Manhood of humanity

Alfred Korzybski

MANHOOD *of* HUMANITY

The Science and Art of HUMAN ENGINEERING

BY

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CONTENTS

APPENDICES

MANHOOD *of* HUMANITY

CHAPTER I

INTRODUCTION

METHOD AND PROCESSES OF APPROACH TO A NEW CONCEPT OF LIFE

> "For a while he trampled with impunity on laws human and divine but, as he was obsessed with the delusion that two and two makes five, he fell, at last a victim to the relentless rules of humble Arithmetic.
> "Remember, O stranger, Arithmetic is the first of the sciences and the mother of safety."
>
> BRANDEIS.

IT is the aim of this little book to point the way to a new science and art—the science and art of Human Engineering. By Human Engineering I mean the science and art of directing the energies and capacities of human beings to the advancement of human weal. It need not be argued in these times that the establishment of such a science—the science of human welfare—is an undertaking of immeasurable importance. No one can fail to see that its importance is supreme.

It is evident that, if such a science is to be established it must be founded on ascertained facts—it must accord with what is *characteristic* of Man—it must be based upon a just conception of what Man

is—upon a right understanding of Man's place in the scheme of Nature.

No one need be told how indispensable it is to have true ideas—just concepts—correct notions—of the things with which we humans have to deal; everyone knows for example, that to mistake solids for surfaces or lines would wreck the science and art of geometry; anyone knows that to confuse fractions with whole numbers would wreck the science and art of arithmetic; everyone knows that to mistake vice for virtue would destroy the foundation of ethics; everyone knows that to mistake a desert mirage for a lake of fresh water does but lure the fainting traveler to dire disappointment or death. Now, it is perfectly clear that of all the things with which human beings have to deal, the most important by far is Man himself—humankind—men, women and children. It follows that for us human beings nothing else can be quite so important as a clear, true, just, scientific concept of Man—a right understanding of what we as human beings really are. For it requires no great wisdom, it needs only a little reflection, to see that, if we humans radically misconceive the nature of man—if we regard man as being something which he is not, whether it be something higher than man or lower—we thereby commit an error so fundamental and far reaching as to produce

every manner of confusion and disaster in individual life, in community life and in the life of the race.

The question we have, therefore, to consider first of all is fundamentally: What is Man? What is a man? What is a human being? What is the defining or characteristic mark of humanity? To this question two answers and only two have been given in the course of the ages, and they are both of them current to-day. One of the answers is biological—man is an animal, a certain kind of animal; the other answer is a mixture partly biological and partly mythological or partly biological and partly philosophical—man is a combination or *union* of animal with something supernatural. An important part of my task will be to show that both of these answers are radically wrong and that, beyond all things else, they are primarily responsible for what is dismal in the life and history of humankind. This done, the question remains: What is Man? I hope to show clearly and convincingly that the answer is to be found in the patent fact that human beings possess in varying degrees a certain natural faculty or power or capacity which serves at once to give them their appropriate dignity as human beings and to discriminate them, not only from the minerals and the plants but also from the world of animals, this peculiar or characteristic human faculty or power or capacity I shall

call the *time-binding* faculty or *time-binding* power or *time-binding* capacity. What I mean by time-binding will be clearly and fully explained in the course of the discussion, and when it has been made clear, the question—What Is Man?—will be answered by saying that man is a being naturally endowed with time-binding capacity—that a human being is a time-binder—that men, women and children constitute the time-binding class of life.

There will then remain the great task of indicating and in a measure sketching some of the important ways in which the true conception of man as man will transform our views of human society and the world, affect our human conduct and give us a growing body of scientific wisdom regarding the welfare of mankind including all posterity.

The purpose of this introductory chapter is to consider certain general matters of a preliminary nature—to indicate the spirit of the undertaking—to provide a short course of approach and preparation—to clear the deck, so to speak, and make ready for action.

There are two ways to slide easily through life: Namely, to believe everything, or to doubt everything; both ways save us from thinking. The majority take the line of least resistance, preferring to have their thinking done for them; they accept ready-made individual, private doctrines as their own and

follow them more or less blindly. Every generation looks upon its own creeds as true and permanent and has a mingled smile of pity and contempt for the prejudices of the past. For two hundred or more generations of our historical past this attitude has been repeated two hundred or more times, and unless we are very careful our children will have the same attitude toward us.

There can be no doubt that humanity belongs to a class of life which to a large extent determines its own destinies, establishes its own rules of education and conduct, and thus influences every step we are free to take within the structure of our social system. But the power of human beings to determine their own destinies is limited by natural law, Nature's law. It is the counsel of wisdom to discover the laws of nature, including the laws of human nature, and then to live in accordance with them. The opposite is folly.

A farmer must know the natural laws that govern his wheat, or corn, or cow, as otherwise he will not have satisfactory crops, or the quality and abundance of milk he desires, whereas the knowledge of these laws enables him to produce the most favorable conditions for his plants and animals, and thereby to gain the desired results.

