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**OPEN COURT**

Devoted to the Science of Religion,  
the Religion of Science, and the Extension  
of the Religious Parliament Idea

FOUNDED BY EDWARD C. HEGELER

MAY, 1930

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VOLUME XLIV    NUMBER 888

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# THE PHILOSOPHICAL REVIEW

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STATUE OF LEIF ERIKSON

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## MODERN ASTRONOMY AND THE NEW COSMOS

BY J. V. NASH

UNTIL the beginning of the sixteenth century, the Ptolemaic system, positing a static earth round which the sun and planets revolved, dominated the mind of man. Then came the revolutionary discovery of Copernicus, who pried the earth loose from its moorings and sent it whirling through space, revolving on its own axis, in its orbit about the sun. The realization that the so-called fixed stars are distant suns followed as a natural sequence; this was one of the great conceptions of Bruno.

Finally, we grew accustomed to speaking of the *universe*, of which our solar system, as we believed, formed an important part. But now it has been revealed that not only is our sun a comparatively insignificant member of our own universe, but that the latter itself is a minor unit in a great galaxy of universes. The cosmos, in short, is not a universe but a pluriverse.

It was not until the end of the eighteenth century that Laplace, a French scientist, worked out his famous Nebular hypothesis, which held that the solar system was born of a whirling cloud of gaseous matter. This theory, attractive and plausible as it was in many respects, failed to survive modern scientific tests; it has now been superseded very widely by the Planetesimal hypothesis.

The testing of the Laplacian theory which definitely proved its untenability, and the subsequent development of the Planetesimal hypothesis, were the work of two Chicago scientists, Dr. Thomas C. Chamberlin, the eminent geologist and naturalist, and Dr. F. R. Moulton, well known as an astronomer and mathematical physicist. Chamberlin and Moulton were ideally fitted by training in two different fields to collaborate in solving the great problem of planetary genesis.

Dr. Moulton, the younger and now the surviving member of the partnership, explains the Planetesimal hypothesis as follows:

"About once in a period of a thousand times a million times a million ( $1,000 \times 1,000,000 \times 1,000,000$ ) years, our sun will, on the average, approach near another sun. Enormous tides will be formed and a certain amount of material will be shot out, and in this way a spiral nebula will be developed. It will contain nuclei and vast quantities of scattered material. The nuclei in their circulation round the central sun will sweep up the scattered material and grow into planets.

"One such nucleus gradually grew into our present earth. The earth originally probably was too small to hold an atmosphere or water on its surface. As it grew in size, by sweeping up the scattered material in its path, its gravitation increased and eventually it became surrounded by an atmosphere and largely covered with water. The process of growth produces circularity, and so those planets that have grown the most should have the most nearly circular orbits, as Jupiter, Saturn, and the others do.

"The earth is still growing by the accretion of particles of matter. It is highly probable that in earlier times there were possibly thousands of pounds of meteoric material falling every day on every square mile of the earth's surface."

Such, in brief, is the substance of the Planetesimal hypothesis, which now seems destined to hold the field indefinitely. Conceived in its first tentative form about 1900, it has steadily made its way into general acceptance in the United States. In England, about 1919, its underlying principles were adopted by Jeans and Jeffreys as the basis of their "tidal theory," which has gained wide currency abroad.

Nevertheless, the Laplacian hypothesis will always command respect as a landmark in scientific progress. It was a truly great achievement when given to the world in 1796, and the fact that it held the field for over a century is in itself a remarkable tribute to its plausibility. It was a beautiful theory, appealing strongly to the imagination. Dr. Moulton himself speaks kindly of it. He believes that it rendered a priceless service by accustoming mankind to the idea of a natural evolution of the earth, involving a time element of millions of years in place of the six thousand years of Biblical chronology. The Planetesimal hypothesis pushes back the ultimate

origin of the earth—and, incidentally, of the life thereon—to an immensely greater distance still. A hundred years ago the world was not ready for such daring conceptions as are involved in the Planetsimal hypothesis.

