"Whatever may be the new notions which future experiences give us about the world, we are sure beforehand that there will persist constantly a stuff that we might call energy."

Henri Poincare

We are accustomed in our epoch to focus everything around the notion of a physical world, and the proofs that are called for are always of a material order, concrete, concise, mathematic, scientific, reasoned, analyzed, proven. We recall how the English philosophers were disturbed when Laplace stated his proposition that a sufficiently developed intelligence which had been sufficiently instructed about the position and movements of the atoms in every instant, could predict all future History. The controversy between Laplace and Young concerning capillarity is not the only cause of a new general movement of thought, but it must be recognized that he expressed in addition an "extreme" doubt about the mathematical logic of his rival. Even though the whole system of Laplace was rejected, it was re-established with greater force in the following generation by Poisson, who found in Young's theories his own starting point for a constructive effort amid these opposed currents of two nationalities, thus establishing a basis of work for the study of theoretical physics. Therefore, it must be admitted that it was due to the English school that several great men such as Carnot and Fresnel, to whom the development of physical science is due, received

their first acknowledgment.

The study of the historical evolution of the physical theories is essential for a full understanding; it is through the work of a Kelvin or a Helmholtz that profound ideas take form.

The laws of science are like an absolutist monarch, they do not tolerate modifications, but sometimes we may ask whether the scholar is not the toy of his definitions, and whether the world which he fashions and discovers, is not simply the creation of his own fancy! ...

Monsieur Le Roy, in the Review of Metaphysics and Morals (1901), declared a similar viewpoint on the same theme, but Henri Poincare replied: "No, we witness what science does for us every day. The scientific objective does not exist by itself as the dogmatics imagine in their naivete', but only the relation between the objects, since beyond those relations there is no knowable reality".

I cannot, for the moment, present any support for this view because, as I have indicated with regard to the non-Euclidian geometry of Lobatschewsky, the scientific principles obtained by logical derivations, etc., have not always had, for me, the value which is generally granted to them.

Starting from the theory that the sum of the angles in a triangle is less than two right angles, I contradict the common official line of thought which considers mathematical reasoning as truly deductive,

geometry as derived from experience, and physics as based on induction obtained from the repetition of tested phenomena.

The manner in which Leibnitz wished to demonstrate that two plus two equals four is well known: "I take the one as a definite number and go on 'adding one'; I add then one to an "x" number. There is no place for this definition here. At once I define the numbers 2, 3, and 4 by the equalities:

$1 + 1 = 2$; $2 + 1 = 3$; $3 + 1 = 4$;

and in the same way define the operation "x + 2" by the relation

$x + 2 = (x + 1) + 1$.

$2 + 2 = (2 + 1) + 1$, definition of 4

$(2 + 1) + 1 = 3 + 1$, definition of 2

$3 + 1 = 4$, definition of 3

Then $2 + 2 = 4$, which is what I wanted to demonstrate".

In reality this is not a demonstration; in mathematics it is called a verification: the Leibnitz' argument is purely analytical, since verification differs from demonstration in so far as analysis predominates in the former. He uses conventional definitions; if mathematics were thus reduced to series of verifications, it would no longer constitute a science, no more than winning a chess move could institute a new science.

Thus, we might discuss the nature of mathematical reasoning, surprise the geometrician in his work, or verify the diverse branches of science, but all these studies are in constant evolution, and I prefer to agree with Henri Poincare in the

last sentence of his book Science and Hypothesis: "I guard myself against making a prophecy which might be false by choosing between the day when a book is ready for printing and the day when it will be placed before the public".

As soon as we put aside current calculations, it is the continuum which attracts all the interest of our research, as Tannery in his Introduction to the Theory of the Functions of a Variable has defined so well. The continuum is, in fact, unity and multiplicity, though the real mathematical continuum is quite different from that of physics and metaphysics. The elements of the continuum would be intimately joined, forming a whole wherein the period would not have had an existence previous to the line, but the line would exist as something preceding the period....

It is known that between two consecutive series, one or several intermediate series may be inserted, and then, between those rows, others and again others, and so on indefinitely. Thus, we have an unlimited number of numbers or terms which are called: fractional, rational or commensurable. Between these integers, which are already infinite in number, others may be inserted which are called: irrational or incommensurable. The continuum conceived in this manner is no longer a collection of individualities arranged in some order (and infinite in number), but in external relationship, the one to the other.

This is not the common conception, as Monsieur Henri Poincare remarks, adding that according to this concept it is supposed that an intimate connection exists among the elements of the continuum which constitute a whole, wherein the period has no existence preceding the line, whereas it is the line which exists preceding the point. It is a pure creation of the spirit, without a real place in experimentation, the fact being that the mathematical continuum is built on a continual scale of irrational and fractional numbers, employing strictly the whole number, as the mathematicians of the German school and as Kronecker have done fervently.

We must pass over the definition of the incommensurables, the creation of the mathematical continuum, what the physical continuum is, and over many other branches of analysis which cannot be discussed here, and for which an ample preliminary exposition would be necessary before really undertaking the study of the problem.

I have always been disagreeably surprised to see how the declarations of geometric axioms are sometimes taken literally, in spite of knowing that this deductive science is based on a logical kind of experience which is often quite irrational in its relation to pure Truth.

