within us therefore is a divinity—a guiding prineiple for all our actions, thoughts, and words; this is reason; and in this, man is distinguished from the lower animals. Man is a nerve-motor mechanism; that is, man is a

machine in action, where the motive power is nervous energy. The body machine comprehends all the structures entering into its formation, as the bones, muscles, tendons, membranes, ligaments, fibres, glands, organs, tissues, etc, and includes all the parts of the cerebro spinal axis which is now known to be a complex mechanism in itself. Function is an attribute of matter. The whole body, every organ, tissue, or cell has some part or parts to perform in the economies of life: thus the salivary glands secrete saliva, and the functions of the saliva are to lubricate the food in process of mastication, and to convert cooked starch in the food into sugar.

We speak of "the system" as the sum-total of the bodily activities; but there are various "systems," or groupings of allied organs which are subsidiary to a definite functional activity; thus the digestive system (alimentary tract) is concerned with digestion; the circulatory system (heart, arteries, veins etc.) with the circulation of blood; the respiratory system (lungs, air-passages, etc.) concerned in the act of breathing; the excretory system, with the removal of waste products from the body; the muscular system, with movement; the skeletal system, with the framework and structural support of the softer parts of the body; and the nervous system (brain, cord, and nerves) which

presides over, and co-ordinates the functions of the other systems.

The tissues of the body are the structures having a common unit, but which may be found in different situations of the body-machine, as muscular, osseous, glandular, vascular, connective, serous, mucous, fatty, fibrous and nervous tissue. The ultimate element of all is the CELL.

Health is the normal state or condition of the structures of the body and their functions, it is the coefficient of life; the greater the coefficient the fuller is life. "The natural, glowing, energetic fire of health—superb health is seen and felt. It is magnetic. It makes for itself place and following. It is constructive. It is initiative. It is happy. It is humane. It is beautiful. It radiates strength and brightness. It agitates for the good of others. It compels pleasantly to be and to do one's best. Sound health denotes 'pure, active, and strong' blood circulating easily in a body-machine, unclogged with waste products. It denotes the membranes unbenumbed by poisons and readily absorbent. It denotes full reserve forces undissipated by deleterious influences. Sound health means not only vitality, action, intelligence, but correct instinct and long life. As life advances and ripens, true health is always an increasing

quality, for health feeds upon health; indeed, health must be judged largely by habitual tendencies, as they add to or subtract from physiological capital. Most fortunately nature always seeks to develop along normal lines, and struggles against health destroyers." —"The Aristocracy of Health."

Metabolism is a term applied to cell activity—constructive or destructive—going on within the organism. The intake (food and air) undergoes combustion within the tissues, and thus potential energy is transformed into active energy. The balance or equilibrium between the constructive and destructive processes must be maintained for the condition of vitality called health. The principle of the conservation of energy applies; thus the maintenance of the tissues and the resistance of the forces within may be expressed in the form of an equation:—

Food *plus* disintegration of tissues *equals* discharge by excretion *plus* surplus retained.

Disease is a phenomenon of life. Disease is abnormal physiological action. It is the concomitant of digressions from normal states by excess or deficiency. It is the expression of the disordered functions of the mind and body. It is an unfailing and friendly expression of the system to get rid of conditions injurious to the normal functions or structures. Under

the universal law of Compensation, an effort is made by the organism to adjust internal conditions to external ones—the unfailing tendency of the body is towards health. When at last nature fails to make the adjustment by reason of continued irritation or deflection, the balance fails and the result is death. The culture of the mind and body is therefore the greatest of virtues, and is our duty. "Perhaps nothing will so much hasten the time when body and mind will both be adequately cared for, as a diffusion of the belief that the preservation of health is a duty. Few seem conscious that there is such a thing as physical morality. Men's habitual words and acts imply that they are at liberty to treat their bodies as they please. The fact is, that all breaches of the laws of Health are physical sins." (Spencer. "Education.") Physical sin is a waste of energy or a misdirection of energy, often in misguided efforts for well-being and happiness; but as universal law is not variable but constant, so the effects of sin are inevitable, hence, accordingly, regrets are vain;—only the weakling in the struggle for existence asks for plenary grace and the "wages of virtue" in a future life. No fact is more patent than that man's physical salvation is of his own making. He is saved by the assertion of his higher self—"making stepping stones of our dead selves to higher things."

The structures and functions of the body are conserved to a degree by what may be termed the "factors of safety" the result of constant uniform forces. Like the "margin of safety" of any mechanical structure, which is built to withstand twice or thrice the pressure required of it; and which has many safety devices, as well as extra beams or bolts to provide against unusual strain or stress; the 'factors of safety" are maintained (1) by a redundance of elements; (2) by [illegible]. Thus in the body mechanism the principal organs are duplicated (e. f. cerebral hemispheres, lungs kidneys, testicles, ovaries, supra-renal glands, thyroid bodies, mammary glands) where one is quite able and capable of performing the functions; again the secretions of different glands are synergetic, e. g. both the salivary glands and the pancreas secrete a ferment that converts starch into sugar; again there is what is termed the vicarious functions of organs e. g. the sweat glands and the kidneys in elimination of waste matter from the body. There is also an excess of tissue in the asymmetrical organs, e. g. the blood, the liver, the pancreas, the spleen, the alimentary canal, and the heart, out of all proportion to the ordinary needs of the system; but in those tissues where this seeming prodigality of substance is not noted, as the skin, connective tissue, bones, serous and mucous membranes,

and the special senses, there is a hyper-sensitiveness to pain. Pain is the sentinel to safeguard the integrity of the organism. The function of pain is conservative; it is a manifestation of the irritated nerves calling out against a continuance of the forces or conditions that make for ill-health. Without pain there would be no reparation or healing of injured parts by the blood and connective tissues, which is the medium of the cell activity of the blood. There are also many super-added safeguards, e. g. the blood supply and pressure of its circulation; the coagulation of blood after severe hemorrhage; also devices, as in the mechanism and complex apparatus of respiration, supplementing various organs and their functions; in a word, there is stored up in the body-machine most abundant reserves of pabulum-material—surplus and energy to be used for those parts of the organism for emergency, repairs and for restoring and continuing the functions of the body; hence there is a Physiological reason for the saying: "While there is life there is hope."

All repair is carried on under the latent reserve energy of the system, and this energy is directed and intensified by the dominant Will. Without Will the body-machine would remain passive and serve no high purpose whatever. Will-power overcomes resistance, and its perfection of action is in conformity

to law. Law is an expression or generalization for the sum-total of our experiences, as for example, the law of gravitation. The laws of health are of more restricted application. In this study of personal health we need only consider those laws which apply to the phenomena of bodily maintenance and resistance; and those conditions or incidents which make for ascent or descent.

It will be necessary in the course of this study to note the intimate relation between personal or individual health and that much wider and more complex problem of social or communal health. Indeed, we may premise here that many of the problems of personal health depend for their complete solution upon a wise paternalism by the State. We do not subscribe to any sect or "ism," "but seize the truth wherever found—be it heathen or Christian ground."

A general view of the subject of personal health will include a consideration of

Maintenance	(Structural)	Food	Air	Sunlight.
	(Functional)	Exercise	Rest	Training.
Resistance	(Direct)	Mechanical	Chemical	Nervous.
	(Indirect)	Immunity	Heredity	Idiosynerasy
Incidents	(Ascent)	Cleanliness	Order	Temperance
	(Descent)	Dirt	Bad habits	Excess.

These divisions of the subject are of course arbitrary, and are far from presenting that exact classifica-

tion which a full analysis would demand, but are made for convenience of description and explication. Under each caption are included sub-heads and titles, and we would emphasize the interrelation of these details. The above table is offered as a didactic means permitting convenient reference from the text.

The use and application of the terms "maintenance," "resistance," "incident," "immunity," "heredity," "idiosyncrasy," etc., are defined under their chapter headings.

MAINTENANCE

III

MAINTENANCE (STRUCTURAL)

FOOD, AIR, SUNLIGHT

The essential requirements of all organic structures are food, air and sunlight. They are the organic trinity and are interdependent. Food is demanded for the nutrition of the body, air for its oxidation or combustion within the system, and sunlight as the proximate source of light, heat and energy. Air and sunlight vary with elevation, latitude and moisture, which conditions also govern the distribution of the vegetable and animal kingdoms, the source of man's food supply. Maintenance of the body in health is continued by adaptation to these primal necessaries.

Food is the raw product required by the organism; and its quantity is governed by the work done or the energy developed by its utilisation. The proximate principles of food are proteids (nitrogenous), carbohydrates (starch and sugar) and fats, and the elements, water and inorganic salts. Physiologic Chem-

ists have sub-divided these into an almost endless and confusing array. This is mere theorising, and does not enter into the practical application of the problem. Man is not a digestive test-tube, nor is analogy a safe guide in so complex a problem; but experience and reason are the surest guides as to the requirements of the body

"It is undeniable that people find out now, as in the past, when they will take the trouble to investigate their habits, that there are certain broad rules regarding their commissariat-department which, when followed and observed mean happiness and health, and which, equally, when neglected, cause misery and illness to follow in their train. Mankind have always been empirics before they become scientists—and so in a rough and ready fashion, they discovered, as the results of experience, suitable foods and a diet adapted to the special needs and circumstances of life."—Dr. A. Wilson.

Many of the laws of health had been recognized by the great ethical teachers of the world. Wisest of all, the Buddhist looked upon the use of flesh as taboo; and the Mosaic Scriptures enjoined specific and definite ordinances as to clean and unclean animals, and the rites and ceremonies to be practised by the priesthood preparatory of the flesh for domestic use; the

Stoics and Pythagoreans taught and commended abstinence from animal food and wine; and the practical Romans erected a statue to Pythagoras, as the greatest of the Greek philosophers, for while Plato speculated upon the "soul" the proto-type of the "spiritual man" of Pauline theology—these great empire builders recognized in the practical teachings of Pythagoras, that health and sobriety are the very foundation of greatness, both of the state and of the individual. There is much wisdom, too, in the teachings of the Roman Church in regard to seasonal and hebdomadal fasting and abstinence from flesh meat. Thus a quasi-religious sanction was given these rules of conduct, which are for the most part coincident with scientific deduction from known facts and experiments. Like the Trojan of old who was sneered at by the masterful Greek for eating the marrow of the bones of wild animals that he might thereby increase his strength and bodily prowess, his modern counterpart tries to adopt a diet of specific foods for specific requirements. It is a false analogy. Physiological chemistry has definitely demonstrated that the essential elements are the same in both vegetable and animal foods, and that the digestive products are identical. Man is , therefore, capable of conforming to a wide range of food stuff, but in regard to the quantity,

quality and frequency of eating, the laws of health are more insistent, and, although modified by immunity, heredity or idiosyncrasy, still to the transgressor is meted out the penalty of his sin.

"The fattest hog from the sty of Epicurus" was the taunt of the abstemious but cynical Stoic to the philosophy of the enjoyment of life while we have it—the "Carpe diem" of Horace, and I think it was Carlyle who advised "the fat contributor" to divest himself of his surplus adipose tissue and regard the "gospel of work." The excessive use of food, or the use of food as a mere sensual gratification, has been justly regarded as a reproach. A superficial view of comparative anatomy would indeed seem to indicate that man needs a "mixed diet" inasmuch as there is a resemblance of the teeth, stomach, and liver in man to these organs in the carnivora; while on the other hand the length of the bowel and the presence of that vestige of gut of so much importance to the appendectomy specialist is taken as proof that man's lineage was herbivorous, or rather frugivorous as his anthropoid ancestors lived on fruits and nuts.

Whatever the food content may be when disturbed functions manifest themselves in ill-health the first consideration is to "slow down" on the food supplies of whatever quality in order to permit the func-

tions of elimination to rid the organism of waste products clogging the machine. Let me quote here the words of Prof. Huxley: "But whatever the circumstances, if the quantity of food taken exceeds the demands of the system, evil consequences are sure to follow. Overtaxing the digestive organs soon derranges their functions, and is a common and efficient cause of dyspepsia. If the food is not absorbed from the digestive apparatus into the system, it rapidly undergoes decomposition. Large quantities of gas are thus generated. If the digestion be strong and its products are absorbed, an excess of nutriment is thrown into the blood and the circulation is overloaded. If food is not expended in force, the natural alternative is its accumulation in the system, producing plethora and an abnormal increase of fatty tissue. This is accompanied by congestion of important organs, malassimilation of nutritive material, and increased proneness to derangement and diseased action."