Humanity must know the natural laws for humans, otherwise humans will not create the conditions and

the customs that regulate human activities which will make it possible for them to have the most favorable circumstances for the fullest human development in life; which means the release of the maximum natural-creative energy and expression in mental, moral, material and spiritual and all the other great fields of human activities, resulting in happiness in life and in work—collectively and individually—because the conditions of the earning of a livelihood influence and shape all our mental processes and activities, the quality and the form of human inter-relationship.

Every human achievement, be it a scientific discovery, a picture, a statue, a temple, a home or a bridge, has to be conceived in the mind first—the plan thought out—before it can be made a reality, and when anything is to be attempted that involves any number of individuals—methods of coordination have to be considered—the methods which have proven to be the best suited for such undertakings are engineering methods—the engineering of *an idea* toward a complete *realization.* Every engineer has to know the materials with which he has to work and the natural laws of these materials, as discovered by observation and experiment and formulated by mathematics and mechanics; else he can not calculate the forces at his disposal; he can not compute the resistance of his materials; he can not determine the capacity and requirements of his power plant; in

short, he can not make the most profitable use of his resources. Lately in all industries and particularly during the late World War, which was itself a gigantic industrial process, another factor manifested itself and proved to be of the utmost importance: namely, the human factor, which is not material but is mental, moral, psychological. It has been found that maximum production may be attained when and only when the production is carried on in conformity with certain psychological laws, roughly determined by the analysis of human nature.

Except for productive human labor, our globe is too small to support the human population now upon it. Humanity must produce or perish.

Production is essentially a task for engineers; it essentially depends upon the discovery and the application of natural laws, including the laws of human nature. It is, therefore, not a task for old fashioned philosophical speculation nor for barren metaphysical reasoning *in vacuo;* it is a scientific task and involves the coordination and cooperation of all the sciences. This is why it is an engineering task.

For engineering, rightly understood, is the coordinated sum-total of human knowledge gathered through the ages, with mathematics as its chief instrument and guide. Human Engineering will embody the theory and practice—the science and

art—of all engineering branches united by a common aim—the understanding and welfare of mankind.

Here I want to make it very clear that mathematics is not what many people think it is; it is not a system of mere formulas and theorems; but as beautifully defined by Professor Cassius J. Keyser, in his book *The Human Worth of Rigorous Thinking* (Columbia University Press, 1916), mathematics is the science of "Exact thought or rigorous thinking," and one of its distinctive characteristics is "precision, sharpness, completeness of definitions." This quality alone is sufficient to explain why people generally do not like mathematics and why even some scientists bluntly refuse to have anything to do with problems wherein mathematical reasoning is involved. In the meantime, mathematical philosophy has very little, if anything, to do with mere calculations or with numbers as such or with formulas; it is a philosophy wherein precise, sharp and rigorous thinking is essential. Those who deliberately refuse to think "rigorously"—that is mathematically—in connections where such thinking is possible, commit the sin of preferring the worse to the better; they deliberately violate the supreme law of intellectual rectitude.

Here I have to make it clear that for the purpose of Human Engineering the old concepts of matter, space and time are sufficient to start with; they are

sufficient in much the same way as they have been sufficient in the old science of mechanics. Figuratively speaking Human Engineering is a higher order of bridge engineering—it aims at the spanning of a gap in practical life as well as in knowledge. The old meanings of matter, space and time were good enough to prevent the collapse of a bridge; the same understanding of space and time as used in this book will protect society and humanity from periodical collapses. The old mechanics lead directly to such a knowledge of the intrinsic laws governing the universe as to suggest the new mechanics. Human Engineering will throw a new light on many old conceptions and will help the study and understanding of matter, space and time in their relative meanings, and perhaps will ultimately lead to an understanding of their absolute meanings.

Philosophy in its old form could exist only in the absence of engineering, but with engineering in existence and daily more active and far reaching, the old verbalistic philosophy and metaphysics have lost their reason to exist. They were no more able to understand the "production" of the universe and life than they are now able to understand or grapple with "production" as a means to provide a happier existence for humanity. They failed because their venerated method of "speculation" can not *produce,* and its place must be taken by mathematical think-

ing. Mathematical reasoning is displacing metaphysical reasoning. Engineering is driving verbalistic philosophy out of existence and humanity gains decidedly thereby. Only a few parasites and "speculators" will mourn the disappearance of their old companion "speculation." The world of producers —the predominating majority of human beings— will welcome a philosophy of ordered thought and production.

The scientists, all of them, have their duties no doubt, but they do not fully use their education if they do not try to broaden their sense of responsibility toward all mankind instead of closing themselves up in a narrow specialization where they find their pleasure. Neither engineers nor other scientific men have any right to prefer their own personal peace to the happiness of mankind; their place and their duty are in the front line of struggling humanity, not in the unperturbed ranks of those who keep themselves aloof from life. If they are indifferent, or discouraged because they feel or think that they know that the situation is hopeless, it may be proved that undue pessimism is as dangerous a "religion" as any other blind creed. Indeed there is very little difference in kind between the medieval fanaticism of the "holy inquisition," and modern intolerance toward new ideas. All kinds of intellect must get together, for as long as we presuppose the situation

to be hopeless, the situation will indeed be hopeless. The spirit of Human Engineering does not know the word "hopeless"; for engineers know that wrong methods are alone responsible for disastrous results, and that every situation can be successfully handled by the use of proper means. The task of engineering science is not only to know but to know how. Most of the scientists and engineers do not yet realize that their united judgment would be invincible; no system or class would care to disregard it. Their knowledge is the very force which makes the life of humanity pulsate. If the scientists and the engineers have had no common base upon which to unite, a common base must be provided. To-day the pressure of life is such that we cannot go forward without their coordinating guidance. But first there must be the desire to act. One aim of this book is to furnish the required stimulus by showing that Human Engineering will rescue us from the tangle of private opinions and enable us to deal with all the problems of life and human society upon a scientific basis.