Some axioms are no more than propositions used for analysis, such as: "Things which are equal to the same thing are equal to each other", but they form no part of the propositions included in

geometry. Others, however, are prototypical of this science, such as "the line can only pass through two points", and: "The straight line is the shortest distance between two points", and now I wish to hold off a moment with respect to the erroneous character of this declaration, the inaccuracy of which I have proven more than once (nor have I been the only one to do so).

The third geometric axiom has created famous disputes. Known as the postulate of Euclides, its demonstration has been sought in vain through History. It is enunciated in the following manner: "From a point only one straight line can be drawn parallel to another given straight line". The Russian, Lobatschewsky and the Bulgarian, Bolyai, have demonstrated that the proof is impossible and Riemann made the analysis in Uber die Hypothesen, welche der Geometrie zum Grunde liegen. Lobatschewsky has even held that from a point several parallel lines can be drawn to a given straight line. Moreover, he even formulated several theorems completely opposed to Euclidian geometry, which, nevertheless, are equally logical and were never refuted, such as: "It is impossible to construct an identical figure to another with different dimension", or, "if the circumference of a circle is divided into "x" equal parts, and the tangents are drawn at the points of intersection, the x tangents will form a polygon if the radius of the circle is small enough, but if the radius is long enough, then they will never meet", etc.

Riemann's geometry is in fact no different from spheric geometry, and Lobatschewsky's is simply a branch of ordinary

geometry because it is limited to two dimensions, like Beltrami's, who, however, might extend his argument still further by means of his so-called positive and negative curvatures.

In order to interpret non-Euclidian geometry, it is necessary beforehand to make clear the definitions, as is customary in other branches of science.

In this manner, we will understand as space the part of space above the fundamental plane.

The plane is to be understood as that sphere which cuts the fundamental plane at right angles.

The line is the circle which cuts the fundamertal plane at right angles.

In the same sense we should understand the "distance between two points" as the logarithm of the inharmonious ratio of these two points and of the intersection of the fundamental plane with the circle that passes through these points and cuts them perpendicularly.

In this way, the theorem, "The sum of the angles of a triangle is less than two straight angles" of the non-Euclidian geometry can be translated as "If a curvilinear triangle has for its sides the arches of a circle, the product of which could cut the horizontal plane at right angles, the sum of the angles of this curvilinear triangle would be less than two straight angles", and, consequently, no contradiction will be possible.

It is well-known that the word "existence", for instance, does

not have the same value when it deals with mathematics as when it refers to a material object, and John Stuart Mill said, perhaps too adventurously: "All definitions contain an axiom".

There is frequently in all this a question of words, of terms, or acceptance of definitions. When in the middle of the last century the fluids of Coulomb were laughed at, no one suspected then that the theory would be accepted fifty years later under the name of electrons. Wherein lies the difference between those permanently electrified molecules and Coulomb's electric molecules? In the electrons of electricity there is the "mass" (small particle of matter), but Coulomb never denied the "mass" of his fluids...!

There is also an example in the case of the principle held by Carnot, who established his theories about indestructible heat on false hypotheses, asserting that it could be converted into force for use in work.

This theory was rapidly rejected. Later Clausius resorted again to the same theories, and to him belongs the triumph. In its primitive form, Carnot's theory expresses, besides the true relations, other inexact relations, remains of old ideas, which in no way affect the reality of the first. Clausius simply separated all this as if removing dry branches. The result was the second thermodynamic law.

There are three Frenchmen who have marked the point of departure for the period of modern geometry: Descartes, Desaegues,&

Pascal; Fermat must be included with reference to modern analysis and the improvement of differential calculus. By association of ideas, doubtlessly, I think at once of the calculus of probabilities. What probability exists that of two dice thrown on the table, one of them marks number 6? Each may fall in 6 different manners: the number of possible cases is 6 times 6 equal 36. The number of favorable cases is 11, the probability is established as $\frac{11}{36}$. This is the correct solution.

But Monsieur Henri Poincare said: "Why can we not proceed in a different way? The dots marked on the dice form $\frac{6x7}{2}$ which is equal to 21 different combinations. Of these 6 are favorable, thus the probability is $\frac{6}{21}$." And this member of the Institute of France ends by saying: "Why should the first method of calculus of the number of possible cases be more lawful than the second?" It must be replied: the total number of possible cases produces equally probable cases. The probable must be defined by the possible.

The impossibility of squaring the circle was demonstrated in 1885, and the Academy of Sciences rejected systematically every research referring to this matter. There was a psychological reason in the mind of the academicians which was, above all, argument, and, if they had been compelled to reply, they might have said "Why pretend to hope that a particular value of a transcendental function should be an algebraic number? If Pi is the root of an algebraic equation, why pretend that

this root should be a period of the function 'hegative 2 x", and why does not the same occur with other roots of the same equation?"

If we take the first 10,000 logarithms of a table, it is easy to suppose that in half of them there is the probability of finding paired numbers in the third decimal, and, indeed, if these tables are examined, we find as many paired numbers as odd ones.

Keeping in mind the concept of probability in physical sciences, we may dwell a moment upon the calculus of probabilities as applied to games of chance. The question of luck in roulette has the same basis as the ordinary calculus, that is, a mathematical hypothesis.