We often meet another form of specious reasoning by those who advocate a flesh diet, that by giving food in small bulk there is thought to be a saving of energy in its conversion into products suitable for absorption into the circulation, but the organs of digestion are for the most part a series of hollow muscles and require exercise for their functional activity; and the physician follows

a like process of false reasoning where he orders predigested beef, "beef tea", peptone, etc. to supply the needs of the body during illness, or by the use of artificial ferments with a view of results which the forces of organic evolution laid upon those structures called the alimentary tract, and its complementary organs.

On the other hand Vegetarians have pointed to the vigorous and sturdy race who live beyond the Tweed. The Scot has not to this day forgotten that old Tory, Dr. Johnson, the lexicographer, for his definition of oatmeal: "a crushed grain; the principal food of the inhabitants of Scotland, but fed to horses in England"; to which the best reply is, Where will you find such men or such horses?

In a recent study of the chemistry of porridge as a food, Dr. Watson finds that it has the added advantage over other cereals in increasing the secretion of the thyroid gland in animals fed upon it—rats and guinea pigs were the animals used both in the test and in the control experiment, and hence his inferences must be received with caution; and here we may be permitted to question whether the Scotch are freer from Goitre, Rickets, Cretinism than other races? The use of oatmeal is more properly an instance of selection by the grim necessities of environment. The Scot sends his good mutton to market in order to pay "The Laird"

his rent. So the Irishman foregoes his "meat-and-potatoes" because by stupid and inequitable economic laws he has nothing left but the "potatoes." On the other hand, the English navvy, whose diet consists principally of flesh meat is said to exceed the French peasant whose diet consists principally of vegetables, in endurance. The English navvy is not, however, a very intelligent organism. He wears a cap, as a man's hat is "a world too wide" for him. He is not to be compared to wood-cutters of the Tyrol, who do exceedingly hard work with great expenditure of strength,and whose food consists principally of flour and butter.

Dietetics has its rigid orthodox conformists—those who accept routine on faith, as well as those who accept routine on tradition; both accept the dogma of three meals a day, but if, as Huxley points out, one have no natural appetite for a meal, it is unreasonable to add a surfeit of food while the system is still unprepared to utilize it. Breakfast is, therefore, an irrational meal, except to those engaged for long hours at heavy manual labor; the time which usually elapses till the next meal is not long enough for the system to burn off the super-added raw material.

We are not however dealing with the aesthetics of health just here, but shall study the eternal fitness of

things and the beauty of health later on. In this day of the strenuous life, food is gulped down in masses—perhaps to expedite matters, is floated down with sloppy tea or unspeakable coffee. Take time, my friends. Your lives may not depend upon it, but your health does; and health is of paramount importance and consideration with the wise.

Do we need concrete examples to emphasize the law of compensation? Each violation of this law has its nemesis—a single mistake is not overlooked, but nature is long suffering, and only repeated and persistent abuse of her laws leads to disastrous consequences. The business man who eats two kinds of flesh meat at a meal, and perhaps two or three such meals a day—the young woman who eats [illegible] sandwiches of peanuts etc. between meals; the diner-out who indulges in the festive "salad"; the child who eats a surfeit of "candy" or any other glucose preparation; may indeed enjoy some slight pleasure, but unhappily the consequences follow as night follows day, and headache, indigestion and dyspepsia follow surely in the wake of such infractions, and eventually lead to manifestations of disturbed metabolism and excretion. The business man eventually falls a victim to Lithemia in all its protean forms; the young woman has acne or urticaria, or some other affection indicat-

ing defective elimination by the liver and kidneys, and the vicarious efforts of the skin to remove waste matter from the system; the *Banqueteur* has to reckon with his liver, and in a "bilious attack" pays the penalty of overindulgence, while his par'ner in transgression not infrequently falls a victim of the "get him some how" doctors for what they term "appendicitis" due to the clogging of his bowels with effete excrementitious matter, and the decomposition of the same within the bowels; and the "innocent" babe will hardly escape—so fair, so just, so equitable are nature's laws when properly understood--the poor babe pays a like penalty to the stupidity and invincible ignorance of its guardians.

In all these, suffering nature works overtime in her kindly efforts to eliminate irritating matter from the system in the form of catarrh of the skin, and of the mucous membranes of the stomach and bowels, and of the bronchial tubes. Nature seems to regard our mistakes and errors as due perhaps to inexperience, and holds up these danger signals called ill-health' that he who runs may read, and learn that the body and its care is a sacred trust, that virtue is its own reward, and that reward, Health.

An argument has been advanced that where the productive power, material progress and industrial

enterprise are at their highest, man has adopted a liberal meat dietary, which argument we can readily concede a priori to apply to the mere mechanical machines, the "hewers of wood and drawers of water", like the "makers of bricks" of old, who hankered for the "fleshpots of Egypt." Chittenden and his school after an exhaustive study of this subject, conclude "It is obvious that the smallest amount of food that will serve to maintain bodily and mental vigor is the ideal."

Immunity plays an important role in the use of food, as for example, "colored people" are said to eat "carp", "dog fish", "lunge", "chicken", "hog", and other gross and foul-feeders, with impunity. That many people can, owing to hereditary influence, eat calf's brains and veal, though occasionally they suffer from acute indigestion or epilepsy therefrom. That owing to conditions of idiosyncrasy some persons cannot eat cheese and sardines, or lobsters, or eggsalad or even "Welsh rarebit" before retiring at night! It has been established beyond a question of cavil that the greater part of our ailments is due to excess or indiscretion in our eating. I once knew a good old Catholic priest who cured a girl of epilepsy or falling sickness by tying a ribbon around her neck (not however, to compress the carotids or the vagi), but as a reminder of an injunction not to eat

animal food. The good father knew not how old was the interdict of animal flesh, "but builded better than he knew." The Master Builder, Buddha knew: and Maya, (in Aryan Mythology) the proto-type of the Virgin – she who sits upon the moon with the tiger (the symbol of the blood-thirsty meat-eating-savage) at her feet,offers health transcendent to her votary. But having grievously sinned the great Fetish is appealed to, and the priest of the craft is summoned. His counterpart in Hunterian days, when asked by the father of his fiancee, how he expected to support a wife, pulled out his lancet; those were the days of "blood letting",as these are of the hypodermic syringe.

I once read a book entitled "Till the Doctor comes," a small volume intended for the instruction of the laity. Well! when the Doctor comes, what does he do? As pain is so constantly present in all conditions of injury to bodily structures or acutely deranged function, he probably pulls out his "gun" and gives the patient a full dose of morphine—thus obtunding or stupifying the nerves; but unfortunately this "knocking down of the watchman" only defers the evil day. Let us take a not uncommon case, Ye physical sinner has had his surfeit of "lobster salad" or "devilled crabs" or "Welsh rarebit" or "pickled pork",or any of the other unspeakable abominations devised as FOOD.

The outraged nerves of the stomach offer protest; the musculature of the organ is spasmodically contracted by the irritant mass; "he groans, as a sick girl"; his heart's action is quickened by the violent reaction set up by the system against an unwholesome concretion supplied the digestive apparatus as "raw material"; a cold sweat breaks out—ah, there are "reliefs" and "killers of pain" at hand; he takes some with the only result that an abortive attempt is made at emesis—the while this "Lord of Creation" has his measure of false sympathy!

The Doctor comes; Presto!—a hypodermic of morphine, or morphine and atropine, and the pain ceases. The Doctor tells him he has acute indigestion or gastritis or gastralgia. What is the state of this patient? He is under the care of his medical attendant next day—for a week longer; well, he recovers eventually "in spite of the treatment," but a few such attacks and he falls a victim to chronic derangement of the functions of digestion.

The cure—let the great Cornaro speak. After giving an account of his early reckless life, which left him broken in constitution, and afflicted with dyspepsia, and gout: and the utter failure of medicine to afford relief, except by a constant drugging, he says: "I was resolved to try whether those things which

pleased my appetite were really prejudicial or not to my health; and whether that proverbial aphorism, wherewith gluttons are wont to defend themselves, viz; "That which favors is good and nourisheth," be consonant to truth and reason. Upon trial, I found otherwise; for salads, ice, pork, salt meats, sausages, and the like, notwithstanding they were once very grateful to my palate, yet proved very pernicious to my constitution. Hereupon, trusting more to my own experience, I 'declined' all these noxious things and made a choice of those victuals only which best suited my constitution; and moreover took special care never to rise from the table but with still something of an appetite. This after I had renounced intemperance, I was resolutely bent upon continuing it to my life's end, and O happy for me that I had courage and resoluton enough to attempt it." The cure is courage and will, with a reform from our besetting physical sin.

Defective nutrition is the chief cause of wasting disease; for, while the structural factors of the body-machine, viz; Food, Air, Sunlight are interdependent, the primal necessity of the organism is nutriment. This means, as we have seen, a dietary suitable as to condition of age, occupation, environment etc. Defective nutrition arises largely from two principal

causes: (1) Want of proper variety in the food-content: (2) Improper cooking of food. When the food supp ies are made up large'y of vegetable products a wide range is necessary; thus, a meal of "porridge" may be commended, but two such meals a day continued for some length of time would result in bodily decline of strength and weight. So, too, the flesh user: the "poor farmer" with his eternal pork three times a day or the consumer of beef, day in and day out, or the "boarder" with his invariable "an egg and a cup of coffee," are reduced to a condition of low resistance of the vital forces. Cooking food is an important consideration. It renders the food more palatable, disintegrates the tissue fibres and outer coverings of the food, in permitting access to the digestive fluids; destroys germs and the ova of parasites. A question of proper cooking is also concerned in rendering the food more nutritious. So indeed, a proper and suitable dietary may be regarded as a fine art. It is certainly incumbent upon the State to provide for proper instructions in this art, either in the public school, or in special training schools. The fundamental doctrine upon which a system of public schools is founded is that the state demands that its citizens shall be useful and productive members of the community. It assumes that the individual is the unit of which a "heal-

thy state" is built up. Now the individual is unfit—a loss or waste to the state—who does not possess sound bodily health; and it does not need any exhaustive review of statistics to discover that the Great White Plague is the efficient cause in decimating the population of all civilized communities. If modern observation and experiment have proved anything conclusively, it is that consumption is a disease of defective nutrition; for while we may concede the specific origin assumed by the "germ theory" to be instrumental, these germs find a "happy hunting ground" in an individual of poor nutrition.

It follows therefore that an important duty devolves upon the state in relation to domestic education. The state must realize that it can no longer depend upon the vagaries of medicine, with its drugs and medicaments. Such were to lean upon the Egyptian reed. No more pitiable exhibition of impotency can be found than the medicine-man who pretends to "arrest" consumption with Cod Liver Oil, in fact that other—the primitive medicine-man—who affects to beat out the "spirits" of disease by the beating of tom-toms may have a plausible defence, in so far as "suggestion" "helps some". This favorite "food" for sufferers from incipient consumption, anaemia, adynamia, and other wasting diseases was "Oleum Morr-

hope" —"the sheet anchor" "in chronic lung disease, more especially in the various forms of pulmonary phthisis", and many of the poor benighted laity still pin their faith to it upon the authority of the profession. The unfortunates were fed upon it and "gained weight" and otherwise improved "owing to its contained iodine and other mineral compounds" Nature protested in vain, and made heroic efforts to remove the vile stuff by the emunctories of the body; but failing, stored it up in the sub-cutaneous, and sub-serous connective tissues of the body, but soon found its way into the intercellular tissues, and the victim became a complete "blubber sac." Still the plague grew apace, so the victim was gathered to his fathers.

The public have grown wary of the panaceas of the Allopath, who only yesterday exploited "hypophosphites" to be followed to-day by "glycerophosphates" or the vile and poisonous creosote, after the scientific fizzle of the nineteenth century—the anti-tubercular serum or toxin of Koch. "The dead hand of the Arabian still presses sore upon our practice, and precious weeks are too often lost in trusting to a poly-pharmacy which in some instances would make the heart of Avicenna or Averroes to rejoice. It may seem hard to say so, but my firm conviction is that more tuberculosis patients are injured than helped by drugs."—Osler.

The solution of the problem is one of Social Economics "The world does move." We have better food-laws, and in every enlightened community an abundant public water supply. The State must solve the "housing problem", which means those other essentials of maintenance; Air and Sunlight, either in building houses in the congested districts of our cities, or by a system of "back to the land" for the underfed—the "great submerged tenth", who live from hand to mouth; but above all, these advances must be supplemented by public instruction in hygiene and right living; so that it will be thought of as a disgrace for anyone to be diseased.