If those who know why and how neglect to act, those who do not know will act, and the world will continue to flounder. The whole history of mankind and especially the present plight of the world show only too sadly how dangerous and expensive it is to have the world governed by those who do not know.

In paying the price of this war, we have been made

to realize that even the private individual can not afford to live wrapped up in his own life and not take his part in public affairs. He must acquire the habit of taking his share of public responsibility. This signifies that a very great deal of very simple work, all pointing in the direction of a greater work, must be done in the way of educating, not engineers and scientific men only, but the general public to co-operate in establishing the practice of Human Engineering in all the affairs of human society and life.

In writing this book I have had to wrestle with tremendous difficulties in expressing new thoughts and in indicating new methods. The reader who stops to criticize words or expressions because of their more or less happy or unhappy use will miss the whole point of the work. The reading of it should be done with a view to seeing how much can be found in it of what is new and good that may be elaborated further, and put into better form. This new enterprise is too difficult and too vast for the unaided labor of one man—life is too short.

The method used in this book in analysing life phenomena is essentially an engineering method, and as physics and mechanics always suggest to mathematicians new fields for analysis, it is not improbable that Human Engineering will give mathematicians new and interesting fields for research. The humblest rôle of mathematicians in Human Engineering

may be likened to that of "Public accountants" who put *in order* the affairs of business.

In relation to mathematics Bertrand Russell has said: "Logic is the youth of mathematics, mathematics is the manhood of logic." This brilliant *mot* of the eminent philosopher of mathematics is no doubt just and is profoundly significant; the least it can teach us is that it is useless to try to find a dividing line between logic and mathematics, for no such line exists; to seek for one serves merely to betray one's ignorance of mathematical philosophy. Elsewhere Mr. Russell says: "The hope of satisfaction to our more human desires, the hope of demonstrating that the world has this or that ethical characteristic, is not one which, so far as I can see, philosophy can do anything whatever to satisfy." By "philosophy" he means mathematical philosophy—a philosophy that is rigorously scientific, not vaguely speculative. I am entirely unable to agree with him that such a philosophy can make no contribution to ethics. On the contrary, I contend, and in this book I hope to show, that by mathematical philosophy, by rigorously scientific thinking, we can arrive at the true conception of what a human being really is and that in thus discovering the characteristic nature of man we come to the secret and source of ethics. Ethics as a science will investigate and explain the essential nature of man and the obligations which the essential

nature of man imposes upon human beings. It will be seen that to live righteously, to live ethically, is to live in accordance with the laws of human nature; and when it is clearly seen that man is a natural being, a part of nature literally, then it will be seen that the laws of human nature—the only possible rules for ethical conduct—are no more *super*natural and no more *man*-made than is the law of gravitation, for example, or any other natural law.

It is no cause for wonder that mathematical thinking should lead to such a result; for Man is a *natural* being, man's mind is a *natural agency*, and the results of rigorous thinking, far from being artificial fictions, are natural facts—natural revelations of natural law.

I hope I have not given the impression, by repeated allusion to mathematical science, that this book is to be in any technical sense a mathematical treatise. I have merely wished to indicate that the task is conceived and undertaken in the mathematical spirit, which must be the guiding spirit of Human Engineering; for no thought, if it be non-mathematical in spirit, can be trusted, and, although mathematicians sometimes make mistakes, the spirit of mathematics is always right and always sound.

Whilst I do not intend to trouble the reader with any highly technical mathematical arguments, there are a few simple mathematical considerations which

anyone of fair education can understand, which are of exceedingly great importance for our purpose, and to which, therefore, I ask the reader's best attention. One of the ideas is that of an *arithmetical progression;* another one is that of a *geometrical progression.* Neither of them involves anything more difficult than the most ordinary arithmetic of the secondary school or the counting house, but it will be seen that they throw a flood of light upon many of the most important human concerns.

Because we are human beings we are all of us interested in what we call progress—progress in law, in government, in jurisprudence, in ethics, in philosophy, in the natural sciences, in economics, in the fine arts, in the practical arts, in the production and distribution of wealth, in all the affairs affecting the welfare of mankind. It is a fact that all these great matters are interdependent and interlocking; it is therefore a fact of the utmost importance that progress in each of the cardinal matters must keep abreast of progress in the other cardinal matters in order to keep a just equilibrium, a proper balance, and so to maintain the integrity and continued prosperity of the whole complex body of our social life; it is a fact, a fact of observation, that in some of the great matters progress proceeds in accordance with one law and one rate of advancement and in others in accordance with a very different law and rate; it is

a fact, a fact of observation and sad experience, a fact attested by all history and made evident by reason, that owing to the widely differing laws and rates of progress in the great essential concerns of humanity, the balance and equilibrium among the parts is disturbed, the strain gradually increases until a violent break ensues in the form of social conflicts, insurrections, revolutions and war; it is a fact that the readjustment that follows, as after an earthquake, does indeed establish a kind of new equilibrium, but it is an equilibrium born of violence, and it is destined to be again disturbed periodically without end, unless by some science and art of Human Engineering progress in all the great matters essential to human weal can be made to proceed in accordance with one and the same law having its validity in the nature of man.