The roulette wheel in the casinos is divided in 37 equal parts, over which a ball jumps due to the rotation given to the roulette; the ball stops after a certain number of turns on one of the boxes marked with a number from 0 - 36. These subdivisions are black or red and the choice of one corresponds either to one color or the other.

According to the impulse given to the ball, the probability of the angle may vary from θ to $\theta + d\theta$. The famous mathematician Henri Poincare supposes the probability of $\phi(\theta)\, d\theta$ He says that the choice is made in a completely arbitrary way. Let us take E as the measure of each red and black box and we shall have to calculate the integral: $\int \phi(\theta) d\theta$, as applied both to the red boxes as well as to the black ones in order to compare

the results. We must consider an interval 2ϵ comprising two consecutive black and red boxes. M and m represent maximum and minimum in respect to the values of the functions $\phi(\epsilon)$ in the said interval. The interval applied to the red boxes will be less than $\Sigma M\epsilon$, and the interval applied to the black boxes greater than $\Sigma m\epsilon$. Thus the difference will be less than $\Sigma (M - m)\epsilon$.

However, if the function ϕ is supposed to be continuous, and moreover, if the interval ϵ is very small in respect to the sum of the angles described by the needle, the difference M-m will also be very small. The difference of the two integrals will be very small on account of this fact, and the probability will be around ½.

Professor Poincare insists on the following fact: "We see that even without knowing anything of the function ϕ we must act as if the probability were ½." This explains why, from an objective viewpoint, if we observe a certain number of plays, the result will always be as many red as black ones. In spite of this logic, it is a gross error, and the players always fall into it, to imagine, for instance, that after a series of six red plays, there will be a "sure hit" on black; they believe they are following a law that will secure a victory, since it seems too unlikely that the same color could be repeated seven times, though in reality they forget that the probability ALWAYS

remains on ½. Therefore, if the series of seven red plays seems to be unlikely, it is no less unlikely that a series of six red ones should be followed by a black "stroke." It simply occurs because it is easier to observe the improbability of seven consecutive strikes on the red color, than to see the improbability of six red ones followed by a black one.

Most people feel frightened to think, to reason, and they live on data that they borrow from others; as Einstein said: "He would be in ill repute who dared to criticise the official learning that he had received." This scientist wrote in the first part of his Theory of Relativity: "What is, however, the basis of the affirmation that those propositions of Euclidean geometry are exact? Geometry depends upon such fixed concepts as the "plane", the "point", the "straight line", which enable us more or less to associate ideas which are defined by certain axioms, which, because of the same ideas, we are willing to accept as true."

The word TRUTHFUL should not be associated with pure geometry; truthfulness corresponds to a correlation with REALITY, and geometry is not concerned with that but with the connections ideas have to each other.

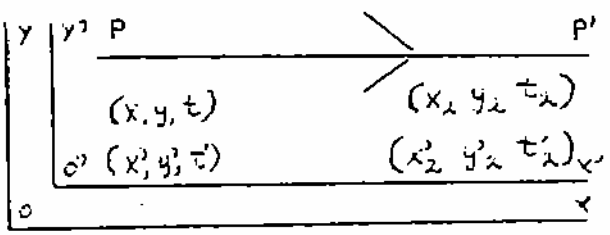
Albert Einstein[66] defines very well this relativity of Truth and Reality, when he says: "I place myself in the window of a railway compartment and let fall a stone perpendicularly on the ground, without throwing it. Then

I see that the stone falls along a right line. A pedestrian observing alongside the railway will see this stone fall to the ground describing a parabolic curve. I then ask myself: is the trajectory of the stone in reality a straight line, or does it describe a parabola?"

An enormous problem referring to space arises, though, originating from this simple matter; we have an idea about the structure of space and we ought to examine it with respect to its motion and its relation to a rigid body that might serve as a reference. The matter of position also plays a role in Professor Einstein's example. What must we take as a point of reference, the car or the railway ground? The system of coordinates takes its place here, and the famous scientist concludes: "The stone follows a straight line in relation to a system of coordinates applied rigidly to the railway car, but with relation to a system of coordinates applied rigidly to the ground (the platform of the railway), it describes a parabola."

We cannot make an analysis here of the theory of relativity; rather, we would advise for better documentation the particular works dealing with this matter.[67]

For instance, if we want to determine the speed, we take "u'I" as unity of a point "P" with relation to "O" in the direction of Ox (or Ox') according to the following graph:



We take x_1' and x_2' as "x distances" from P with time t'_1 and t'_2 respectively.

Then P is displaced with relation to O' according to a distance $\overline{PP'}$ or $x_2'-x_1'$ in a time of $t_2'-t_1'$ which is the same as:

$$u_1' = \frac{x_2' - x_1'}{t_2' - t_1'}$$

We shall now find the speed of P with regard to O. If we call this speed u_1, we shall have:

$$u_1 = \frac{x_2 - x_1}{t_2 - t_1}$$

We note that the x and the t correspond to the O in the evaluation of the x' and the t' which were previously given regarding O'. If we substitute x_1, x_2, t_1, t_2, by the equations of Lorentz's transformism[68] from the first and the fourth we shall have[69]:

$$u_1 = \frac{B(x_2' + vt'_2 - B(x_1' + vt'_1)}{B(t'_2 + \frac{ux'_2}{c^2}) - B(t'_1 \frac{vx'_1}{c^2})}$$

If we eliminate B, we shall then have:

$$v_1 = \frac{x'_2 - x'_1 + (t'^2 - t'_1)v}{t'_2 - t'_1 + \frac{v}{c^2}(x'_2 - x'_1)}$$

Let us divide the numerator and the denominator by $t'_2 - t'_1$ and we shall have:

$$v_1 = \frac{\frac{x'_2 - x'_1}{t'_2 - t'_1} + v}{1 + \frac{v}{c_2} + \frac{x'_2 - x'_1}{t'_2 - t'_1}} = \frac{v + v'_1}{1 + \frac{vv'_1}{c_2}}$$

This result gives the theorem for speed according to the principle of relativity.