But as reforms and altruistic measures make slow head against the current of prejudice and ignorance, we have to offer a measure of Hope to the afflicted. The land is dotted with sanitaria devoted to the cure of this plague, but they are at best but forms of segregation, temporary expedients, of benefit in so far as they train the afflicted in a routine and course of living consonant with the known laws of recuperation and repair. We have much symyathy, however with the German saying "Good food is the best sanitorium in the world." The ancient Cymri, a persistent type in the sturdy Welshman of to-day, worshipped in the open "in the circle of Light."

II. Air. In man the social instinct has become highly evolved in that struggle for existence and supremacy which makes him "Lord of Creation." The social functions of life, (eating, drinking, and being merry) have also been largely modified in the process of selection, and man has long passed the epoch of the cave-men and the lake-dwellers. Not by "fortuitous chance" may man arrive at the best adjustment of these factors which have played such a dominant rôle in his destiny from remote pre-historic times. Nature is indeed more concerned with the conservation of the species, but has placed a burden of health maintenance upon the individual, and woe to him who neglects that trust. But nature has made him concessions—great concessions in the margin of safety, assuming no fixed purpose in her efforts at differentiation. Thus we find that the body mechanisms are provided with factors of safety, the result of constant uniform forces. The "factors of safety" in respiration are (1) The function is involuntary, or only under control of the will to a minor degree; (2) In the air itself (the raw product) there is an excess of oxygen above man's needs; (3) the very increase of the waste product, carbonic acid, excites increased efforts at respiration (dyspnœa) (4) The organs, the lungs and bronchi are constructed on the bilateral plan—with a

tissue surplus beyond the wealth of Crœsus; (5) The muscular mechanism is reduplicated; there is the diaphragm, the costal muscles, and a complete supplementary set for occasions of strain or stress. (6) The gods have given of it abundantly; there is an envelope 45 miles high surrounding this mundane sphere. Air supplies the essential oxygen to the blood which is the medium of the tissue changes in the body.

This further step of the organism in elaborating the products of food-digestion in the economy is called Respiration, as the preparatory step is called Alimentation, and is a union of the oxygen of the air with the products of digestion, with the production of heat and energy, and is comparable to combustion, where the waste product of the change, viz. carbonic acid, is removed by the same medium, by the lungs in expiration. The lungs have therefore a twofold function, of supply for the necessary oxygen, and for the elimination of the waste product, carbonic acid. Atmospheric air contains; in vols. per cent (Kirkes) oxygen 20.96; nitrogen 79; carbonic acid .04; watery vapor and temperature, variable. Expired air represents a loss of oxygen and a gain of carbonic acid of about 5 per cent. Ventilation therefore, or a provision for a change of air in our dwellings becomes an important consideration; for we see that the supply

becomes fouled by use, indeed an excess of carbonic acid in the medium of respiration becomes injurious to the tissue and in extreme degree may cause death. Some advance has taken place in the solution of the problem of properly ventilating our houses without wasteful loss of heat needed for our warmth and comfort.

Our homes are for the most part heated by burning coal or wood or other organic carbon products. This combustion adds immensely to the sum total of the carbonic acid which is exhaled from the lungs during respiration. Science has not yet devised a means for its utilization, by storing it up or reconverting it into new energy, but plant life uses a certain fractional amount. As a waste product therefore it must be promptly disposed of. Scientists have given us a formula for our necessary requirements of fresh air, based upon a renewal of supply at certain periods, and have devised nice instruments for determining the exact proportion of carbonic acid in our apartments. The practical man, however, will not burden his memory with such considerations for good fresh air like health is everyone's right—it is not yet taxed. As for carbonic acid, the most fitting thing is to get rid of it. "Open therefore your windows towards Jerusalem" to permit ingress of air vitalized by the

sunlight, and by opening a door or window opposite, the effete vitiated air will be effectually removed.

Some finical person will shudder at the thought of a "draught", and many good people spend their days in misery of contemplation that they may "catch cold." It is only when the system is over-fed and over-charged with tissue-waste that one "takes cold", which is an evidence of the imperfect adjustment of the system and its functions to external conditions by reason of the increment of descent (making for ill-health), uncleanliness, bad habits and excess.

III. SUNLIGHT. Fresh air and sunlight are almost convertible terms. The toilers in the factories and mills and those confined for long hours in the workshops suffer from "prison pallor", from want of fresh air and sunlight; the dwellers in shaded valleys suffer from Goitre, Rickets and Cretinism. The deleterious effects of the absence of sunlight is seen in the effects of "night-work" upon the toilers who by reason of age, sex, or physical condition are least able to resist injurious influences; and strict legislative enactment should govern in such employment. Out of the fresh air, out of the sunlight, organic nature dwindles and degenerates. No other two factors play so important a part in the struggle for existence. Without proper food, fresh air, sunlight and cleanliness there

can be no sound health. Bravely the body resists, as the soldiers did under the insanitary conditions in camp, only "to fade away and gradually die" of Typhus, Typhoid and Dysentery.

Sunlight is absolutely essential for the forces of the body organism to effect that transformation of energy manifest in chemical (heat), muscular (work), and nervous (thought) change. Without sunlight the blood grows pale, the muscles lax and atonic, the mental faculties apathetic and perverse. Why then delude the sufferer with a false hope, with iodine and arsenic and strychnine, and other rat poisons? Let the afflicted turn to the light as a plant does; let him remember that it is not what he eats but what he digests that counts for health; and that, whether or not one mythical Adam left all the land by equal right to his children, he certainly favored none with a private right to the atmosphere, air is the one thing of which we must be prodigal for health.

MAINTENANCE

IV

MAINTENANCE (FUNCTIONAL)

EXERCISE, REST, TRAINING

Exercise is voluntary muscular exertion. It is thus that the digestive, secretory, and vascular functions are stimulated and quickened. It comprehends play and amusement for the body, and diversion for the mind. Labor is a form of bodily exercise. It differs from exercise in its results; from training, in that the latter is a method or manner of work. Young animals are playful as they grow and develop. "All work and no play makes Jack a dull boy." Work has an element of compulsion, and its results are productive. Thus cutting a tunnel through a mountain, or blasting rock from its surface, or mining coal from its interior, is work, but mountain-climbing is exercise, and very good exercise indeed, for all in ill-health, but from a physiological point they are the same, viz. muscular contraction. Exercise supplies the stimulus for functional activity; the respirations are quick-

ened, the heart beats faster, the temperature is raised from half a degree to a degree; a fuller supply of blood is sent to the brain and stomach, and to the glands of secretion and execretion; the tissue change within the cells (metabolism) is increased; the mental activities are quickened; the senses become more acute and a general sense of well-being follows. However, when exercise is carried to excess, as it often is in games and gymnastic exercises, it simulates a form of unproductive labor. "Carrying water in a sieve" "Making ropes of sand", i. e., causes exhaustion and overwork.

A not uncommon physical sin arising from want of exercise is obesity. The surplus of visceral and subcutaneous adipose arises more frequently from a want of proper exercise than from gross indulgence at table. It becomes a vicious state of the system; and like a bad habit, once established, may render the unfortunate pitiable. With proper exercise the victim may be restored to health.

A man who takes regular exercise is not lazy; while we have lazy workmen and unfit workmen by reason of poor or improper training. For one lazy or unfit workman however, we have a hundred who are compelled by a vicious social system, to a state of degrading servitude, in whom the power of resisting disease is at the lowest ebb This is the industrialism

of to-day, when the workman often labors in insanitary shops and factories—bereft of wholesome air and sunshine, and often too with an unequal division of the fruits of labor. Again the worker in "Sweat Shops", must toil perhaps through the night to make a pittance to keep the body in bare necessaries.

The form of exercise may best be determined by temperament. Man is a social animal and needs amusement or diversion, which supplies exercise for the mind; for otherwise he becomes morose, ill-tempered, discontented, and narrow. He must get away regularly from the dull grind, as an unhealthy attitude of mind re-acts upon the body-machine and renders it a less efficient instrument. Exercise carried to excess leads to strain or stress upon the internal organs, and it must be carefully carried out by those suffering from imperfect mechanism of the circulatory system, as valvular diseases of the heart, or aneurism of the blood-vessels may result therefrom; and the practice of such violent exercise has caused hernia and other structural injuries to the body. In exercise, therefore, moderation must be observed. Take exercise with discretion, as a painter makes a few sketches and flourishes to guide his inspiration. Prof. Marey says; (International Science Series): "The ancients who positively worshipped physical exercise, only

understood it from the point of view of practical experience; they were entirely ignorant of the functions of muscles, but they knew how to turn out a good runner or wrestler." Exercise is an essential structural requirement of the body mechanism, as muscular tissue forms one half its bulk (42% by weight), and water constitutes 75% of this. Further, the important functions of elimination of waste is provided for thereby as about one-half the nitrogenous material of the body is stored in muscle, and exercise is nature's way of removing its excess. There is therefore a physical basis for a system of exercises; but that form of exercise as walking, running, swimming, rowing, boating, skating, which calls for activities of the voluntary muscles to maintain their proper tone—neither excess or deficiency of the water-content, and which acts along the line of natural tendency of bodily development, is best. For the latter reason, certain exercises leading to deformity must be avoided, as mechanical gymnastics, trapese, fencing, or any from of exercise where the effort is localised, other parts of the body not sharing in the work; or where an attitude of the body is maintained by deflection from the normal axis, or by performance of those movements which a man does not naturally practice, and which are in violation to his structural conformity or

carriage. From these forms of exercise result deformed chest, round shoulders, scoliosis or spinal curvature. Imagine one of those old Greeks, "who positively worshipped physical exercise" attending a modern gymnastic display, and we may recall the biting sarcasm of Prof. La Grange: "When we attend a gymnastic display and study at leisure the conformation of the young people who take part in it, we have a certain feeling of disappointment—what! is this then the harmony of form, the pureness of contour, which our Gymnastics should find, like the old Greeks, in the practice of physical exercise? —Examine the antique statues of "Achilles", of the "Fighting Gladiator", and of the "Discobolus", and you cannot help saying that if these heroes were moulded by gymnastics, they must have been gymnastics quite unlike ours."

Let us admit that no one has less the appearance of a demi-god than a performer on the trapese. The vicious defect in these forms of exercises is that they make the arms play the part of legs. However, we have made a long stride from those Evangelical days when Tollmer wrote: "Play of whatever sort should be forbidden in all Evangelical schools and its vanity and folly should be explained to the children with warnings of how it turns the mind away from God and Eternal Life, and works destruction to their immortal

souls", to the days of Kingsley's "Muscular Christianity." Those forms of Gymnastics called *ground* exercises are most beneficial for health, where they are performed in the upright posture, and consist of successive movements of the muscles in flexion, extension, pronation, supination, adduction, abduction or circumduction—involving the joints of the limbs, pelvis and neck. Here the limb does work in proportion to its muscles, thus as one group is fixed the reciprocal antagonistic muscles of extension are coordinately inhibited; and the limb moves only its own weight. No dumb-bells, weights or clubs to strain the tendons which give attachment of the muscles to the bony structure.

Thomas Aquinas, and his school, who were close followers of Aristotelian ethics, enunciated seven deadly sins. Two of these sins are gluttony and sloth; and they are the physical sins of the lithaemic—he of the gouty or rheumatic habit. He eats, gorges himself with nitrogenous food, thus clogging the excretory organs with the waste products of defective tissue change or metabolism, and uric acid accumulates in his blood, or is thrown out into the connective tissues of his body. The chief physiological conditions which lead to an increase of uric acid are (1) Increase of meat diet and (2) diminution of oxidation

processes such as occur in people with sedentary habits. (Kirkes) He will not take exercise in the open Forsooth, it makes too great demands on his system, which he must coddle and conserve! An old English physician, to impress this fact upon a rich old lady, a patient of his, and who habitually indulged in generous food and ale, and old wine "buried in the reign of Tibullus", called her affection "Rheumatism", "room-it-is-ma'm",—the want of physical exercise out of doors.