Taken in combination, the facts just stated are so extremely important that they deserve to be stated with the utmost emphasis and clarity. To this end I beg the reader to consider very carefully and side by side the two following series of numbers. The first one is a simple geometrical progression—denoted by (*GP*); the second one is a simple arithmetical progresson—denoted by (*AP*):

GP : 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, etc.;

AP : 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, etc.

For convenience of comparison I let them begin with the same number and for simplicity I have taken 2 for this initial term; observe that in the (*GP*) each term is got from the preceding term by *multiplying* by 2 and that in the (*AP*) each term is got from its predecessor by adding 2; in the first series the multiplier 2 is called the common *ratio* and in the second series the repeatedly added 2 is called the common *difference;* it is again for the convenience of comparison that I have chosen the same number for both common ratio and common difference and for the sake of simplicity that I have taken for this number the easy number 2. Other choices would be logically just as good.

Why have I introduced these two series? Because they serve to illustrate perfectly two widely different *laws of progress*—two laws representing vastly different *rates* of growth, increase, or *advancement.*

Do not fail to observe in this connection the following two facts. One of them is that the magnitude of the terms of any geometric progression whose ratio (no matter how small) is 2 or more will overtake and surpass the magnitude of the corresponding terms of any arithmetical progression, no matter how large the common difference of the latter may be. The other fact to be noted is that the greater the ratio of a geometric progression, the more rapidly do its successive terms increase; so that the

terms of one geometric progression may increase a thousand or a million or a billion times faster than the corresponding terms of another geometric progression. As any geometric progression (of ratio equal to 2 or more), no matter how slow, outruns every arithmetic progression, no matter how fast, so one geometric progression may be far swifter than another one of the same type.

To every one it will be obvious that the two progressions differ in pace; and that the difference between their corresponding terms becomes increasingly larger and larger the farther we go; for instance, the sum of the first six terms of the geometrical progression is 126, whereas the sum of the first six terms of the arithmetical progression is only 42, the difference between the two sums being 84; the sum of 8 terms is 510 for the (*GP*) and 72 for the (*AP*), the difference between these sums (of only 8 terms each) being 438, already much larger than before; if now we take the sums of the first 10 terms, they will be 2046 and 110 having a difference of 1936; etc., etc.

Consider now any two matters of great importance for human weal—jurisprudence for example, and natural science—or any other two major concerns of humanity. It is as plain as the noon-day sun that, if progress in one of the matters advances according to the law of a geometric progression and

the other in accordance with a law of an arithmetical progression, progress in the former matter will very quickly and ever more and more rapidly outstrip progress in the latter, so that, if the two interests involved be interdependent (as they always are), a strain is gradually produced in human affairs, social equilibrium is at length destroyed; there follows a period of readjustment by means of violence and force. It must not be fancied that the case supposed is merely hypothetical. The whole history of mankind and especially the present condition of the world unite in showing that far from being merely hypothetical, the case supposed has always been actual and is actual to-day on a vaster scale than ever before. My contention is that while progress in some of the great matters of human concern has been long proceeding in accordance with the law of a rapidly increasing geometric progression, progress in the other matters of no less importance has advanced only at the rate of an arithmetical progression or at best at the rate of some geometric progression of relatively slow growth. To see it and to understand it we have to pay the small price of a little observation and a little meditation.

Some technological invention is made, like that of a steam engine or a printing press, for example; or some discovery of scientific method, like that of analytical geometry or the infinitesimal calculus; or

some discovery of natural law, like that of falling bodies or the Newtonian law of gravitation. What happens? What is the effect upon the progress of knowledge and invention? The effect is stimulation. Each invention leads to new inventions and each discovery to new discoveries; invention breeds invention, science begets science, the children of knowledge produce their kind in larger and larger families; the process goes on from decade to decade, from generation to generation, and the spectacle we behold is that of advancement in scientific knowledge and technological power according to the law and rate of a rapidly increasing geometric progression or logarithmic function.