Dr. Moulton believes that life began on the earth at least two billions of years ago. "Life did not begin," he says, "until our earth had reached approximately its present size, and this was probably two billion—two thousand million—years ago. It is likely that life began first on the seashore, where the air and the soil and the water unite.

"The water dissolved from the rocks various elements, such as sodium, potassium, calcium, iron, and so forth, and carried them in solution into the sea. On the seashore there was an infinite variety of concentration of these various elements. There was also the rhythmic succession of day and night, and the pulsing tides and the lapping waves, which gave a variety so great that it is impossible now to match it artificially.

"Somehow, in a manner unknown, the first steps in the great life sequence upon the earth were taken. Of course, the first forms of life were very low. The smallest micro-organism which we have to-day may be comparatively high in the scale, containing at least 100,000 molecules. Most of the life history of the earth was past before the vertebrates came on.

"During all that period the sun has radiated light and heat upon the earth almost exactly at its present rate, and during all that time the earth has never been visited by any great cataclysm which destroyed all life."

But the earth, important as it is to mankind, is merely one member, and not a particularly significant one, of a large planetary family circling about the sun. Besides the eight principal planets,<sup>1</sup> there are about a thousand smaller ones. The eight major planets are divided into two groups. The four nearest to the sun are called the terrestrial or earthlike planets, and are similar in many ways to the earth. Mercury is less than one-half the size of the earth, and is too small to hold an atmosphere. Mars is one-third smaller than the earth, and has only a very thin atmosphere. Venus is almost exactly

<sup>1</sup> The discovery, early in 1930, at the Flagstaff Observatory, of a trans-neptunian planet increases this planetary group to nine. Professor Chamberlin had forecast the discovery of planetary bodies beyond Neptune. See *The Two Solar Families: The Sun's Children*, pp. 154-156.

the same size as the earth; it is, indeed, often called the earth's twin. It is about 25,000,000 miles nearer the sun, and has so dense an atmosphere that its surface is entirely obscured; hence we are not acquainted with the markings on it.

The question of life on Mars has for long baffled investigation. Mars is about 50,000,000 miles farther from the sun than is the earth; its temperature, according to Dr. Moulton, is on the average about that of the poles on the earth, although during the Martian summer the temperature in the equatorial belt probably rises above freezing.

Some observers have reported curious markings on the surface of Mars, which they thought to be artificial canals constructed for the purpose of irrigating the arid surface of the planet from the melting ice-caps in the Martian polar regions. These ice-caps are clearly visible through our large telescopes. The "canals" of Mars were first reported by Schiaparelli, the Italian astronomer, in the 1870's. In recent years the late Percival Lowell at Flagstaff Observatory, in Arizona, has drawn elaborate maps showing an intricate network of these "canals." Other experts maintain that these markings are an optical illusion; at any rate, no actual photographs of them have ever been secured.

In view of the scarcity of atmosphere and of water, together with the very low temperature and the small size of the planet, Mars does not seem very attractive as a place of residence. In this it differs notably from Venus, where, because of the greater proximity to the sun, the average temperature is, as Dr. Moulton believes, about 150 degrees. In the course of millions of years, however, the planet will slowly cool, so that when the earth becomes too cold to support life in comfort and its natural resources are exhausted Venus may offer a refuge for mankind, if man can in the meantime perfect a means of crossing the gulf of space which separates the two planets. The British scientist, J. B. S. Haldane, has published some fascinating speculations on the subject of the colonization of Venus from the earth.