Lithaemia, or its protean manifestations, includes half the diseases which afflict man. In lithaemic conditions uric acid is thrown out into the connective tissue. This is the most widely distributed of the body tissues. In it ramify the blood-vessels for the nutrition of the body; it surrounds all muscles and nerves, and is the sub-structure of all membranes, as the skin, mucous, and serous membrane; it occurs between the subdivisions of all glands both secretory and excretory. Lithaemia is an unsanitary state of the system, with the million tubes and sewers overloaded with waste products. The bowels or great sewer—the "cloaca magna" becomes overloaded with effete excrementitious matter, and as the bile, "the natural purgative of the body" fails, intestinal indigestion follows, due to the decomposition

within the body of this effete matter at a bodily temperature of 98.5 Far.—"hotter than Africa and more putrid." The biliary tubules are clogged with its vicious presence, and the bile obstructed in its flow is re-absorbed into the system, thus poisoning the blood current, which again re-acts by producing impaired secretion. The kidneys through their myriads of tubules make an effort to remove it, thus the urine becomes hyperacid and irritates the mucous membrane of the urinary tract, often causing nephritis, cystitis, and the deposit of uric acid concretions of calculi. When the blood is charged with it the tension of the blood-vessels is increased, leading to valvular trouble, hemorrhoids, etc. Owing to this increased tension of the blood-vessels there is also impaired respiration, with accumulation of carbonic acid—another waste product, in the system, whose presence further impairs the organic changes called metabolism. The skin, with its millions of tubules or tiny sewers try to remove it, with the result that eczema, pruritus, and other cutaneous affections are manifest by its irritation. The irritation of the nerves is shown in headache, neuralgia, iritis, chorea, sciatica, pleurodynia, muscular rheumatism, lumbago, and a host of other symptoms or affections follow, interchangeable in time and form. The system as a further effort to

dispose of this waste, precipitates it into the serous structures, thus causing pleuritis, pericarditis, endocarditis, peritonitis, and a host of other "itises."

The adenoid or lymphoid structures are prone to become affected by uric acid poison; hence we have tonsillitis, typhlitis, appendicitis, and so runs the vicious circle. This condition is not to be remedied by taking drugs. The nitrogenous food content must be reduced—the patient must forego animal food and alcoholic drinks, and further he must exercise daily in the open.

It may seem a far call from scientific facts to Eastern Allegory. We may however, be permitted to use this paraphrase to fix ideas by an example. We may suppose however, that the sequel to the parable never happened, or that it simply "illustrates a moral and adorns a tale" of how many like the weak King repay a service by base ingratitude and return to their idols like "the dog to his vomit." There once lived a Greek king, who was sorely afflicted with a leprosy, and his physicians had unsuccessfully tried every remedy they were acquainted with, but to no avail. A strange physician arrived at court. He proposed to cure the king's afflictions without the use of either internal doses or outward applications. Then he made a sort of racket or bat, with a hollow in the handle, to

admit the drug he meant to use, (suggestion seems to have been of early use among the craft), but he told the king that he must ride on horseback to the racket or tennis-court; that he must take this bat and play the game. The king did so, vigorously, till his whole body was in a perspiration—the remedy did operate; for we are told "the king then left the game, returned to the palace, bathed, and observed very punctually all the directions that had been given him."

It is difficult to present a composite picture of this protean manifestation of uric acid poison, or rather the poison of defective metabolism of the tissues by reason of which uric acid and other waste products are precipitated, first in one portion of the body and then in another. The character of the symptoms will, however, depend upon what particular organ or tissue the brunt of this toxic product falls. An example may serve to fix the essential nature of a regulated food supply, as well as the need of proper muscular exercise to prevent those changes of defective metamorphosis called lithaemia;—Madam G. of sedentary habits, aged ? (a daughter of Eve) an eater of animal flesh, suffered from frequent attacks of the "blues" had violent "splitting headaches", irritability, lassitude, and mental lebetude. Shall we say of so refined a person that she maintained about her person ("a veritable

dry earth closet") many feet of over-loaded Lowel, and though she took her morning bath or "tub" and used perfume of a delicate aroma;"all was not healthy, all was not sound." Her breath was offensive, tongue coated, she had severe pains and aches of the muscles, "She felt as if she had been pounded." The smaller joints soon became swollen and painful; so the brave woman paid the penalty. Two or three weeks of enforced abstinence and nature restored the balance. She had what is euphemistically called rheumatism—or gout. She would indeed admit the "gouty hereditary tendency", but physical sin? never. Did she return to her sins? Did her sins find her out?

> "They eat, and drink, and scheme, and plod
> They go to church on Sunday;
> And many are afraid of God,
> And more of Mrs. Grundy."

11. REST Rest is essential in the structural maintenance of the body-machine. It is a manifestation of a stage in the rhythmical activities of cells and though it may be preceded by fatigue or exhaustion it is accompanied by *repair*, and constructive change.

Sleep is referable to the involuntary activities of

the body. The functions of nutrition, circulation, respiration, secretion, elimination and reflex nervous action are automatic, but under control of the will as a compelling agent. During health the activities of the brain, heart, lungs are continuous, but a period of rest or cessation must follow voluntary muscular activity.

The human machine can only work intermittingly; after exercise or work, repose or rest becomes a necessity. There is need of repair in a living organism, and it depends upon muscular fatigue. Muscle fatigue protracted beyond the warnings of the system—the factors of safety—(breathlessness, pain or distress) leads to injury of the mechanism. During rest or sleep the formation of waste products is lessened, resistance is lessened within the organism, and thus the balance or equilibrium is restored and provision made for a new expenditure of energy. Sleep or repose is therefore necessary to life and health and the following are its chief effects. The body is at rest, external impressions are at the minimum, and therefore the functions of the nervous system at their lowest; hence, that sub-activity of nervous energy called dreams, where some slight impressions from the senses remain, with a corresponding semi-conscious state of sensation which includes memory, but not the higher

functions of mind as deliberation and determination. The philosophers and mathematicians of ancient Egypt must have had this physical condition of passivity in mind when they placed a chamber within the inner recess of the great pyramid (a symbol of life) to shut out all external impressions; hence, dream-rest—sleep—oblivion. Sleep is normal, for sleep is rest, so far as the body-machine can rest. The heart, the great force-pump, slows down; the bellows, or lungs are less active; the process of combustion, going on within the organism is at its lowest, but the reflex nervous processes governing all these never cease—except in death. The nerves, unlike muscular tissue, are not fatiguable, as their energies are a form of molecular action. Sleep is, therefore, that reduction of molecular activity to its lowest denomination commensurate with vitality. It is not therefore to be confounded with that diseased condition induced by narcotics and hypnotics or other poisonous drugs. Loss of sleep is more damaging to the organism than starvation. Persons have been known to survive a fast of forty days in the wilderness, on shipwreck, or shut up in mines or beleaguered cities, but die, from loss of sleep in a week. Normal sleep is not produced by a poison.

Physical sin, as excess, or bad habits, wrong or wasteful efforts for oblivion, are the chief causes of

Insomnia. What does your medical man do for the unfortunate? He is liberally dosed with narcotics and hypnotics, which soon become a necessity for him, and he may contract the awful habit. Who is to blame? "These great and wise humanitarians", as Stevenson ironically calls these purveyors of destruction to manliness and integrity, are not to blame! "The highest type of humanity is that which does the most to make our earthly home a heaven; the highest worship of God is service to man." (Carnegie) The converse is unfortunately too true. "The lowest type of humanity is that which does the most to make our earthly home a hell; the meanest worship of God is a pretension of service to man."

III. TRAINING.—"We call training a series of practices the object of which is to render a man or an animal, as completely and as quickly as possible, fit for the performance of a given work." (Int. Science Series.)

It is that condition of structure and function which best enables the fit to survive. From very early life, children are trained to eat, to walk, to talk, to write, etc. that they may grow and develop along normal healthy lines. The left-handed is trained in right-handedness. The stammerer or stutterer is taught to talk properly; and the shuffling in gait, to walk.

One set of muscles may be utilized by training as we see in the trotting horse, as compared to the pacing horse, where training is the adaptation of the organism to particular conditions of activity. The special senses are developed by training; indeed, it is axiomatic in physiology that "function makes structure." A noticeable instance of neglect of proper training is in that want of co-ordination of the direct and oblique muscles of the eye, giving rise to the condition called strabismus, or squint. The usual course is to apply spectacles to the poor unfortunate, which soon becomes a habit, and the victim goes through life so handicapped. How the usual frame of window-glass can help the sufferer is one of those mysteries in which the science of optics bears no part.

The power of endurance varies inversely to the resistance of fatigue, and this resistance largely depends upon training. Training in a wider sense is preparation, "semper paratus." It includes the faculties of the mind as well as the bodily functions, getting the best of which we are capable. It begins with the child, but "none too old to learn." There is a continual struggle going on—the struggle for existence, the struggle for health; he who fails is a weakling whom nature cuts off as unfit. Nor will prayers, nor vain regrets nor drugs avail. Our hope is to live near to Nature.

An object lesson in training may be learned from Japan, which has within our own times risen to a first class power. In new Japan, physical training may be said to be a part of the national religion, and is allied to patriotism. The army has been improved to the highest degree of physical excellence through improved hygiene and training; and the recruits show a like improvement through cleanliness, orderly conduct, and temperance, in their general physique and morale.

In our own country the training schools, gymnasia, and extension departments of the Y. M. C. A. have been productive of much good; and even the Sunday schools are taking up the "gospel of physical righteousness"; while conservative Rome lends its patronage to manly sports and competitive games. We are hopeful of this new attitude of the church, for too long the "odor of sanctity" has been the odor of laziness and uncleanliness.

Training therefore is an essential requirement for personal health in order that the individual may rise to his fullest height of capacity for service and achievement.

RESISTANCE

V

RESISTANCE (DIRECT)

MECHANICAL, CHEMICAL, NERVOUS

MECHANICAL.—Normal resistance of the mechanism is the perfect balance of its actions and reactions. In health there is complete harmony of all the functions, so that, resistance is not perceptible to the mind. Indeed the supply and distribution of energy is largely automatic, and when the balance is disturbed there is an automatic effort at repair. The human organism differs from a machine or mechanism in two essential particulars, viz. the power of self-repair and reproduction.—No machine provides for its own repair, much less for the continuance of its kind. Thus, when a limb is broken, the nerves call out by pain commanding the part at rest; the vessels pour out a plastic lymph between and about the broken ends of bone. This lymph becomes organized into a connective tissue; which by the deposit of earthy

matter completes union and restores the continuity of the severed parts. Even here we note the close analogy to mechanical processes; for the callus about the ends of the bone may be compared to the scaffolding about a building in process of construction, and having served its purpose, it is eventually removed by absorption.

The marvellous mechanism of the body, the adjustment of means to ends—the seeming design of all its parts, would, *A Priori*, indicate a great artificer. But we find there has been a gradual evolution of all these parts by adaptation and selection and by many other external and internal physical forces. Volumes of dithyrambics have been expended on the marvels of the human mechanism, and thus by illogical inference an argument for an outside designer or artificer has been deduced. Good old Paley would be startled to think that the Lord did not first make the river-bed and then turn the river on. That insensate river never made that marvellous river-bed? How perfect in maintenance and resistance, how wonderfully adjusted are the incidence of depth, and width and surface in their design!

The heart beats in health 70 times a minute; 2½ oz. of blood pass through at each beat. This means 175 oz. a minute and 7⅞ tons a day. In normal vig-

or, each drop of blood makes the entire circuit of the body in between two and three minutes — a daily trip of 168 miles, through grand canals and endless tributaries. (Henderson.) Physiologists tell us that for the purpose of distributing nutritive material and of removing waste or effete material an eighth of a horse power of energy is daily manufactured. The above figures must necessarily vary as the pulse in health may run in different individuals from 60 to 80 per minute, but they serve to illustrate what is implied by mechanical resistance of the bodily functions and which bear so direct a relation to the stability of the system, but the interdependence of the forces of resistance must always be borne in mind. The chemical resistance of the blood-cells is correlative to the mechanical resistance of the current; and the resistance within the arterioles and the muscular tension of the vessels is thus expressed by Kirkes (Physiology): "The main resistance to the passage of blood through the tissues is situated in the arterioles, and not in the capillaries; this is usually spoken of as the peripheral resistance, and is variable by alterations in the calibre of the arterioles, their muscular tissue being under control of the nerves which are termed vaso-motor." This friction and impedence are factors of mechanical resistance.

In so far as the contraction of muscle is expended upon the bones, there is in the structural mechanism a condition of mechanical resistance, which is manifested in the movements of joints. Here, indeed, a superficial consideration might be inclined to find purposeful design but the movements and sockets of joints all fall within the laws of mechanics, whether the ball-and-socket of the shoulder, or the hinge-joint of the forearm, or fingers. The direction of organic evolution is indeed comparatively plain from a comparison of the bones of the limbs. Part for part is found, but modified through ages of adjustment by adaptation.