And now what must we say of the so-called sciences—the pseudo sciences—of ethics and jurisprudence and economics and politics and government? For the answer we have only to open our eyes and behold the world. By virtue of the advancement that has long been going on with ever accelerated logarithmic rapidity in invention, in mathematics, in physics, in chemistry, in biology, in astronomy and in applications of them, time and space and matter have been already conquered to such an extent that our globe, once so seemingly vast, has virtually shrunken to the dimensions of an ancient province; and manifold peoples of divers tongues and traditions and customs and institutions are now con-

strained to live together as in a single community. There is thus demanded a new ethical wisdom, a new legal wisdom, a new economical wisdom, a new political wisdom, a new wisdom in the affairs of government. For the new visions our anguished times cry aloud but the only answers are reverberated echoes of the wailing cry mingled with the chattering voices of excited public men who know not what to do. Why? What is the explanation? The question is double: Why the disease? And why no remedy at hand? The answer is the same for both. And the answer is that the so-called sciences of ethics and jurisprudence and economics and politics and government have not kept pace with the rapid progress made in the other great affairs of man; they have lagged behind; it is because of their lagging that the world has come to be in so great distress; and it is because of their lagging that they have not now the needed wisdom to effect a cure.

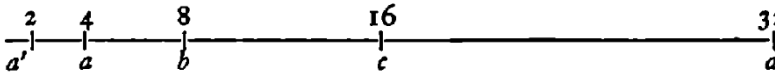
Do you ask why it is that the "social" sciences—the so-called sciences of ethics, etc.—have lagged behind? The answer is not far to seek nor difficult to understand. They have lagged behind, partly because they have been hampered by the traditions and the habits of a bygone world—they have looked backward instead of forward; they have lagged behind, partly because they have depended upon the barren methods of verbalistic philosophy — they

have been metaphysical instead of scientific; they have lagged behind, partly because they have been often dominated by the lusts of cunning "politicians" instead of being led by the wisdom of enlightened statesmen; they have lagged behind, partly because they have been predominantly concerned to protect "vested interests," upon which they have in the main depended for support; the *fundamental* cause, however, of their lagging behind is found in the astonishing fact that, despite their being by their very nature most *immediately* concerned with the affairs of mankind, they have not discovered what Man really is but have from time immemorial falsely regarded human beings either as animals or else as combinations of animals and something supernatural. With these two monstrous conceptions of the essential nature of man I shall deal at a later stage of this writing.

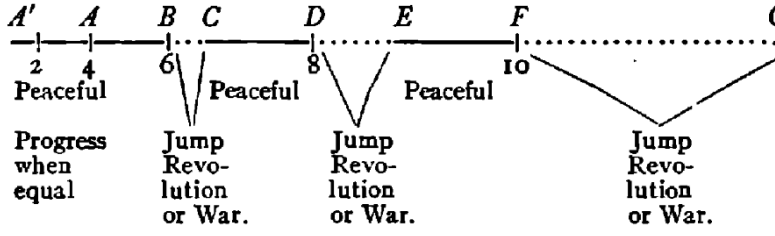
At present I am chiefly concerned to drive home the fact that it is the great *disparity* between the rapid progress of the natural and technological sciences on the one hand and the slow progress of the metaphysical, so-called social "sciences" on the other hand, that sooner or later so disturbs the equilibrium of human affairs as to result periodically in those social cataclysms which we call insurrections, revolutions and wars. The reader should note carefully that such cataclysmic changes—such "jumps," as we may call them—such violent read-

justments in human affairs and human relationships —are recorded throughout the history of mankind. And I would have him see clearly that, because the *disparity* which produces them increases as we pass from generation to generation—from term to term of our progressions—the "jumps" in question occur not only with increasing violence but with increasing frequency. This highly significant fact may be graphically illustrated in the following figure:

Geometric evolution of the natural and technological sciences. —Peaceful progress.



Arithmetical evolution of the so-called social "sciences," accelerated by violent "jumps."—Non-peaceful social progress.



*a'*2, 2*a*, *ab*, *bc*, *cd*, represent the geometrical law of progression in the natural and technological sciences (peaceful evolution).

*A'*2, 2*A*, *AB*, *CD*, *EF*, represent the lagging arithmetical law of progression in the so-called social sciences (peaceful evolution).

Both of these during the same periods of time.

BC, DE, FG, represent revolutions or wars, with the aftermath of revolution of ideas—the "jump"—violent readjustment of ideas to facts—forced by events.

ab, bc, cd, and *AB, CD, EF,* take the same amount of time, but the second progression being much slower than the first one, the "jumps" or revolutions occur at shorter intervals as time goes on and thus more frequently force us to coordinate our ideas to facts. Periods of peace or seeming peace alternate more and more frequently with periods of violence; the mentioned *disparity* of progress in peaceful times is the hatching seed of future violence.*

*To digress a bit, it may be interesting to add, that population and the need of people increase in a geometrical progression; and also that the growth of individuals is limited by the fact, that they have to absorb their food through surfaces which as growth goes on increase only as *squares*, while the bodies to be fed, being volumes, increase in size as *cubes* increase, as the cubes of the same base grow faster than the squares,

$$2^2=4, \quad 2^3=8, \quad 3^2=9, \quad 3^3=27, \quad \text{and so on,}$$

it is obvious, that in the infancy of an organism only a part of the food goes to maintain life, the larger part goes for growth; when the organism becomes larger, the absorbing surfaces, growing proportionally to the square, the food is spent to build the mass of the volume of the body and is spent proportionally to the cube. Suppose our organism has grown to a size twice as large, its absorbing capacity has become four times larger, its volume eight times larger. In case of 3 times, the difference will be 9 and 27. It is obvious that at some point, all the absorbed food will be used to maintain life and none will be left for growth, and this last process will stop. This is another example which explains how the theory of dimensions is vitally important in life and shows why it is absolutely essential to take account of dimensions in the study of life problems.