There is more to add regarding the "fourth dimension", and as Einstein writes in Relativity, General Theory chapter XVII: "The non'mathematician feels dominated by a mysterious shudder when he hears talk of the fourth dimension. Nevertheless, there is no more reasonable exposition thereof than that of the world around us which is a space-time continuum of four dimensions. Space is a continuum of three dimensions; that is, it is possible to describe the position of a point by three numbers (coordinates) x, y, z, and there is also an indefinite number of points near the former, the position of which can be described by

coordinates x^1, y^1, z^1, which can be as near to the point as the ones we choose and define with the respective values of the coordinates x, y, z. We speak of continuum in view of the latter property and thanks to the fact that there are three coordinates, we talk as though there were three dimensions."

In the same way, the word "world" as used by Minkowsky, expresses four dimensions, because it is the world of the physical phenomena in the sense of space-time.

It is a fact that, according to classical mechanics, time is absolute, that is, independent of positions and conditions in the movement of the system of coordination. This is expressed in the last equation of transformation of Galileo: $t'=t$.

The consideration of the world from the viewpoint of the fourth dimension is very natural for the theory of relativity, because according to this theory, time lacks independence.

This is demonstrated in the fourth transformation equation of Lorentz:

$$t' = \frac{t - \frac{v}{c^2} x}{\sqrt{1 - \frac{v^2}{c^2}}}$$

This is not the moment to dwell upon this analysis, for it would be too technical. All these problems about the vision of the universe, the fundamental laws of mechanics, the systems of coordinations, time, space, the absolute, the principle of relativity, the world-ether, the experiences of Michelson, or Morley, of H.A. Lorentz, the special principle of relativity according to Einstein, the world of four dimensions, etc. etc. are all exciting details for intellectual curiosity, but they go beyond the framework that we have outlined here.

Those analyses, formulae, and problems were mentioned to afford a nearer approach to human thought, which otherwise would still remain within purely objective cognition; we wish to present yoghism as the complete fusion of all the directions that general human thought may follow.

Thus it will perhaps be better understood why I have chosen the word Yoghism (in spite of the unpopularity of an additional ISM) in order to place within an accessible doctrine things which, otherwise, could never be discussed within the definition of YOGA. In other words, Yoga is a spiritual experience, and Yoghism is better defined as a way of life flowing from that experience; a MATHESIS within the reach of all Humanity.

In this chapter we have made a rapid summary of what belongs directly to Science and in the preceeding pages

we had reviewed the evolution of human thought from a general viewpoint. This was done with the intention of proving that there is no reason for human thought to be held back, and finally, to show that by the scientific method alone it is impossible fully and surely to REALIZE the TRUTH. Day by day, the most varied and profound problems are studied and thereby either a complete standstill in intelligent advancement will take place (due to catastrophies to a period of obscurantism or to reasons which are too immaterial to be examined here), or else the search for the infinite will lead toward something whose very point of departure is still quite unknown.

This means that a synthesis has to be made, and that time should not be lost in a lot of details, leaving them to technicians who like to specialize in such researches; the Wiseman, the real investigator of Pure Truth, the Initiate, does not require those technical formulae, nor the analysis of details, nor that profound knowledge, but rather, a general realization which will allow him to have, at the same time, an overview of the universe in its infinite greatness and in its infinite smallness, reaching finally the supranormal plane of spiritual realization called SAMADHI, or any other means that might delimit the personality, which is eclipsed, in order to replace it with the individuality which returns to its real place, or still better, which <u>finds again</u> its true nature in the Infinity of Universal Consciousness.

"Truth can walk unarmed
throughout the World..."
--Bedouin Proverb

In 1905, when Einstein published his very coherent report on the theory of general relativity, the courage of his ideas created a great sensation, particularly since there were few important experimental confirmations at that time. Evidently, this scientist underwent many attacks against his ideas (especially those directed against him in 1918 by Philip Lenard of Heidelberg, who was famous for his research on the cathodic rays). These attacks gave rise to excellent commentaries. Scientific progress has developed out of an intellectual amusement rather than as a vital point of real investigation.

The curvature of space is a purely intellectual concept that we approach by transforming the intelligible relations of a continuum of four dimensions, retaining them as surfaces of space, as the learned Harry Schmidt holds in Relativity and the Universe[70]. One must be particularly attentive not to conceive of a "curved space" as necessarily being a sphere!

Let us say at once that those who fully understand these problems are limited in number, there being but a few persons who can follow closely the explanations of the scientists, therefore, the arising of misunderstanding even among the scientists is inevitable, and this means

that an endless amount of time is lost in the attempt to understand a theory of one of the branches of Science, particularly since it is likely that some years later an eminent scholar may upset all conceptions on the subject and one needs then to undertake the study of a new theory, which has new applications, etc....