The same considerations apply to the resistance in the gastro intestinal or alimentary canal and its various diverticula. This tract, which is about thirty feet in length in man, serves for the passage of food from its entrance at the mouth, and during its elaboration by the various secretions which act upon and transform its elements preparatory to absorption into the system for nutriment, and for the final removal of the waste products from the lower bowel. In this complex mechanism called the "Digestive System", the evidence of adaptation is even more striking than in the "skeletal system", and the factors of safety are many. The greater part of the stomach and many

feet of the bowels have been removed, and still the remaining parts have continued the functions of digestion and nutrition. We must note, however, that many modern surgeons contend that it would be advantageous to remove the vestige of bowel called by the hybrid Graeco-Latin name of vermiform appendix. In fact by a parity of reasoning the whole large bowel should be removed as owing to the vicious habit of meat eating fecal decomposition takes place there causing auto-infection with its train of evils. Why eat the meat? Why not take less meat and more outdoor exercise? No doubt these surgeons are as wise in their generation as those who removed the tonsils, "the watchmen" at the gateway of the "grand canal," as a preventative of quinsy!

> "His breath of instant thirst
> is a warning of a creature matched with
> strife,
> To meet it as a bride, or let fall life
> on life's accursed." ("Earth and Man.")

The breath is the most insistent of the necessaries of the organism. The breath or pneuma, was regarded by Zeno and the Stoics generally as the very principle of life. It may be mechanically regarded as a fluid, which meets with resistance within the organi-

ism. Thus, the stability of the complex mechanism, "the respiratory system" is maintained by the balance of the internal forces to external conditions of pressure, temperature and humidity. A "margin of safety" attends the "factors of safety"; as labored breathing or dyspnea sets in long before the tissues are in actual need of oxygen. With the expenditure of energy of muscular exercise or work, the oxygen of the inspired air is used up in combustion within the tissues, at the same time is produced carbonic acid which acts as an irritant furthering respiratory activity, till breathlessness—another factor of safety—ensues. This interchange of gases in the tissues is a very complex condition of resistance, and many factors enter into its adjustment. True, we are creatures "matched with strife", but with pure fresh air we "meet it as a bride"; nor need we live in underground damp and dark cellars, "which let fall life on life's accursed." Can we not help them? How shall conduct be judged except by a fraternal standard! The principal of adaptation is not incompatible with a high idealism.

II. Chemical.—Chemical resistance is a manifestation of the transformation of energy. Thus the potential energy of the food taken into the body is changed into active energy or force. This is expended in heat and functional activity. Again in muscular contraction

there is a transformation of potential energy of chemical affinity into other forms of energy. This is the principle known as the transformation of energy, i. e. one form of energy may be comprised in terms of another, or in its mechanical equivalent, work. Hence, accordingly there is a co-relation and interdependence of the factors of resistance.

Heat is a form of molecular motion, and is developed within the body during the process of tissue change (metabolism). A part of this heat is transformed into movement. Thus the average (Helmholtz) heat produced in the body in health is represented by 7% external mechanical work; 80% of the remainder is discharged by radiation, conduction and evaporation from the skin, and the balance by the lungs and excreta.

The normal heat of the body is 98.5 Far., which is maintained in health in all conditions of climate—summer and winter; this condition is maintained chiefly by the functions of the skin by evaporation of perspiration, and by radiation and conduction under control of a reflex mechanism of the nervous system. This mechanism regulates and controls the blood supply to the various organs. Thus when the body is exposed to great external heat or as the result of heat developed by muscular contraction, the cutaneous

vessels dilate, a large supply of blood is deflected to the skin where it is cooled by radiation and evaporation. The functional activity of the sweat-glands is stimulated thereby and perspiration is free; conversely in exposure to cold or chill the cutaneous vessels contract, and the blood is determined toward internal organs. If this condition is severe or sudden, there results congestion of the internal organs, but chiefly the lungs and kidneys suffer from the brunt of such exposures.

Fever is a condition of resistance of metabolism in which the temperature of the body is above normal; and the height as indicated by the thermometer is a measure of its intensity. It is a physiological process, an effort of the reflex mechanism to equalize the formation and discharge of heat. Under the pathological theory fever and its concomitant inflammation were regarded as disease. They are conservative efforts of the system at balance and repair. The poor patient was not allowed a drop of water to drink; though as above indicated, the reflex mechanism acts through the functions of the skin for cooling the body; and Brand when he introduced the cold bath treatment for abstracting the surplus heat due to the excessive destructive metabolism of nitrogenous tissue in febrile conditions, was looked upon with a species of horror. Increased

internal resistance shown by increase of expenditure of proteid material is particularly noticeable in Lung Fever (Pneumonia), Pus Fever (Pyaemia) Typhoid Fever (Enteric or filth fever), Intermittent fever (Ague). The practice of the profession has been in the past to "bring down" the fever, and unfortunately the patient's vital force or resistance with equal pace, by heroic doses of antipyretics, as Quinine, Antifebrin, Antipyrine and other vaso-motor paralysants; or by aconite, digitalis, veratrum or other cardiae depressants. The only rational means of restoring the balance is in accordance with hygienic principles; indeed, the treatment of fever is enlightened nursing, and calls for cold affusion, the wet pack, or best of all, the carefully graduated cold bath.

II. NERVOUS RESISTANCE.—Nervous resistance is manifested by sensation, voluntary, and automatic movement. As energy is developed in the peripheral nerve ends in response to an external excitement or stimulus, this is transmitted as molecular motion to the brain by sensory nerves. A stimulus from the brain (voluntary), or from the spinal cord (involuntary) is conducted by motor nerves. The special sense organs are highly evolved nerve-ends, which are connected by sensory nerves with other complex nerve-groups situated in the brain. There are similar

complex nerve-groups situated in the spinal cord with similar connection with peripheral nerve-ends. Transformation of an excitement into sensation or into voluntary movement takes place in the brain; while transformation into automatic motion takes place in the spinal cord, and is termed reflection. The latter includes both reflex motion and secretion, excretion, and other organic functions.

A study of the evolution of the nervous system would indicate that all nervous action was primarily unconscious reflection. A typical reflex action is seen in the pupil response to light, in the closing of the eyelids on the irritation of the sensory nerves of the eye, in sneezing or coughing due to irritation of the mucous membrane of the nose and throat. The organic functions of the body are in great measure actions of this character, as swallowing, peristaltic action, micturition, defecation, parturition, etc. The activities of digestion, absorption, secretion, elimination, etc. are reflex acts, likewise the functions of circulation and respiration. All manifestations of reflection are indirectly under control of the will, and all are more or less subject to direct or indirect stimuli both internal and external; thus a change in the character of the blood may give rise to subjective sensations, as hallucinations, etc., and the emotions play an important

part in the direction of resistance, e. g. a cheerful thought will accelerate the heart's action; and chagrin or fear has been known to inhibit the function of digestion. From the general law of resistance is drawn the deduction, viz.: "From the length of time occupied by the reflex irritant, it is to be inferred that the transmission of the excitement has to meet considerable resistance in the nerve-cells. This resistance naturally increases with the number of nerve-cells to be traversed, so that the transference of a reflex action from a definite sensory fiber to different motor nerve fibers is not always equally difficult, and is the more difficult the greater is the number of the cells which lie between the two" (Rosenthal, "Muscles and Nerves.") It is thus that we explain the "selective" action of poisonous drugs, e. g. alcohol acts primarily on the brain, but a continuance of the irritant causes nervous tremors and debility; and, by further paralysing the forces of resistance, leads up to delirium tremens, in which the voluntary muscles are reflexly agitated, and the sensations perverted by spectral illusions. In accordance with the above inferences, alcohol always acts as an irritant, disturbing the balance for muscular co-ordination, as well as diminishing the power of resistance to cold. Again, opium at first slightly increases the reflex function of the

spinal cord, but soon depresses that function as well as the general sensibilities; and the brain becomes dull, and drowsiness supervenes; but when the irritant is strychnine, the reflex transference is so marked that the spinal cord is early attacked, and violent tetanic spasms supervene upon the slightest touch on the skin, which proves the irritating effect of the drug, especially on the reflex nerve-groups of the cord; and the passage of the excitement to remote motor fibres.

The special senses are arranged on a bilateral plan as "factors of safety." Our knowledge of external conditions is derived through the senses. We know and learn from what we feel, hear, taste, smell or see. The skin is endowed with common sensation, which is present also in the inner organs of the body, namely, the sensation of pain. Pain arises as soon as the excitement or stimulus, which produces sensation exceeds a certain strength. There is evidence that there is a special sense of pain, and this would explain the difference in resistance, and the hypersensibility of certain persons to pain. Pain is also a "factor of safety", and conveys to the brain a knowledge of conditions inimical to the organism. Persons of unstable character—the weary yet restless ones—are prone to seek in narcotics or opiates surcease from pain, and soon become by tolerance habituated to their use.

TOLERANCE.—

"Vice is a monster of so frightful mien,
That to be hated needs but to be seen;
But seen too oft, familiar with her face,
We first endure, then pity, then embrace."

Tolerance is a condition of passivity of the resisting forces of the organism brought about by the continuance of an irritant poison. It is a deflected condition of both chemical and nervous resistance. At first the system makes heroic efforts to remove the foreign injurious product e. g., tobacco, alcohol, morphine, etc. by the organs of elimination, but eventually a vicious circle is set up within the tissues; and the organism labors, handicapped by an enemy, not unlike the old man of the sea of eastern allegory, who encumbered his victim by his presence, and bade fair to perpetrate his tyranny upon succeeding generations.

RESISTANCE (INDIRECT)

IMMUNITY, HEREDITY, IDIOSYNCRASY

IMMUNITY.—Immunity is a condition of the cellular elements of the body-tissues; and is an indirect factor of resistance. This power of resistance pos-

sessed by the body-organism is diminished by uncleanliness, enfeebling habits and excess; and increased by opposing conditions making for ascent. In the event of irritation, or through the invasion of elements inimical to its normal activities, there results a corresponding reaction. This immunity varies with the individual. Liability or susceptibility to ill-health or disease follows from a lowered standard of resistance. It was thought that immunity to infection followed an attack of certain diseases, but this is amply disproved by recurrent attacks of the exanthemata, erysipelas, malaria, diphtheria, etc., not to mention gout, rheumatism, and the score of affections comprehended under Lithaemia.

Many theories have been advanced to account for immunity. The most recent which is really the old Humoral Theory re-vamped, attributes to the cells of the blood and tissues not only a defensive but an offensive power. The white blood corpuscles, or phagocytes are said to act as soldiers, meeting the foreign invaders of the blood current, destroy them, and to be destroyed in turn by the organic products secreted by the invaders.

There are many theories as to HOW this process causes immunity; one of which assumes that there is by supererogation a product left which acts as an anti-

dote to the poison should the enemy attempt future invasion. This is the theory of phagocytosis, which assumes that the leucocytes wage physical warfare with the intruding organisms. Supplemental to this theory we have what is termed the "opsonin theory" or sub-theory, as the "immunologists" failed of practical results.

The word "opsonin" is derived from the Greek, and means "to prepare the feast." Clean washed bacteria (by a singular perversion of sanitary law) are said to be distasteful to the phagocytes; but if the bacteria are treated to the serum of an immune animal then the leucocytes DEVOUR them eagerly!

We do not despair but science may yet be enabled to produce in the body organism a condition of at least temporary immunity, such as has been claimed for protective inoculation against Small Pox.

Indeed there has been devised a preventive inoculation for typhoid, cholera, and plague, and no doubt now that the life cycle of two so-called specific germs has been worked out, we may soon (contrary to good morals) have an artificial immunity against lues! Why not? Have we not the Jennerian rite? Jenner like Athanasius "stood against the world", and ever since the battle has been waged between the medical homo-ousians and homoi-ousians: one party contending

that small pox proceeds from, and is identical with cow pox; the other that they are distinct diseases. We have had, therefore, the day of arm-to-arm inoculation from an original smallpox case by a virus attenuated by successive transmission; but the dualists are now dominant, and vaccination with calf's lymph is the vogue.

It is not to be understood that temporary or artificial immunity is not impossible, and science may eventually solve the problem, but the present procedure is unscientific because insanitary and unclean—indeed, it gives the public a false sense of security, blinding them to the fact that the essential causitive factor of infectious disease is FILTH—a fouling of the air and soil by the products of animal waste and decomposition, polluted water, contaminated milk and unclean food supply.