As a matter of fact these few mathematical considerations can hardly be called mathematics or mathematical philosophy; nevertheless, without bringing attention to these very simple mathematical ideas we should not be able to proceed any further than in the past. Our life problems have always been "solved" by verbalists and rhetorical metaphysicians who cleverly played with vague words and who always ignored the supremely important matter of dimensions because they were ignorant of it. There was no possible way to arrive at an agreement on the significance of words, or even the understanding of them. Let us take, for instance, such words as "good" or "bad" or "truth"; volumes upon volumes have been written about them; no one has reached any result universally acceptable; the effect has been to multiply warring schools of philosophy—sectarians and partisans. In the meantime *something* corresponding to each of the terms "good," "bad," "truth" exists as matter of fact; but what that something is still awaits scientific determination. If only these three words could be scientifically defined, philosophy, law, ethics and psychology would cease to be "private theories" or verbalism and they would advance to the rank and dignity of sciences.

Here I may quote a characteristic of life as expressed by one of the "heroes" of my esteemed friend Harvey O'Higgins, in his book, *From the*

Life, Imaginary Portraits of Some Distinguished Americans (Harper, N. Y.).

"Warren never philosophized; he handled facts as an artisan handles his tools; but if he *had* philosophized, his theory of life would probably have been something like this: 'There is no justice, there is no morality, in nature or in natural laws; justice and morality are laws only of human society. But society, natural life, and all civilization are subject in their larger aspects to natural laws—which contradict morality and outrage justice—and the statesman has to move with those laws and direct his people in accordance with them, despite the lesser by-laws of morality and justice.'"

If such are the creeds of "distinguished people" anywhere, what better can we expect than that which we see in the history of humanity?

But the fact that the old philosophy, law, ethics, psychology, politics and sociology could not solve the practical problems of humanity, is not any reason whatsoever why we should despair. The problems can be solved.

To follow the reasoning of this book, it is not necessary to be a highly trained specialist; the only qualifications required are candor, an open mind, freedom from blinding prejudice, thoughtfulness, a real desire for truth, and enough common sense to understand that to talk of adding three quarts of milk to three-quarters of a mile is to talk nonsense.

CHAPTER II

CHILDHOOD OF HUMANITY

THE conclusion of the World War is the closing of the period of the childhood of humanity. This childhood, as any childhood, can be characterized as devoid of any real understanding of values, as is that of a child who uses a priceless chronometer to crack nuts.

This childhood has been unduly long, but happily we are near to the end of it, for humanity, shaken by this war, is coming to its senses and must soon enter its manhood, a period of great achievements and rewards in the new and real sense of values dawning upon us.

The sacred dead will not have died for naught; the "red wine of youth," the wanton waste of life, has shown us the price of life, and we will have to keep our oath to make the future worthy of their sweat and blood.

Early ideas are not necessarily true ideas.

There are different kinds of interpretations of history and different schools of philosophy. All of them have contributed something to human progress, but none of them has been able to give the world a

basic philosophy embracing the whole progress of science and establishing the life of man upon the abiding foundation of Fact.

Our life is bound to develop according to evident or else concealed laws of nature. The evident laws of nature were the inspiration of genuine science in its cradle; and their interpretations or misinterpretations have from the earliest times formed systems of law, of ethics, and of philosophy.

Human intellect, be it that of an individual or that of the race, forms conclusions which have to be often revised before they correspond approximately to facts. What we call progress consists in coordinating ideas with realities. The World War has taught something to everybody. It was indeed a great reality; it accustomed us to think in terms of reality and not in those of phantom speculation. Some unmistakable truths were revealed. Facts and force were the things that counted. Power had to be produced to destroy hostile power; it was found that the old political and economic systems were not adequate to the task put upon them. The world had to create new economic conditions; it was obliged to supplement the old systems with special boards for food, coal, railroads, shipping, labor, etc. The World War emergency compelled the nations to organize for producing greater power in order to conquer power already great.

If there is anything which this war has proved, it is the fact that the most important asset a nation or an individual can have, is the ability "to do things."

"In Flanders Fields the poppies blow . . .," that is too true; they blow and they are strong and red. But the purpose of this writing is not the celebration of poetry, but the elucidation and right use of facts.

Normally, thousands of rabbits and guinea pigs are used and killed, in scientific laboratories, for experiments which yield great and tangible benefits to humanity. This war butchered millions of people and ruined the health and lives of tens of millions. Is this climax of the pre-war civilization to be passed unnoticed, except for the poetry and the manuring of the battle fields, that the "poppies blow" stronger and better fed? Or is the death of ten men on the battle field to be of as much worth in knowledge gained as is the life of one rabbit killed for experiment? Is the great sacrifice worth analysing? There can be only one answer—yes. But, if truth be desired, the analysis must be scientific.

In science, "opinions" are tolerated when and only when facts are lacking. In this case, we have all the facts necessary. We have only to collect them and analyse them, rejecting mere "opinions" as cheap and unworthy. Such as understand this lesson will know how to act for the benefit of all.