It is better to have a system of general comprehension, a method at the level of everyone, a doctrine offering a whole.

In the second half of the XVIII Century, Lavoisier founded chemistry on what is practically its present day basis. He attested that Matter is neither created nor destroyed in chemical transformations. This is of great value and it has later been confirmed several times. Indeed, the impossibility of loss or gain in this domain makes us think, on one side, of the alchemic transmutation, and on the other, of the constant evolution of things which prevent the attainment of that final point which will always escape research. This is affirmed by the famous Biblical axiom: "There has been no beginning nor will there be an end"...

All Nature's processes had been explained, but when scholars began to confess that something escaped their inquiry, XVIII Century thought had already solidified the mechanical notion of things into a dogma and this dogma

culminated with the mathematical physicist Lagrange in his Analytic Mechanics, which was published in 1787 (note that Newton published his Principia exactly one hundred years before, that is, in 1687); however, these viewpoints were definitively closed and new horizons of thought were opened by the edition in 1873 of Clark Maxwell's Electricity and Magnetism.

Maupertuis, Clairaut, d'Alembert, Laplace, Fourier, Carnot, and many other physicists and mathematicians form a series of names characterizing the victorious epoch of analysis.

In 1801, Bichat elaborated his theory of organic tissues; in 1835, Johannes Muller described the "cells"; in 1838 and 1839 Schleiden and Schwan established their fundamental character, and in 1840, biology and chemistry could be established on an atomic basis, though the triumph of atomism had to wait until the end of the century and the coming of the electron...

The notion of viewing matter atomically began with Democritus and Lucretius; in modern times John Dalton completed the work of Lavoisier, introducing the idea of the atom in chemistry, just as half a century later, Louis Pasteur did so in biology. Pasteur demonstrated infinite smallness just as astronomers show us infinite greatness... and the History of Humanity goes on with a cascade of names,

some more important than others in the revolutionary theories of science, but without having, in spite of all, replied to primordial questions such as "What is Life? From whence does the mysterious force called life come? What is the reason for this life?" and we omit other highly important questions which are even more embarrassing to Science...

In Nature as we know it, there are numerous static periods corresponding to ordinary matter. In the oldest rocks known to geologists, the molecules have remained intact more than one thousand million years, and not only intact with respect to themselves, but also in respect to their position in relation to others. During this lapse of time, the pulsation of a molecule vibrates at the frequency of the light of yellow sodium, which must be about $16.3 \times 10^{22} = 163{,}000 \times (10^6)^3$. The atom seemed at first indestructible, but we know now that it is not so; furthermore, the apparent indestructibility of the electron begins to seem debatable also...

It is important to note the great similarity among these practically indestructible things; electrons are always very much alike, if not to say identical, as are all the nuclei of hydrogen. Observation of a number of analogous bodies reveals this characteristic uniformity. Thus, common sense leads us to understand that in order

for an organism to survive, it must function in its entirety at the same time, a thought which implies enormous consequences and requires a good deal of reflection.

Aristotle noted biological accidents in his Physicae Auscultations (book II, chapter 8). He applied the same principles which make rain to the structure of the species. The rain does not necessarily fall in order to make wheat grow, nor does its falling necessarily mean the harvested crop will be ruined! ...

The first who dealt with the question of the modification of the species in a really scientific manner undoubtedly was Buffon; nevertheless, it was Lamarck who drew the attention to this theme in Zoologic Philosophy and also in Natural History of Invertebrate Animals. Buffon thought that species were descendants of other species (thus even man), and he defined the neck of the giraffe as being a consequence of the necessity of eating from the branches of trees. He believed in the law of progressive development; what he expounds in his Zoonomia represents a compromise between the viewpoints of Lamarck and Dr. Erasmus Darwin (grandfather of Charles Darwin). Goethe adheres somewhat to the same ideas, and it is interesting to note how he insisted on knowing why cattle have horns, but not what they are used for. These ideas were manifested at the same time in England by Dr.

E. Darwin, in Germany by Goethe, and in France by Geoffrey Saint Hilaire (1794-1875).

Dr. W.C. Wells in 1813, the Hon. Rev. Herbert in 1822, Prof. Grant in 1826, Patrick Matthew in 1831, the famous geologist von Buch in 1836 (who did a physical description of the Canary Islands) were all of the same opinion: that the several species are slowly transformed until they form a permanent species that can no longer be crossed. The American Professor Haldeman advanced some arguments in 1843 supporting the hypothesis of development and modification of the species, and in 1846 the geologist M.J. d'Omallius d'Halley published his opinion that it was more probable that the species descended by modification instead of being produced separately. In 1849, Professor Owen spoke before the British Association about the archetype of ideas manifested in the flesh in diverse modifications, and afterwards, he advanced his theory in his axiom of the continual operation of a creative power... In 1858 he confirmed the differences in the roots of the Apteryx of New Zealand and the Red Heather of England, which were, he said, created in those isles respectively (though the philosopher had to admit that he did not know how or by what procedure).

In 1850, M. Isidore Geoffrey Saint Hilaire observed in his lectures that specific characteristics were fixed for each species if they remained perpetually in the same circumstances, but were modified by change of surroundings.