HEREDITY.—The condition of variation or differentiation of the tissue cells is an indirect force of resistance. Variation is a congenital modification either manifest or potential. It is therefore hereditary and like the other factors of resistance is to a degree under voluntary control. Heredity fixes the type of differentiation. but individual variation is not hereditable. Sexual selection plays a dominant part in heredity. For good health one must consider pedi-

gree; or as Dr. Holmes expressed it: "The foundation of a good constitution begins with our grandparents." That is, our disposition and physical conformation, as well as the disposition of the body cells are transmitted. As disease is only an evidence of perverted functional activity, it is not transmitted; thus, children are not born phthisical, or gouty, or diabetic, or insane, but of course, may be infected by specific poison through the utero-placental circulation.

Environment is the co-ordinate of heredity, and is effective in the individual, by direct adaptation to external influences as locality, climate, heat or cold, humidity, occupation, etc., and in communal or indirect adaptation to social requirements. It is man's duty to preserve his health; it is likewise a duty of civilized communities to maintain those selective influences which maintain the fit from becoming unfit, and which make for full communal life and health. The logical inference from these principles is the maintenance of State schools, Public Sanitation, (Public water supply, baths, food inspection) State housing of the poor in congested districts. This is not Socialism or Communism so called; for, all this being done, there will remain free scope for the exercise of a healthy individualism.

"Without proper rearing, training, instruction, and practice, no child can become, mentally or physically, a fit member of a civilized community. The non-inheritance of acquired habits and customs makes education an absolute necessity of survival in the artificial and complex state of modern social communities.

"Counterparts are required in private to the measures adopted in public, that the pursuit of health may become the habit of the individual and the family, and not merely make itself known by so many public buildings. Public baths and washhouses find their supplement in private domestic cleanliness; the fresh air of open spaces in the improved atmosphere of interiors, public recreation grounds, and gymnasia in the bodily exercise of the individual for the pleasure of maintaining health." (Sykes, "Public Health Prob's.")

IDIOSYNCRASY.—There is a form of indirect resistance of the body and its tissue elements which varies with personality. This is called idiosyncrasy. No two persons are identically alike. The functional activity of the senses of different persons are tuned to different standards. Sensation varies in different persons not only in degree, but also in the time of transmission of the exciting impressions to the brain, but also in the duration of the nervous reflex in motor

activity. Idiosynerasy is closely allied to heredity, and appears to be dependent upon temperament.

At one time all bodily ills were explained by temperament. Thus melancholy was thought to be due to excess of bile in the system; plethora to excess of blood; nervous irritability, to spleen; rheumatism to rheum or catarrh etc. There is however a dominance of some one of the different systems or mechanisms concerned in functional activity. Thus we have an individual, whose vascular or nervous, or digestive system, holds a "primacy among equals."

Idiosynerasies are intensified by breeding; and many practical lessons may be deduced from the experience of the breeders of animals. Certainly those of neurotic temperament (the epileptic, choreic, hysteric, neuresthenic) should not intermarry, as the descent is downward; and this applies to those of fixed habit as the gouty, the rheumatic, the dyspeptic, etc. It is admitted that the same quality in both parents tends to become intensified in the offspring. It must be said however regretfully that sexual selection stands in an inverted relation to our complex social life quite as much as in those "ages of faith" when marriages were "made in Heaven." Superstition dies hard, and a blind fatalism is still strong in human motive. The woman who marries the roué hopes that [illegible], are

given of heaven. This is the law;—Considerations of personal health govern not only our own well being and happiness, but also the physical and mental health of the race.

INCIDENTS

VI

INCIDENTS

CLEANLINESS } DIRT } ORDER } BAD HABITS } TEMPERANCE } INTEMPERANCE }

Certain factors or incidents bear a direct ratio to maintenance; and an inverse proportion to the forces of resistance; thus cleanliness, order, and temperance, by lessening the resistance insure a great efficiency of the bodily functions; and conversely dirt, bad habits and excess lead to obstruction, impairment and decay of these functions.

"Cleanliness" is said to be "Next to Godliness" and certainly cleanliness order, temperance are the three graces, and the greatest of these is cleanliness. Cleanliness means fit and proper food, air and sunshine. It means order of exercise, rest and training, and it means temperance in all things. Cleanliness of food, (which of course includes milk and water) more properly comes under the domain of communal health, but it is necessary to consider here the usual contam-

inations of food. These are dust, germs and parasites, and foreign substances as preservatives. The user of animal food runs greater risks from these agencies, than the user of vegetables. Nor can the user of flesh safeguard himself against them with ordinary precaution of cleanliness. Thus as meat fibre and blood are co-agulated at 160 degrees in cooking them there is formed a dense envelope on the outside offering effectual resistance to full penetration of the heat to the interior, and blood is seen to run out upon cutting. Now germs and their spores, as well as the ova of parasites, found in meat are exceedingly resistant of heat.

Meat and milk readily undergo chemical decomposition and substances called "preservatives", such as salicylic acid, boric acid and formaldehyde which arrest putrefraction, but have a depressing and harmful influence upon digestion, are added in variable amount according to the ignorance or caprice of the vendor—this is a system of "drugging" our food. It should be a matter of State and Civic policy, to regard this in only one light, as criminal, and the severest penalty of the law should be meted out to the culprits. The enormity of this crime will be understood when we consider that milk is of necessity the principal food of children. The mortality of children under five years

of age is appalling — in spite of the able efforts of sanitarians and humanitarians. What must we think of the ghouls who sell dilute embalmed fluid and call it milk? It is only fair that I should mention here that von Behring attributes the spread of human tuberculosis to the use of cow's milk in infancy. It may therefore be some safeguard to boil the milk. Cows like "human cattle" are created by insanitary surroundings, cramped air space, improper food; and, therefore, a correlative problem is presented for State regulations in solving the problem of prevention of tuberculosis.

As fruits and cereals and vegetables are protected by an outside capsule or membrane, there is less risk of contamination from without, still there are certain garden products not without danger; as, lettuce, cabbage, strawberries, mustard, cress, and celery; all these may readily be contaminated by the use of foul water for irrigation or sprinkling. Copious washing in clean water will render such food innocuous. Further we would not have the Vegetarian forget the words of Boileau; "A warmed-up dinner is never worth much" "Un diner réchauffé ne valut jamais rien." Re-heated vegetable products are very prone to undergo fermentation and decomposition in the alimentary tract.

The air is fouled by the products of respiration, and by the effluvia from the skin. Habitual breath-

ing of foul air leads to malnutrition of the body. Dirt or dust in the air is recognized as a most fertile cause of illness. Those in ill-health owing to the great organic waste and disintegration of tissue contaminate their surrounding atmosphere; and, both for this reason, as well as their urgent need of pure air for repairs, the ventilation of their rooms should be a special care.

"Overcrowding" or crowding persons into a space where the allowance of fresh air for each barely exceeds the minimum of existence (1000 cubic feet, equal to a room 10 x 10 x 10 feet); is a factor of ill-health. Thus in rooms, houses, tenements, or public buildings, provision should be made for proper ventilation. This applies to factories and shops where want of sunlight is also an efficient factor for decline of health.

The putrefraction or decomposition of organic substances foul the air and soil; it should be our constant care, therefore, that our habitations are sanitary, with proper ventilation and sunlight, as these are the best disinfectants.

We may even accept Koch so far at least, when he says that direct sunshine destroys tubercle bacilli from a few minutes to some hours, and that even ordinary diffused light produces the same effect. Sunlight and fresh air are our best weapons against infection. Sunlight is the active force maintaining the

purity of the atmosphere, therefore every available means for sunlight contains the possibilities of fresh air.

Dirt (or dust) from refuse or waste of animal excreta carried about by the wind is a source of danger to health, and necessitates urgent precautions against unclean air, or against unclean food; both of which conditions make for descent. Personal cleanliness is a duty; clean bodies; clean clothing; the daily bath are essential for health.

"The Lord let the house of a brute to the soul of a man,
And the man said; "Am I your debtor?"
And the Lord said; "Not yet; but make it as clean as you can
And then I will let you a better."

On the Continent they are making efforts to supply schools with baths and thus develop in young children, a knowledge of the pleasures of cleanliness. In conditions of "over-crowding", cleanliness becomes more and more a necessity. Pubiic baths should be provided by the State; for, while we cannot hope to make men good by legislative enactment, we can supply the means and teach them the needs of cleanliness for health.

The use of the bath is a measure of the enlightenment of a country; but bathing may be carried to ex-

cess, as in the decadance of the Roman Empire, when the public baths formed the loitering places for the lazy and effeminate aristocracy of those days. There are certain rules, therefore, to be observed as to times, duration, frequency of bathing, but these, as well as the form of bath must be governed largely by personal experience or idiosyncrasy. The following general rules however may be laid down for guidance:—

A bath should not be taken soon after a full meal, as the heart's action may be unduly disturbed by the distended stomach, for proper bathing is a form of exercise. It is advisable after taking a hot bath to rest, and some food should be taken before going into a much lower atmosphere; for, should the blood suddenly recede from the skin, it will be directed to the stomach as the line of least resistance; otherwise its recession might produce congestion of the lungs or kidneys. A period of rest should also follow swimming or diving as these are also forms of exercise; and conversly a bath or swimming exercise should not be taken when the body is fatigued. After a cold bath a brisk rubbing of the skin will bring about proper reaction, and a sense of exhilaration and well-being. A bath following severe exercise should be of moderate temperature, owing to the high pressure of the blood-

vessels, and a sudden plunge while the body is overheated is liable to produce vaso-motor paralysis or shock.

Many persons smear themselves over with olive oil or cocoa butter after a bath, as the doctors in the Victorian era smeared their incipient consumptive patients to prevent them "catching cold", or as the Bushman smears his scalp with grease and dirt to prevent him "catching heat!" These "good reasons give place to better" in an age of reconstructive ideals. The skin removes by excretion waste matter from the system; but it also possesses a series of structures called the sebaceous glands or follicles; which secrete an oily substance for the necessary function of lubrication, while limiting the evaporation of the perspiration from the surface. Those persons therefore, whose skin is inclined to be dry and harsh should avoid the use of alkalies, as ammonia, and soda, in the bath, as these substances readily dissolve this natural protecting oil of the skin. Thus the bath is not only a necessity for health but desirable for our personal comfort and beauty; indeed, it is a virtue that certainly makes for cleanliness, which in this case means self-respect.

ORDER. —"He who hath no rule over his own spirit is like a City that is broken down and without walls." (Proverbs.)

Order means good habits of living, regularity; the keeping of good hours to insure rest and repose. Order implies a regulation of the amount of water taken to supply the excretory organs of the body —viz.; the skin and kidneys; and it means regular attention to the evacuation of the bowels. It applies to proper clothing, both in weight and quality, for preventing the radiation of heat from the body, and in adjustment to season and climate, as imperative for the maintenance of health.

Order has been called Nature's first law. There is a stock of energy on hand in the body.—"The margin of safety" to meet emergencies and repairs. This capital is not inexhaustible, and will undergo rapid depletion in all conditions of ill-health; as it is said: "health once lost is not easily regained." There is need therefore of a settled trend of living—this we term Order. It promotes harmony of action and function and makes for ascent. It means, too, that we must take an accounting of our physical capital and resources regularly, so that any divergence or deflection from the normal health may be promptly remedied by sane and judicious methods of life and action.

HABITS. —"Since all the leaves are full
Appointed for this second strain, mine art
With warning bridle checks me."
Dante.

Bad habits are directly contrary to order, and are antagonistic to health. During the growing and developing period there is very unstable equilibrium of the factors of maintenance to the internal forces. It is during this period that bad personal habits work irreparable injury. The remedy is instruction —proper instruction. The youth needs exercise, rest and training, that he may develop a healthy manhood; as he is in the growing period, he needs amusement and relaxation. His training should be stripped of that false modesty which fears to tell him physiological truths. He is not unlike one in primitive times, in the childhood of the race, groping with mysteries of nature. It is not the part of wisdom to keep him too zealously from knowledge which otherwise will come to him pruriently, if not given candidly and sympathetically. When he is properly instructed in the nature and function of reproduction, an appeal to his instinctive manliness is his salvation. Teach him that deterioration of mind and body is the inevitable consequence of physical sin.