The other group of planets consists of four globes of tremendous size in comparison with the earth. Jupiter is a thousand times larger. Saturn, Uranus, and Neptune, the outermost planet, complete the group. All four are probably entirely gaseous in composition and, owing to their immense distance from the sun, they receive a negligible amount of light and heat. The quantity of heat



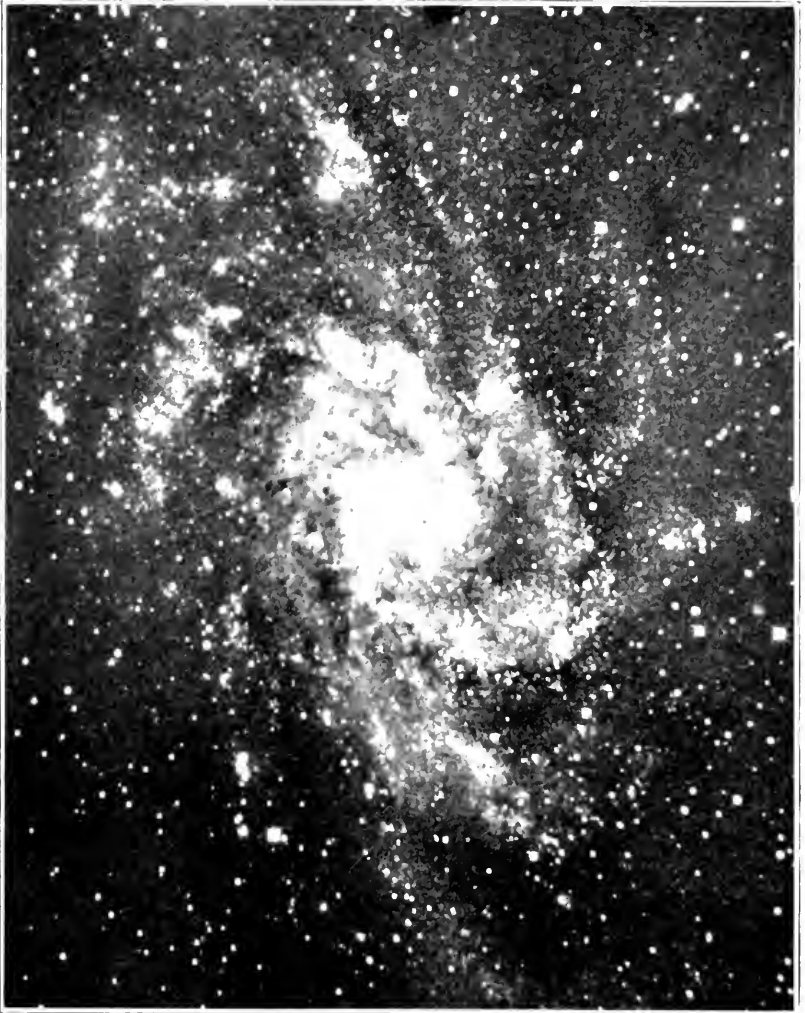
received by Jupiter, for instance, is only one-tenth of that at the North Pole of the earth.

In the space between Mars, the most outlying of the terrestrial planets, and Jupiter, the nearest of the giants, about a thousand planetoids, or little planets, have their orbits. They are of varying sizes, some not more than twenty-five miles in diameter and scarcely visible through the most powerful telescopes, while others attain a diameter of between 200 and 500 miles.

All of the principal planets, except Uranus and Neptune, have been familiar to man since the earliest times, for they are brilliant objects in the sky. Uranus, however, is just beyond the reach of the unaided eye; it was discovered by William Herschel in 1781, and was for a time known by his surname. The orbit of Uranus was soon calculated and the movements of the planet noted for a considerable number of years. This led to one of the most astonishing and dramatic discoveries in the history of astronomy. One of the most impressive characteristics of the universe, as Dr. Moulton likes to emphasize, is its orderliness. Astronomers, therefore, were puzzled because the movements of Uranus, as observed from year to year, did not agree with the mathematical predictions. In the course of time the variation became intolerable to scientists. It was just as perplexing as if every time one added up a given column of figures, and knew that no error had been made, a different total resulted.

Finally, it was suggested that the irregularities in the motion of Uranus might be caused by the disturbing effect of an undiscovered planet. But how should one know where to look for this elusive, unknown planet, invisible to the unaided eye, in the immensity of space? It would first be necessary to work out, by higher mathematics, the supposed orbit of a planet which human eye had never seen, basing the calculations on the accumulated effects of its attraction upon Uranus over a period of sixty years. A young English scientist named Adams and a young Frenchman named LeVerrier, working independently and by different methods, determined the spot where the mysterious planet should be, in the depths of space three billions of miles away. Then a young German named Galle pointed a telescope at the spot indicated by LeVerrier and found the planet now known as Neptune, in almost the exact location where it was believed, on theoretical evidence, to be. This was one of the most memorable discoveries in the history of science.