"To sum up, the observation of wild animals shows the "limited" variability of the species. Experiments on wild animals that were tamed afterwards and of tamed animals passing to wild state show this clearly. These experiments proved, further, that the differences thus obtained may have been a "generic value."

Dr. Freke proclaimed in 1851 that all organic beings descend from one and the same primordial form (Medical Press, Dublin).

Herbert Spencer pronounced in 1852 a thesis on the creation and development of organic beings. He discusses the analogy of several domestic productions and attributed all modifications of embryos of the different species, the difficulty of distinguishing them, and their variety and the principle of general gradation to change of circumstances. He presented a psychology based on the principle of the necessity of acquiring capabilities and mental power gradually.

In 1852 the botanist Naudin held that the formation of the species was analogous to the varieties of cultures, the latest procedures being attributed to man's power of selection! For his part, Dean Herbert thought that earlier species were more plastic than those of today.

In 1853 Count Keyserling expounded his theory of how new diseases arose in the world, caused by miasmas in periods when the germ of the existent species may have been chemi-

cally affected by surrounding molecules of a certain nature, thus giving birth to new forms.

M. Lecocq wrote in 1854: "It is clearly seen that our researches on the fixity or variation of the species leads us directly to the ideas emitted by two justly prominent men: Geoffrey Saint Hilaire and Goethe." (Studies on Botanical Geography vol. I, page 250)

Unge, the famous botanist and paleontologist published[71] in 1852 his belief that the species appeared in accordance with the development and its modifications (Dalton had already expressed that in 1821). Similar viewpoints were published by Oken in his mystic work: Natur-Philosophie; Godron mentions it also in his book On Species ; Bory Saint Vincent, Burdach, Poiret, and Fries were among those who classified the species as one of beings continually produced.

In 1855, Rev. Baden Powell put forth in Essays on the Unity of Worlds a philosophy of the creation wherein he rejected the phenomenon of coincidence in the same way that Sir John Hershel stated that the introduction of a new species would be in contradiction to Nature.

In 1859 von Baer proclaimed the common parentages of all present day creatures (see Zoologisch-Antropologische Untersuchungen and the works of Prof. Rudolf Wagner).

The same year Professor Huxley held a lecture in the Royal Institute on "Persistent Types of Animal Life";

Dr. Hooker published his Introduction to the Australian Flora, and finally, Charles Darwin published his Origin of the Species on the 24th of November 1859.

In spite of the success that Darwinism had, it seems to have lagged now, and the theories on species are no longer discussed with such fervor as other problems which adorn the conversations in the parlors...! It is no longer fashionable, to a certain point, to talk about the "origin of species." We must admit there have arisen new theories which contradict the testimonies of the famous naturalist. I have on hand his English edition of 1906, and simply cannot agree with the definitions on page 671 and the following pages, not to mention the "Paleozoic Strata", which I can neither accept as Professor Ramsay has presented it, nor as Darwin explains it in Chapter X of Origin of the Species, although, in spite of all, it remains as a classical document. Rather than hearing discussions on how the ungulate (or ungulate quadruped) is now divided into "even toes" and "uneven toes" and how the Macrauchenia of South America is a likely link between these two great divisions, I think it would be better to examine more carefully the origin of those variations! The author writes, for example, on page 471: "No one will deny that the Hipparion is an intermediary species between the present day horse and some sort of ancient ungulate"... No, surely not. But it seems that Darwin as the eminent

naturalist that he was might have given us more explanations. It is interesting to note, in the chapter referring to "the state of development of ancient forms as compared with living forms", that the Foraminiferous might have met a fatal end if they had arisen during the Laurentian period, and likewise the Brachiopodae if they had been present during the Cambrian formation, because they would not have had sufficient time to develop their organs up to the natural standard. In fact, the technical extension remains uncertain regarding the real problem: the answer to the eternal investigation.

The long treatises of Charles Darwin made me think, by association of ideas, of Kant, who, having read the appendix of Clairaut's work Figure of the Earth, was so full of admiration, that he got carried away with himself in the superfluous illustrations on capillary action that are found in his Criticism of Pure Reason, Transcendental Analytics, and Second Analogy of Experience.

Everywhere we find the same analytical tendency in opposition to the real sense which ought to be shown in the minds of all the Thinkers.

Even the most versatile seem to stop at fixed lines and limit themselves with technical definitions, often beyond the reach of general comprehension, leaving the student in a terrible state of anxiety, since he either wishes to inquire further, or, on the contrary, wants to forget very

quickly the little he has learned.

Apart from Spinoza, who kept to the ancient way of thought, or Leibnitz, on account of the novelty of his monad , the others such as Locke, Berkeley, Hume, Kant, followed the same current, a fact exemplified by Rene Descartes who, it must be admitted, did no more than express in a well-defined form that "which floated in the air" during his epoch. William James, who often appears to be the initiator of a new stage in philosophy, actually also represents the official inauguration of the influences that already existed in his time. On the other hand, as A.N. Whitehead of Cambridge observed, there remains a certain comfort in the contrast between William James' essays Does Consciousness Exist? published in 1904 and those of Rene Descartes Discourse on the Method published in 1637.