Tobacco.—The tobacco habit is a reversion to a lower stage in the evolution of man. The use of some narcotic or stupifying poison is characteristic of the aborigines of all countries. It is an effort to obtund or dull the acuteness of general sensibility through one or more of the special senses. The North America savage used tobacco for this purpose. By its use there is produced a stoicism to external conditions —an artificial immunity, and obliviousness to the immanent relentless need for effort in the struggle for existence.

The Indian smoked his pipe of peace, and passed into a state of passivity. In a higher civilization this insistent struggle is not less immanent and soon the European learned from the Red Man the use of Tobacco.—No doubt tentatively at first as all habits are acquired, from the filthy use of snuff to the Mephistophelan refinement of the Cigarette which dulls and stupefies the sensibilities through two channels—the sensitive taste corpuscles at the base of the tongue and the olfactory nerves in the nose. The Tobacco habit is largely acquired by imitation or example. The case against Tobacco is thus summed up by Savage: (Neuroses): "Tobacco has many enemies and after many battles have been fought it has been shown that it may produce blindness, associated with distinct changes in the optic nerves. I never yet saw a

case of insanity due simply to Tobacco. I have seen aggravation of other nervous symptoms follow its use. I have met with nervousness, indecision, sleeplessness and jealousy, depending on the excessive use of Tobacco. It is more common to find excessive smoking first up-setting the digestive functions and then causing secondarily nervous weakness. Smoking in very young subjects tends to indolence and self-indulgence and may thus be a just cause for producing disordered action or loss of control."

The State should make the sale of tobacco to any youth under the age of puberty a penal offence.

VENERY.—

"He that has light within his own clear breast
May sit in the centre, and enjoy bright day,
But he that hides a dark soul, and foul thoughts,
Benighted walks under the midday sun."

Milton. (Comus 1—281.)

In polite society the subject is taboo; which condones moral iniquities as the guilt of the unfortunate forced to a life of shame by the fierce struggle for existence. The Church "leaves them to the Lord", "whose grace is sufficient for all", with an occasional spasmodic wave of "Moral Reform." This is the reproach of Christianity—the by-word of the Mormon

and the Turk. The greatest work is ever the nearest to hand—but the Churches are more intent in proselytizing each for his puny sect. The heathen who sit in darkness have precious souls. Refined Hypocrisy!, which takes to its bosom the cold reptile with his iodoform and mercury, but casts upon his partner in guilt, the stigma of "unclean."

The fathers of the American Revolution had saner views and enacted as follows for the "plaster Saints" (Med. Record May 1907) "That the sum of Ten Dollars shall be paid by every Officer, and the sum of Four Dollars by every soldier, who shall enter or be sent to any hospital to be cured of the Venereal disease." The solution of the problem is one of social economics. Every case of Venereal disease either in the male or female must be regarded as a menace to public health. Separate "communal" service is not sufficient. They should be isolated like the other "pox" patients.

> "My own hope is a sun will pierce
> The thickest cloud earth ever stretched;
> That, after Last, returns First,
> Though a wide compass round be fetched;
> That what began best, can't end worst,
> Nor what God blessed once, prove accurst."

These were the words of Browning as he stood in the Paris morgue and looked upon the human wrecks

who took their lives in despair. While we must admit that many have sunk through their own fault, who will deny them possibilities for goodness, and tenderness and love! Is one Mary Magdalene to be the redeemed of these millions during twenty Christian centuries! We revolt at the fatalism of Kipling and his school, who teach that

"It was all ordained from the first,"

"Oh Thou who has builded the world,
Oh Thou who has lighted the sun,
Judge Thou of the sin of the stone that was hurled
From the light of the sun—
As she sinks in the mire of the tarn
Even now."

"Social Reform", not less than Public education is a state problem; and the same fundamental consideration applies, viz., the state rises or falls in the scale of nations by the general intelligence and virtue of its citizens. We are hopeful, even sanguine, that with the progress of personal and communal health, the state, "which has done so much of late years to make straight the crooked ways," will find a solution of this problem.

With Browning and Emerson, and Mazzeni, and Tennyson, and Kingsley, and "a host of other witnesses", we have "faith in man", and this faith means conformity to the laws of individual and communal health: Self-preservation is an essential necessity of the State. The state must, therefore, apply the means to eradicate the canker eating out the heart, and sapping the vital energy of Society. For the individual, the essential is character, or the direction of the will, whose cultivation is self-control.

There is the case of the young man between Scylla and Charybdis. He believes that the instinct of nature must have outlet by self-pollution or by prostitution. Telemachus, my son, listen! Truth alone is moral. Hear the words of Wisdom:— "The first step in the control of these diseases is to educate the public, even though this same public is averse to being instructed. The difference in the attitude of an enlightened public toward disease is well illustrated in its progressively improving views as to tuberculosis as contrasted with the absolutely barbaric treatment of leprosy. Education must include information as to the extent and dangers of these diseases. The laws of sex and life be taught them early, before the sexual passions appear. Children must know about the physiology and hygiene of sex. They must learn to

control these passions and be told the grave dangers of excesses. Young men must be taught how to live according to the laws of health. The surest prophylactic measure is to teach and promote continence. It is not true that sexual intercourse is necessary to the health of a man, nor that man has any natural right to gratify these appetites. Continence is compatible with the best health of mind and body. No woman has any reasonable right to believe that the marriage ceremony will transform a polygamous man into a monogamous partner. Thousands of virtuous women suffer untold tortures because of this differing standard between men and women." Dr. Morrow. (Journal A. M. A. p. 44.)

NARCOTISM.—Narcotism or the use of opium, morphia, cocaine or other drugs is a crying evil—and which of these have not been initiated into the vile habit by narcotic drugs being prescribed for them? The panacea of the practitioner is morphine—tell me what ill your Doctor does not prescribe it for? Its contra indications to him are few and far between. The poor weak victim soon learns to buy it for himself or herself, and this begins the downward descent both of mind and body.

Two English men-of-letters Coleridge and De Quincey have given us graphic descriptions of the fell

effects of the habitual use of laudanum, which is an alcoholic tincture of opium, from which is also derived the alkaloid morphine. "Laudanum" was looked upon as a boon by those to whom life seemed not worth living, being oppressed by a blind and dark fatalism. Two whole nations, the Turks and Chinese, whose attitude of life is fatalistic to stagnation, have fallen victims to the very general use of opium. England is not without reproach in the compulsion exercised upon China to permit the importation of Indian opium; but there is much promise for the future, by force of public opinion in England for reform; as well as by the recent prohibitory enactments of the Chinese Court.

The system seems gradually to accustom itself to the use of narcotics, and by tolerance the quantity taken must be increased to produce the stupifying effect. Farquharson, in his text-book on therapeutics sounds this warning-note: "We must be very careful to warn our patients from time to time of the absorbing nature of this practice, and of its enervating effects on mind and body." p. 354. The modern doctor has an ingenious little instrument which enables him to inject morphine beneath the skin. This instrument is his *Vade Mecum*. "Blood letting" is no longer tolerated by an enlightened public opinion, nor

will it tolerate the "hypodermic" when it becomes seized of the deleterious effects of drug-injections upon the normal recuperative power of the body, not to speak of the deplorable effects of self-indulgence often induced by its use.

Both Coleridge and De Quincey freed themselves from the slavery by the power of will. De Quincey says: "I triumphed, but think not that my sufferings were ended." The sufferings become less and less with a manly hope and courage. The fixed resolve triumphs over the crave, the agitation, the throbbing, and writhing of the system. Beware the use of one drug to cure the effects of another drug, the transcendent will alone can save.

Dante, the divine poet, the great Master Craftsman, saw in his vision of Hell the words: "All hope abandon Ye who enter here." (Inferno IV. 42) It was but the reflex of the disturbed mind within, the thought of a mediaeval age—when a material hell was the almost universal belief. There is hope; man's will may remain dormant, and his body and reason lethargic under the baneful influence; but while life remains there is hope. None fails but he who gives up.

TEMPERANCE. "Evolution ever clinging after some ideal good, and Reversion ever dragging Evolution in the mud."

Passions, as anger, lust, depraved appetite for food or drink, unmanly fear, superstition and cowardice, must be over-ruled by Power of Will, and a lofty ideal, "A sound mind in a sound body", cultivated. These passions and appetites are the most potent cause of deflection from the state of health, as they debase the mind, which in turn reacts upon the body. The man who gorges himself with food differs only in degree from him who drinks alcoholic beverages to excess; and he who allows by anger or lust his animal instinct to rule his actions, is but a reversion to the wild beast. Fear, superstition and cowardice can only be eradicated by sound education. An ideal of some kind is necessarily possessed by every person, but means must be adopted to enable a fit ideal to be formed.

> "For rigorous teachers seized my youth,
> And purged its faith and trimm'd its fire,
> Showed me the high white star of truth.
> There bade me gaze and there aspire."

Fear, superstition and cowardice is the heritage of those days of darkness when events were gauged by

the planets, or the entrails of animals; and when plagues and pestilence were thought to be due to divine wrath, but Science sees in every effect a commensurate cause, therefore we are enabled to govern our lives by definite hygiene laws, as well as to foresee the result of known causes—and thus prevent the onset of disease.

INTEMPERANCE. (Excess.)—Intemperance or Alcoholism is the chief downward agency for ill-health, not only for personal ill-health, but for the ill-being of the community. It bears an indirect relationship to poor food; thus poor food causes a poor physical bodily state manifest in dyspepsia, which alcohol seems to temporarily relieve, as well as stimulate the bodily functions. The weakling in the struggle for existence falls a victim to alcohol, as an expedient to sustain the vital energies in the battle. It is not a source of energy, as energy comes only from healthy normal activity, As we have seen healthy activity is dependent upon the nutrition of the tissues, by which the balance of the factors of resistance is sustained. It is time therefore that a person of poor resistance, and especially of poor indirect resistance by reason of poor immunity, heredity or temperament, be wary in his use of alcohol. Alcoholism not only reduces the personal health of its victim, but is the most fertile cause of crime. It be-

comes then the duty of the State to regulate or inhibit the sale of this poison, and the Vendors should bear a liability to the State.

It is said that the history of civilization proves the need of some artificial stimulant; that therefore the use of alcohol in some of its forms as wine, beer or whiskey is almost universal among Western peoples. It is an abuse of language to call alcohol a stimulant; it is a chemical poison to the cellular elements, and leads directly to degenerative change within the organism. To assume that because Alcoholism has been a concomitant of civilization, it stands in a causal relation to that civilization is to confuse cause and effect. A study of the philosophy of history conclusively demonstrates that it does not make for progress; and that it has been a noticeable incident in the decay of nations and peoples. To the individual to whom personal health is of paramount importance Alcoholism is the "Foundation of Death."

There is hope for the alcoholic, for him who seeks surcease from the strain and stress of the battle of life in the delusive cup. Alcoholism is but a condition of lowered resistance, and is not to be remedied by the double chloride of gold, mitroglycerine, atropine, strychnine, or other drug poisons. The cure is in the

Will—the dominant Will. He should consider first the order of his living. If he cannot adjust himself to his environment he may adjust his environment to him, by good food and sunshine, by proper exercise and rest, and by the avoidance of the occasion of sin.

"Interpose at the difficult minute, snatch Saul the mistake,
Saul the failure, the ruin he seems now—and bid him awake
From the dream, the probation, the prelude, to find himself set
Clear and safe in new light and new life."—
Browning (Saul).

The Lithaemic is particularly liable to yield to the crave for alcoholic stimulants, which by restraining the elimination of waste products by the kidneys, and by deranging the hepatic function add fuel to the fire, that is increase the factors that lead to their abuse. Further, a meat diet, a usual precedent of uric acid poisoning and antoinfection by increasing the urinary acidity increases the craving for Alcohol. The tone of the will is lowered, and the physical and intellectual balance disturbed. The Lithaemic is of mercurial temperament—subject to lofty flights of fancy, but also of sudden fits of profound depression. The

Lithaemic is not one who can take alcohol in any form without direct impairment of function. He is especially liable to the narcosis—the depraved desire or craving for oblivion—which usually ends in drunken debauch. There must be no compromise, your manhood is at stake. There is a profound philosophy for the Lithaemic in the Delphic adage "Know Thyself." Know that the only effectual and lasting cure is in thy own Will. Take no form whatever of Alcohol. Do not be deluded by moderate use. Eschew animal food; take exercise in the open air, in the sunlight, —fight off the crave—and the Will is Victor.