Strange, erratic members of our solar system are the comets—attenuated gaseous bodies, with brilliantly glowing heads and fanlike



THE GREAT SPIRAL NEBULA IN TRIANGULUM.  
(Yerkes Observatory)

tails often extending for a distance of 100,000,000 miles into space. The tail always points away from the sun, regardless of whether the comet is coming or going. In receding from the sun, a comet's

appearance suggests the headlight of a locomotive on a misty night.

Comets have singular, elongated orbits. They approach the sun from regions far beyond the orbit of Neptune, dash around the solar disc, and retreat again into the outlying regions of space. Occasionally a comet head is disintegrated by collision with a planet or by too closely approaching the sun.

The distances which comets traverse are so enormous that in some cases the periods of their visits to the vicinity of the earth are separated by more than a human lifetime. In 1680, Newton calculated the orbit of a great comet visible at that time and found its periodicity to be 600 years. Its next visit to this part of space is therefore still several centuries distant.

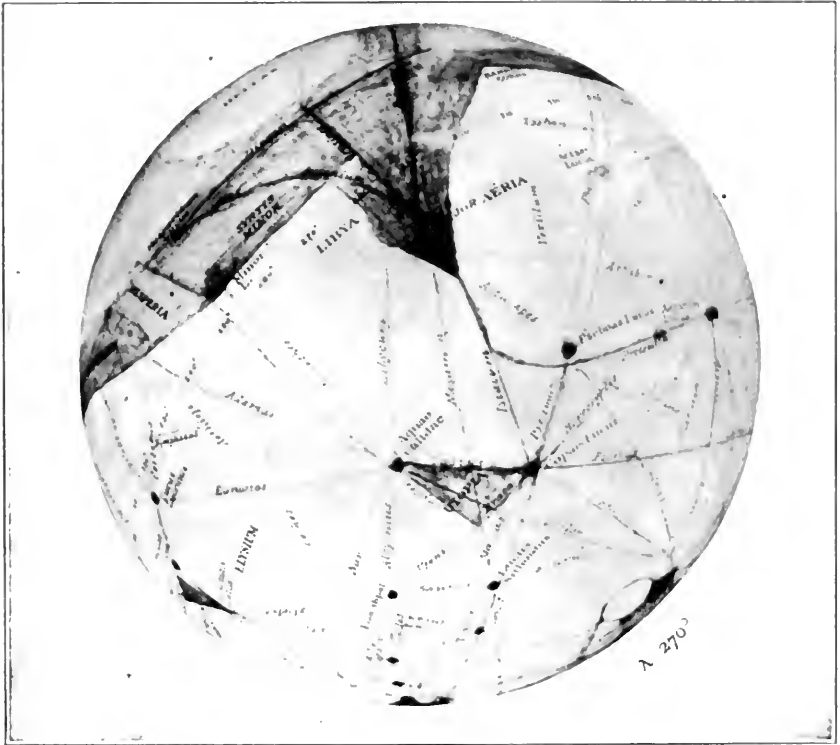
Halley's comet was named for the man who, after the comet's visit in 1682, first worked out its orbit, proving that it was the same comet as those which had aroused excitement in 1607, 1531, 1456, and so on back to 1066, the year in which William the Conqueror landed in England. He predicted its next return in 1759. In other words, its visits are approximately seventy-five years apart. Its next visit was in 1835. Mark Twain, born in that year, had a whimsical belief that he would leave the earth when the comet called again; and as it happened, the comet found him on his deathbed when it blazed into the sky in the spring of 1910. The new-born baby of 1835 had become a white-haired old man of seventy-five years.