In the first part of Princips de Philosophie section 31, Descartes says: "For instance, due to the fact that some substances cease to resist, they cease also to exist; duration is not different from substance except in thought." Does the great French philosopher mean thereby that thought and body exist with no other needs than their own individualities?

In his distinctions of time and duration, and in the relation between matter and extension, Descartes presages such modern notions as the theory of relativity or Bergson's

theory of the generation of things.

But let us analyze a little more closely some things which commentators generally leave in the dark. In his Meditations II, Descartes says: "I must admit that I neither understand nor imagine what a piece of wax is, for it is only the spirit who perceives it. But what is this piece of wax, that it can only be perceived by thought? Perception is no act of sight or touch, neither of imagination, and never was aught of this kind, and even if it formally were so, it is solely an 'intuition'of the spirit"... The word "intuition is generally used to translate the Latin term "inspectio" employed by Descartes. I do not agree with this manner of translating "inspectio" since it is a theoretical notion which is opposed to the practical meaning of the passage. Furthermore, the word "intuition" is debatable, as I have already mentioned in The Initiatic Centers.

I do not want to begin a lexicological discussion, though it is regrettable to observe how lightly words are used, often without concern for their authentic meaning. "Inspection" (inspectio) cannot at all be associated with intuition, which would rather be the result of lengthy "inspections." Bergson has sufficiently dealt with this; he introduced in philosophy the organic concept of physiological science, changed the static materialism of the XVII Century, protested against specialization as an

affront to the Newtonian concept of Nature as anything but a stark abstraction. His pseudo-anti-intellectualism must be construed in this light; in some way he recalls Descartes, though enhanced by an instinctive grasp of modern biology.

We should speak more about the extreme difficulty of reconciling religion and science. Alas, we must add how difficult it is in particular for the Christian religion to be explained through science and likewise for science to be accepted by religious dogma. At first, it was proclaimed authoritatively that the Christian dogma prevailed over any and all scientific explanations; later, more tolerance was allowed by religious representatives. It is now understood that Science as well as Religion are in continual development because there is no immutability in either case. Religion is no less immutable than Science and both are subject to constant variations. In the early times of Christianity there was a general belief among Christians that the world would come to an end in their lifetime. In fact, it was part of the doctrine and the discipline of their organization, and in the course of time the Christian faith was modified several times according to the circumstances, because time and events in some ways make religion. More than once, solid scientific declarations were attacked by the representatives of Christendom.

In the year 535 the monk Cosmas wrote a book entitled Christian Topography, wherein he asserted, using biblical

texts, that the world was a plain parallelogram, the longitude of which was the double of its latitude...! At the same time he denied the existence of the antipodes. It must be added that he was a traveller, who after visiting India and Ethiopia, preferred to retire to a monastery in Alexandria, the great center of culture in that epoch.

It is well known that the movement of the earth was condemned by a Catholic tribunal in the XVII Century. In the past century, the extension of time calculated by geological science put religious people in conflict. The present doctrine of evolution places religion in a constant commotion; thus science remains incompatible with the spiritual system.

But it would be unjust to say that religion is always false and science always true. The fact is in reality more complex and it would be very hard to explain, because concessions have to be made to both sides. In the course of history, science was not always right, just as religion was not always mistaken.

Thus the erudite Jesuit Petavius has shown that the theologians of the early Christian Centuries used phrases which after the V Century would have been condemned as heretical. Cardinal Newman has produced a very good polemical treatise on the development of this doctrine and he never retracted it during the course of his life (he wrote it before becoming a high Roman Catholic ecclesiastic).

Science is still more changeable than theology, though this is usually so because science has not been able to deliver its theories with sufficient proofs, the conditions for those theories being set up by religion. In the beginning of the medieval epoch heaven was located in the region of Paradise and hell under the ground. Perhaps this definition was not formulated in the high official spheres of religion, yet its order of thought far surpassed the frame of the common people. An idea of this kind of explanation can be found in the Dialogues of Pope Gregory the Great[72], a man whose high official position was surpassed by his services towards Humanity.

I have used here the word "religion" in the sense of Christian religion for two reasons: because as I have already stated in the beginning of my book that it is my wish to address the Western world which is particularly Christian, and moreover, because I discuss here in detail how I have evolved from the Catholic I was; thus my writings are above all the discussion that I have undertaken with myself from childhood, and in this book I engage in the disputes which I often held in my mind; I inquired by the methods which were at my disposal and so this work embraces the overall evolution of my method, somewhat as the Discourses embraces Descartes...

The Christian religion is referred to here because it must be recognized that no other religion ever obstructed

the path of science.

Indeed, I do not offer this book as a method or treatise; it is simply the norm that I have followed. As an intellectual I have analyzed and as a Westerner I have criticized and gradually I have opened for myself a road through this apocalyptical labyrinth in search for Truth. Albert the Great said:[73] "He who penetrates into himself and thus surpasses himself, evolves verily unto God." This is achieved, of course, by means of introspection, and therefore it might be said that the Buddhist method is perhaps the best for the study of the Self since it never contradicts true science (see the data that I present in Mysticism in the XX Century); though for my part I could never entirely adhere to this philosophy, because it is too passive and could never satisfy my active temperament (this is quite a personal judgement). Besides, no conversion has ever taken place in my life. In the course of my studies in search of Truth, I have only analyzed, scrutinized and observed the diverse theories that have been offered to the thinking world, the essence of which I have tried to extract without adopting those dogmas which I only studied for documentation, following the necessary rites in order to impregnate myself with the cult. For this reason I have abandoned nothing, have rejected no creed; with the advancement of my studies, I have acquired, experimented, and agglomerated, thus forming a synthesis of knowledge and

revelations which amounts to a real YOGA in the full meaning of the word.