CONCLUSION

VII

CONCLUSION

WILL, HAPPINESS, SUCCESS

I. The Will.—In the last analysis, the doctrine of free will and determinism are not so far removed; indeed, the supporters of the former are a kind of "higher or heavenly utility" men, as opposed to general utility. St. George Mivart—an orthodox champion of the former doctrine (or at least orthodox before he ran foul of the Church in his "Happiness in Hell") writes as follows in his book "Lessons from Nature": "If there is such a thing as morality, it is beyond comparison as to value with mere intellectual culture or capacity, and it necessarily follows that a poor paralysed old woman sitting in a chimney-corner may, by her good aspirations and volitions be repeatedly performing mental acts compared with which the discovery of Newton of the law of gravitation is as nothing." (Chap. 13. p. 381.)

Her "aspirations and volitions" are as naught with the Eternal Energy; but were to some purpose when directed in determined effort to stimulate Hope in the restoration of health. "*Good* aspirations and volitions" is mere "parrot talk", intelligible if the Lord sustained us for His own glory or caprice as a bird in a cage, which beats itself against the bars of its prison. If this poor old woman is paralysed of will, she is paralysed indeed; but so long as she has a modicum of energy of will, she is not poor. Indeed, were her "aspirations and volitions" directed towards the affected limb by dominant effort of will, the recuperative power for repair may be stimulated thereby.

How can an impulse of will reach the paralysed member, when the conducting medium of its energy is injured or destroyed? Here we must recall the wonderful provisions for regeneration, recuperation, repair, and restoration of continuity of the nervous system, which have been termed "factors of safety." First, we infer from its effect that an impulse of will is not unlike the molecular energy of an electric current. There is no structural difference between motor and sensory nerves; indeed, there are sensory nerves which carry inhibitory motor stimuli, and there is evidence of transference of energy from sensory to motor nerves: further, Paul Bert by a series of brilliant ex-

periments proved that nerve fibres possess functional self-repair, and that under certain circumstances, the same nerve will conduct an excitement from the periphery to the center, or by reversion.

Among the "factors of safety" are means for restitutions and vicariation. The group-cells or ganglia of the brain and cord controlling the transformation of energy are doubled in many cases; and other centers may assume the work of the lost or injured ones: further, there are dormant centers in opposite hemispheres which the will may arouse to their new mission of functional activity. The Will which is resigned to accept the paralysis as "a visitation of Providence", or perhaps, "a trial of faith", and hence "a means of attaining grace", is indeed passive, nor need "kick against the pricks", and may morally "repeatedly perform mental acts compared with which the discovery of Newton of the law of gravitation is as nothing."

There is however not only an analogy between energy of will and electrical energy, but we have direct experimental proof of the power of will to generate an electric current, a most potent factor in the performance of movements. That great scientist E. du Bois-Reymond showed this in the following way. (See Frontispiece). The ends of a multiplier or galvanometer are connected with two vessels filled with li-

quid, and the index finger of both hands is dipped in these vessels to obviate the possibility of contact-currents, and when all possible sources of error are compensated for, when the man strongly contracts the muscle of one arm, the result is an immediate deflection of the multiplier, which indicates a current ascending in the contracted arm from the hand to the shoulder. If the muscles of the other arm are contracted, a deflection occurs in the opposite direction. We are, therefore, able by the mere POWER OF THE WILL to generate an electric current and to set the magnetic needle in motion. (Rosenthal)

The will is the exciting cause of movement and the movement is always produced with a vigor proportioned to the exciting cause. A muscle will remain inert or passive if we endeavor to make it contract by means of too feeble an electric current; and, similarly, it will be incapable of action if stimulated by too feeble an impulse of will. The will may be stimulated by Love (perseverance) and Hope (cheerfulness); but it is inhibited by Superstition, and paralysed by Despair.

The power of will has been termed the "influence of mind over matter". This potent and effective influence is now,through the research of experimental psychology, steadily reaching the place of first importance as a healing factor.

A cursory glance at history shows what a dominant part phychic influence has had as a therapeutic agent. We recognize the grain of truth in the chaff of error, for unconscious mental suggestion plays no inconsiderable part even in Messianic times, as we note in several cures e. g. she touched the hem of his garment and was healed. The same influence has been potent through the ages, but by an inversion of cause and effect was referred to a supernatural agency. Thus we have cures referred to relics, images, icons, incantations, imposition of hands, sacred wells, rivers and shrines etc.; indeed, the efficacy of the King's touch is still maintained in many districts in England. Psychotherapy or mental healing recognizes the fact that abnormal manifestations or "disease symptoms" may not only be influenced, but cured by appeal to Will. This psychic influence has been dimly discerned in the past, and accounts for the success of the miracle worker of mediaeval times; as, indeed, the "Faith Curist" and "Christian Scientist" of our own day. One is prepared to admit that this influence may have been instrumental in curing the Dowieite; though, of course, the element of self-deception must be taken into account, where the influence is thus referred to a supernatural cause.

Healing or curing is in accordance with unchangeable laws, and is not in the order of "Special Providences." When the Will is passive, physical law governs; when the Will is dominant, psychic law governs. Within the "house of the brute" is the real man himself—the thinking, determining, controlling Master—The Will.

It is conceded that the healing power is in the body itself, which has been expressed epigrammatically by the proverb; "Nature does the healing, but the Doctor takes the fee." Can we help Nature? Yes; by a better adjustment of our external relations, or environment; or by a better adjustment of the factors of maintenance to the forces of resistance, i. e. of the intake to the products of elimination; but principally by governing our lives in accordance with hygienic laws. The power of control—"the governing power" is the personal human *Will*.

The mists of faith, and the fogs of speculation have gathered about this word "Will." Thomas Aquinas referred the supreme principle to the intelligence; while his great opponent Duns Scotus held the dominance of will as determinant—doing, and therefore ultimate. The Will does. This, expressed in modern scientific terms means that there is an Energy

within, which has its seat in the brain, but is not a function, or secretion of the brain. This energy is the conscious power of Will. We know the will, as we know other mental phenomena, by its effects. Mental processes are all built up of simpler ones; and al find an outlet in motor activity or muscular action, and culminate in the purposeful action of Volition. "It is conceded that *volition* or the act of will produces a molecular disturbance in the cells of the grey matter of the brain, and that this disturbance passing along the nerve fibres is communicated to the muscular fibres." (La Grange) That is, human thought is not generated by the brain, but is a form of energy of which the brain is the instrument. Will-power overcomes resistance, and thus modification of function is subordinated to power of will; and the activities for repair are carried on and intensified by the same power.

Pain is a sensation due to nerve irritation, and is conservative of the bodily structures. Pain calls for rest so well demonstrated by Hilton, in his Classic Work "Rest and Pain." There is indeed accumulative evidence that the body is supplied with special nerves which convey to the brain warning impressions of injury or irritation, which by transformation into conscious sensation we call pain. Pain is

therefore a physiological process essential for the preservation of both the individual and the race. This is the mystery of pain, which theology failed to reconcile with the concept of an all-wise and good artificer outside the mechanism.

Life is a differentiation of the Eternal Energy from within. This supreme energy is manifested in conscious thought in man.

"The preservation of health is a duty" for duty is of the Will, which is concerned in conduct or doing; and the moral man is he who regulates his life in accordance with the Laws of Health.

"'Tis in ourselves that we are thus or thus. Our bodies are gardens; to which our wills are gardeners; so that if we will plant nettles or sow lettuce, set hyssop and weed up thyme, supply it with one gender of herbs or distract it with many, either to have it sterile with idleness or manured with industry, why, the power and corrigible authority of this lies in our wills. If the balance of our lives had not one scale of reason to poise another of sensuality, the blood and baseness of our natures would conduct us to most preposterous conclusions; but we have reason to cool our raging motions, our carnal stings, our unbitted lusts." (Shakespeare)

We are now face to face with the crucial test of these things, which in the last analysis is a personal one. Our purpose has been an educative one; one of persuasion by appeal to reason, that the first principle of health is virtue; and that we must govern our [illegible] in accordance to law—physical, unchangeable, but fair and equitable law; and that happiness itself is, without doubt, a conformity to law.

To the afflicted, and to the weak we hold out Hope—and Faith, and Love; but these are not divinities to be personified and worshipped; they are our own emotions; the Deity within is the dominant Will, which alone can make us whole.

11. HAPPINESS.—Upon health depends happiness, and as we have seen the basic prineiple of health is power of Will—Happiness is the end or destiny of man and the greatest happiness is attained by eontinuous effort at self-perfection, and by our conscious usefulness to another, or to the State.

By will we obtain mastery over bodily infirmities, and self-control of our passions and appetites. All external objects are phenomenal, i. e. are to each individual of his own consciousness. The philosopher Epictetus said when threatened by chains and prison: "You may put my body in prison, but my mind not even Zeus can overpower." That is, what e'er befall is but the nature of ourselves. There is a spark within which neither Zeus nor all the gods can extinguish; and this gives the individual man his true place in Nature.

Happiness as a motive for health culture is not selfish, but altruistic; as the complete man—mentally and physically—is the fit man. As Emerson says: "One worthy man lifts the standard of the community, and to imitate him makes life gladder and more wholesome." As Health and Happiness is man's birth-right, so the miseries of life result from our physical sin or defiance of Nature's laws.

Temperament plays an important part in our attitude toward life (I am my own only when I am master of myself.) True, there is light and shade in our lives, as in all nature. The shadow is but a negation. The normal man will not basely slink into it. Human life is truly a struggle, but yet a splendid campaign. The brave, (optimistic) man goes forth in the battle with the dominant note of Hope in his life—Song. He has an abiding faith in himself—in his own Will Power. He knows that his duty is health, and the betterment of Humanity.

"Therefore I summon age
To grant youth's heritage,
Life's struggle having so far reached its
term:
Thence shall I pass, approved
A man, for aye removed
From the developed brute! a
God though in the germ."

III. Success.—The latter-day pessimistic philosophy of Schopenhauer epitomized by the line from Pope's Essay on Man; "Man never is but always to be blessed." finds expression in the minor key of failure. Success is of health and those factors making for a normal useful life. Why impute the fault to inherited tendencies or susceptibilities or original sin? It is a confession of pitiable weakness. We may even admire Milton's "Devil" who said; "to be weak is miserable doing or suffering", but the plaint of the Persian pessimist is intolerable to men of good, clean, healthy blood and tissues:—

> "Oh Thou who dost with pitfall and with gin
> Beset the road I was to wander in
> Thou will not with predestination round
> Enmesh me, and impute my fall to sin?"

Such a man needs a change of environment. He needs proper food, fresh air, sunlight and exercise to restore his nerves and renovate his moral conduct. There are other claims upon him than Self—he must tone up his outlook upon life by an improved Will-Power. There is no "Pit-Fall" for him who walks in the Light, and if he will drink "Gin" then must he bear the "hob-nailed" liver of the Reptile. There is no predestination; and no free Will. A man may bend his fingers by power of Will in accordance with physic-

al law, but he cannot voluntarily make them exchange places; and were they injured he may still bend them by power of Will in accordance with Psychic Law.

Schopenhauer and his disciple Nietzsche taught a gloomy pessimism from an inverted view of Human Will. To them human life and destiny is an insistent misery; the only relief from which is utter annihilation. The picture of life they draw is all shadow "darkness visible", without perspective,—a Rembrandt with a nightmare, due to mental aberration or deflection. It is unhealthy, morbid, decadent, false and therefore immoral.

I appeal to your own consciousness;—

"For who to dumb forgetfulness a prey,
This pleasing anxious being e'er resigned,
Left the warm precincts of the cheerful day,
Nor cast one longing, lingering look behind."

Truth of every kind is moral; the duties and healthy activities of life are the true test of happiness.

"The grave, where sets the orb of being, sets
To rise, ascend, and culminate above
Eternity's horizon evermore."

Have some object in life. Have some interest in creating and furthering State institutions for the

betterment of your fellow men, then as your own life progresses from interest to interest, from enthusiasm to enthusiasm, from one stepping-stone to a higher one, you can at last "Ad Animam" say: "O Grave! where is thy victory? O Death! where is thy sting?" Let us govern our lives by the divine will within us, without doubt or hesitation, hopeful, open-minded and so grow beyond the bounds of finitude, on through the new adventure which lies beyond.

"And I shall thereupon
Take rest, ere I be gone
Once more on my adventure, brave and new;
Fearless and unperplexed,
When I wage battle next,
What weapons to select, what armour indue."