At present the future of mankind is dark. "Stop, look, and listen"—the prudent caution at railroad crossings—must be amended to read "stop, look, listen, and THINK"; not for the saving of a few lives in railroad accidents, but for the preservation of the life of humanity. Living organisms, of the lower and simpler types, in which the differentiation and the integration of the vital organs have not been carried far, can move about for a considerable time after being deprived of the appliances by which the life force is accumulated and transferred, but higher organisms are instantly killed by the removal of such appliances, or even by the injury of minor parts of them; even more easily destroyed are the more advanced and complicated *social* organizations.

The first question is: what are to be the scientific methods that will eliminate diverse opinions and creeds from an analysis of facts and ensure correct deductions based upon them? A short survey of facts concerning civilization will help to point the way.

Humanity, in its cradle, did not have science; it had only the faculties of observation and speculation. In the early days there was much speculative thinking, but it was without any sufficient basis of facts. Theology and philosophy flourished; their speculations were often very clever, but all their primitive notions about facts—such as the structure of the

heavens, the form of the earth, mechanical principles, meteorological or physiological phenomena—were almost all of them wrong.

What is history? What is its significance for humanity? Dr. J. H. Robinson gives us a precise answer: "Man's abject dependence on the past gives rise to the continuity of history. Our convictions, opinions, prejudices, intellectual tastes; our knowledge, our methods of learning and of applying for information we owe, with slight exceptions, to the past—often to the remote past. History is an expansion of memory, and like memory it alone can explain the present and in this lies its most unmistakable value." *

The savage regards every striking phenomenon or group of phenomena as caused by some personal agent, and from remotest antiquity the mode of thinking has changed only as fast as the relations among phenomena have been established.†

* *An Outline of the History of the Western European Mind*, by James Harvey Robinson. The New School for Social Research, New York, 1919. This little volume gives condensed statements, as in a nutshell, of the historical developments of the human mind and contains a long list of the most substantial modern books on historical questions. All the further historical quotations will be taken from this exceptionally valuable little book, and for convenience they will simply be marked by his initials—J. H. R.

† (J. H. R.) "Late appearance of a definite theory of progress. Excessive conservatism of primitive peoples. The Greeks speculated on the origin of things, but they did not have a conception of the possibility of indefinite progress . . . Progress

Human nature was always asking "why"? and not being able to answer why, they found their answer

of man from the earliest time till the opening of the 17th century almost altogether unconscious. . . . Fundamental weakness of Hellenic learning. It was an imposing collection of speculation, opinions, and guesses, which, however brilliant and ingenious they might be, were based on a very slight body of exact knowledge, and failed to recognize the fundamental necessity of painful scientific research, aided by apparatus. There was no steady accumulation of knowledge to offset the growing emotional distrust of reason. . . . Unfulfilled promise of Hellenistic science. Influence of slavery in checking the development of science. . . . The deficiencies of Medieval culture. All the weaknesses of the Hellenic reasoning, combined with those of the Christian Fathers, underlay what appeared to be a most logically elaborated and definitive system of thought. Defects of the university education. . . . Little history of Natural science, in our sense of the word, taught in the universities. . . . Copernicus, 'De Revolutionibus Orbium Coelestium.' Libri VI, 1543. . . . Copernicus' own introduction acknowledges his debt to ancient philosophers. Still believed in fixed Starry Sphere. His discovery had little immediate effect on prevailing notions. Giordano Bruno (1548–1600) made it his chief business to think out and set forth in Latin and Italian the implications of the discovery of Copernicus. . . . Bruno burned by the Inquisition at Rome. . . . Keppler (1571–1630) and his discovery of the elliptical orbits of the planets. Galileo (1564–1642). His telescope speedily improved so as to magnify 32 diameters. His attitude toward the Copernican theory, which was condemned by Roman Inquisition 1616. . . . Galileo's chief discoveries were in physics and mechanics. Isaac Newton (1642–1727) proved that the laws of falling bodies apply to the heavens. This made a deep impression and finally the newer conceptions of the universe began to be popularized. . . . Lord Bacon (1561–1626), the 'Buccinator' of experimental and applied modern science. . . . His lively appreciation of the existing obstacles to scientific advance; the idols of the tribe, cave, market-place, and theatre. . . . Necessity of escaping from the scholastic methods of 'tumbling up and down in our reasons and conceits,' and studying the world about us. Undreamed of achievements possible if only the right method of research be followed . . . the distrust of

through another factor "who." The unknown was called, Gods or God. But with the progress of science the "why" became more and more evident, and the question came to be "how." From the early days of humanity, dogmatic theology, law, ethics, and science in its infancy, were the monopolies of one class and the source of their power.*

ancient authority. . . . Descartes (1596–1650), . . . he proposed to reach the truth through analysis and clear ideas, on the assumption that God will not deceive. . . . His fundamental interest in mathematics. . . . His claim to originality and his rejection of all authority. . . . Obstacles to scientific advance; the universities still dominated by Aristotle; the theological faculties; the censorship of the press exercised by both church and state; . . ."