Through Art, Science, and Philosophy, man seeks a moral code, forgetting that it does not exist for the whole world! It is not even possible to find a moral code for a whole country, yea, not even for a small collectivity, and I refer to what has been so well defined by Ouspensky in Fragment of an Unknown Teaching page 227: "it is said sometimes that the European morality is a Christian morality, but first of all, Christian morality authorizes by itself many different interpretations and many crimes have been justified under this Christian morality! ... Modern Europe has very little in common with Christian morality no matter how we understand this morality. In any case, if Christian morality has brought to Europe such dreadful wars, then would it not be preferable to be as far as possible from such morality?" Evidently everybody acts always for the "good cause"; the author goes on in page 229: "Everybody tries to act in the interest of goodness 'as he understands it'! But everybody understands it differently and consequently men tear each other apart and kill one another in the interest of 'goodness.' The reason is, nevertheless, the same: men's ignorance and the deep sleep in which they live."

Yes, ignorance; this is what lies at the bottom of social problems. The lack of knowledge engenders dogmatism and division; wars arise from this ignorance.

People speak of Christian morality, of love, seemingly without knowing what it is about. Christian morality is something different from what the 30 different so-called Christian religions can teach! People often talk about love without ever taking the first steps in this vast domain, and, as Master Gurdjieff teaches quite correctly:[74] "He who seeks Truth never talks of love or Christianity for he knows how far he is from them. The doctrine is for Christians, those who live according to Christ, and follow all his precepts. Can those who talk of love and morality live after Christ's precepts? Surely NOT. But there will always be charlatanism of this sort. However, there is a sign which does not deceive: those who speak like they are empty men, and it is not worth the trouble to waste time on them." The teaching of George Ivanovitch Gurdjieff was based above all on the work of a group in full identification with the Master. Having lived in India and Tibet, his long experience led him to the recognition of the efficacy of chellahs following their guru blindly. His own words are (page 233 of his Teaching): "The consciousness of one's nothingness alone can conquer the fear of subordination to another's will. However, strange as it may seem, this fear is actually one of the most serious obstacles on a man's path. A man is afraid that he will be made to do things which are opposed to his principles, views, ideas. Moreover, this fear at once creates in him the illusion that he really has principles, views, convictions, which in reality he never had and never could have. A man who never in his life thought of morality

suddenly begins to fear that he will be made to do something immoral! A man who never thought of his health and had done everything possible to ruin it begins to fear that he will be made to do something injurious to it. A man who has lied to everyone everywhere all his life in the most brazen manner begins suddenly to fear that he will be made to tell lies. I knew a drunkard who feared more than anything else that he would be made to drink! Very often because of this fear of being subordinated to another man's will he will find that nothing succeeds, not realizing that subordination to the will of another which is conscienciously accepted is the only way to acquire one's own will."

This psychology of following a Path traced by an Instructor was abandoned a long time ago, and individual analysis had been substituted for the mouth to ear teaching as practiced in the Schools of Initiation. Ancient Wisdom, called for perserverent men who would receive the Sacred Science directly from his Master, but nowadays only the yoga system remains faithful to this tradition. On the other hand (from philosophy through the most hermetic religion), the initiation can be obtained by means of books or personal reasoning; even in the most secret societies the instruction is offered publicly as long as the neophyte takes the trouble to seek it; "pass words","ritual" and details of occult ceremonies are given in popular works though it has to be confessed, there is not much of the real power left to

guard. On the contrary, in Yoga there always remains something to be received from the Guru. The whole preparation for the method can be done without any help, but a moment comes when the pupil needs advice for practices which could be dangerous without the direction of a Master.

Really, only yoga remains as a truly initiatic teaching; in Yoga it is necessary to have recourse to a Master, an experienced guide who will facilitate the work of transmutation and may provide the indispensable stimulus for the "Great Leap" (the great Realization).

The modern age seems to be returning to this psychology of the Path of Initiation, just as occurred in the time of the Great Colleges of other ages. Indeed, psychology, viewed as science only dates from 1833 with Herbart[75] though Wolff had already mentioned it in 1734 in Rational Psychology. We are far from the classification of the five senses by Aristotle, even though he knew more than those five groups which belong only to the physical plane. Surely it is necessary to start from simple physiology and then progress further into the psychic domain. A vast field was opened for research with Joseph Gall, the forerunner of phrenology, and above all, it was Spurzheim, his collaborator till 1813, who opened up this specialty. Doubtless, with Locke, Berkeley and Hume, philosophy was turned into psychology, but something escaped them, as likewise something escaped Rousseau, Pestalozzi and Froebel in their work.

In fact, the more people talk about psychology, the

further they are from it, because in former ages the Ancients had a full and real psychological knowledge and did not use ambivalent words, while now our system in this scientific branch seems to ignore entirely the basis of analysis. However, as I have stated before, it may be said that our age is returning to the former initiatic methods.[76]