* (J. H. R.) "Phases of religious complex. 'Religious,' a vague and comprehensive term applied to: (1) certain classes of emotions (awe, dependence, self-distrust, aspirations, etc.); (2) Conduct, which may take the form of distinctive religious acts (ceremonies, sacrifices, prayers, 'good works') or the observance of what in primitive conditions are recognized as 'taboos'; (3) Priestly, or ecclesiastical organizations; (4) Beliefs about supernatural beings and man's relations to them: the latter may take the form of revelation and be reduced to creeds and become the subject of elaborate theological speculations.

"Association of religion with the supernatural; religion has always had for its primary object the attainment of a satisfactory adjustment to, or a successful control over, the supernatural. . . . The cultural mind viewed as the product of a long and hazardous process of accumulation. . . . Spontaneous generation of superstitions. Prevalence of symbolism, mana, animism, magic, fetishism, totemism; the taboo (cf. our modern idea of 'principle'), the sacred, clean and unclean; 'dream logic'—spontaneous rationalizing or 'jumping at conclusions'; . . . The 16th book of the Theodosian Code contains edicts relating to the Church issued by the Roman Emperors during the 4th and 5th centuries. They make it a crime to disagree with the Church; they provide harsh penalties for heretical

and that reaction, though it may retard it, can not entirely stop it.*

The idea that organic species are results of special creation has no scientific standard whatever. There is not one fact tending to prove special or separate creation; the evidence, which is overwhelming, is all of it on the other side. The hypothesis of special creation is a mere fossil of the past. Evolution is the only theory which is in harmony with facts and with all branches of science; life is dynamic, not static.

Philosophy, as defined by Fichte, is the "science of sciences." Its aim was to solve the problems of the world. In the past, when all exact sciences were in their infancy, philosophy had to be purely speculative, with little or no regard to realities. But if

* (J. H. R.) "Formulation and establishment of the evolutionary hypothesis. Discovery of the great age of the earth; . . . gradual development of the evolutionary theory. . . . Darwin's 'Origin of the Species,' 1859. Herbert Spencer (1820–1903). . . . Haeckel (1834–1919) and others clarify, defend and popularize the new doctrine. Subsequent development of the evolutionary doctrine by Mendel, Weisman, DeVries and others. Weakening of the special creation theory by other evidence such as archeology and biblical criticism. The significance of the doctrine for intellectual history. Character of the opposition to the evolutionary theory. Popular confusion of 'Darwinism' with 'evolution.' Revolutionary effects of the new point of view. Does away with conception of fixed species (Platonic ideas) that had previously dominated speculation. The genetic method adopted in all the organic sciences, including the newer social sciences. Problem of adjusting history to the discoveries of the past 50 years. Bearing of evolution on the theory of progress. Organic evolution and social evolution."

Judged by this standard, neither philosophy nor its kindred—the so-called social sciences—have in the past been very effective. There was, for example, no official warning of the coming of the World War—the greatest of catastrophies. The future was not anticipated because political philosophers did not possess the necessary basis of knowledge. To be just we must admit that philosophy has been but little aided financially because it is commonly regarded as unnecessary. The technical branches of science have been strongly backed and generally supported by those to whom they have brought direct profit; and so they have had better opportunities for development.

Ethics in the stifling grip of myth and legalism is not convincing enough to exercise controlling influence. Such is the situation in which we find ourselves. Being still in our childhood and thinking like savages, we looked upon the World War as a personal creation of a "war-lord," because those interested in it told us so. We neglected to use our common sense and look deeper into its origins; to perform for ourselves the duty which political philosophy did not perform for us—the duty of thinking in terms of facts and not in terms of metaphysical speculations. Knowledge of facts would have told us that the war lords were only the representatives of the ruling classes. A system of social

approximately 291 million Confucianists, or Taoists, 261 million Roman Catholics, 211 million Mohammedans, 209 million Hindus, 177 million Protestants, 157 million Animists, 137 million Buddhists, 115 million Orthodox Christians—to speak only of the most important religions. Each group, and they are rather large groups, believes its theory or its faith to be infallible and all the others to be false.

Bacon seems a bit remote, but the idols and medieval fetishes which he so masterfully describes are equally venerated to-day.

(*Novum Organum,* by Francis Bacon.)

34. "Four species of idols beset the human mind, to which (for distinction's sake) we have assigned names, calling the first Idols of the Tribe, the second Idols of the Den, the third Idols of the Market, the fourth Idols of the Theatre.

40. "The information of notions and axioms on the foundation of true induction is the only fitting remedy by which we can ward off and expel these idols. It is, however, of great service to point them out; for the doctrine of idols bears the same relation to the interpretation of nature as that of the confutation of sophisms does to common logic.

41. "The idols of the tribe are inherent in human nature and the very tribe or race of man; for man's sense is falsely asserted to be the standard of things; on the contrary, all the perceptions both of the senses and the mind bear reference to man and not to the Universe, and the human mind resembles these uneven mirrors which impart their own properties to different objects, from which rays are emitted and distort and disfigure them.

42. "The idols of the den are those of each individual; for everybody (in addition to the errors common to the race

IX. The Rôle of Salts in the Preservation of Life.
X. Experimental Study of the Influence of Environment on Animals.

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CONTENTS