The best and most recent explanation of the origin of comets—two complex for discussion here—is that given by the late Dr. T. C. Chamberlin in his last book, *The Two Solar Families: The Sun's Children*.

From the earthly point of view, the sun is first among the heavenly bodies. It is, always has been, and always will be, the ultimate source of all life—vegetable, animal, and human—on the earth. It pours out upon our planet every day the light and heat without which any kind of life would be impossible.

The amount of energy which is thrown into space by the sun is so immense as to be far beyond ordinary comprehension. It has been calculated that the energy radiated per square yard from the sun's surface is equivalent to 70,000 horse power. This represents an amount of heat which would melt a globe of ice as large as the earth in two hours and forty minutes. The earth is constantly re-

ceiving energy from the sun at the rate of 160 horse power per inhabitant; yet less than one two-billionth of the energy thrown out by the sun is intercepted by the earth.



MAP OF MARS, BY LOWELL, SHOWING "CANALS."

(Many leading astronomers question the existence of the "canals." Actual photographs do not disclose these strange markings.)

Again, it is not generally realized that the sun is the cause of all our wind and rain. The sun warms the air over the equatorial regions of the earth more than that over the higher latitudes; the resulting currents that are set up produce our winds. The sun's heat evaporates the water of the ocean and raises it into the air a half-mile or more, the winds carry a part of this water vapor in

over the land, where it falls as rain or snow, and in descending again to the ocean it plunges down steep grades and energy is released, which is increasingly being harnessed by man and converted into electric power. The amount of work that the sun does in raising water which falls again as rain may be realized when it is shown that in the eastern half of the United States, where the annual rainfall is about 35 inches, 2,000,000 tons of water fall on each square mile from a height of half a mile or more.

The titanic storms that rage on the surface of the sun are among the most extraordinary of celestial phenomena. They occur with greater intensity and frequency about every eleven years. The spots produced by sun storms range in diameter from the limits of visibility up to more than a hundred thousand miles across. In these storms huge masses of vaporous heated substances, sometimes hundreds of times larger than our earth, are driven hither and thither, with a speed ranging into hundreds of miles a minute. They are sometimes thrown aloft to a height above the sun's surface twice as great as the distance from the earth to the moon; in other words, to a distance of half a million miles. If the earth were lashed by one of these terrific whips of flame, life would be annihilated.

Looked at from the sun, our earth, at a distance of nearly 93,000,000 miles, would appear as a tiny speck. The size of the sun in comparison with the earth may be illustrated by imagining the earth placed at its center and the moon revolving round it as at present. We should find that the moon's orbit would be not only wholly within the sun, but hardly more than half way from the sun's center.

Of the moon, little need be said here. As the heavenly body nearest the earth, it has from the earliest times been a source of lively curiosity to man. Many superstitions have grown up about it; the word *lunatic*, meaning literally "moon-struck," is a reminiscence of one of these superstitions. Others had to do with the supposed effect of the moon on vegetation and crops. The moon was the basis of the first calendar; it gave mankind the *month*.

Many primitive races regarded the moon, like the sun, as a divinity; the moon deity, especially, occupied an important place in their mythologies. The marks on the face of the moon, clearly visible without a glass on a bright night, gave rise to the legend of "the man in the moon." Widely separated tribes, from the Eskimos of the Arctic to the South Sea Islanders, have their stories about

"the man in the moon." An eclipse of the moon was regarded with consternation as an evil portent.

The moon is a dead world, airless and waterless, wandering in its orbit about the earth, and turning on its axis in the same period that it revolves round our planet, so that the same side is forever facing us. Its face is deeply pitted and scarred. There are mountain ranges on the moon, and some 30,000 so-called craters have been mapped. The great lunar crater Theophilus is 64 miles in diameter and 19,000 feet deep. In its center rises a peak 11,000 feet above the plain on which it rests.

Though the moon is devoid of life, it figures largely in human sentiment. When at its full, glowing softly with a tender radiance on summer nights, it has inspired poets and lovers alike. Romance and literature would be poorer without the moon.

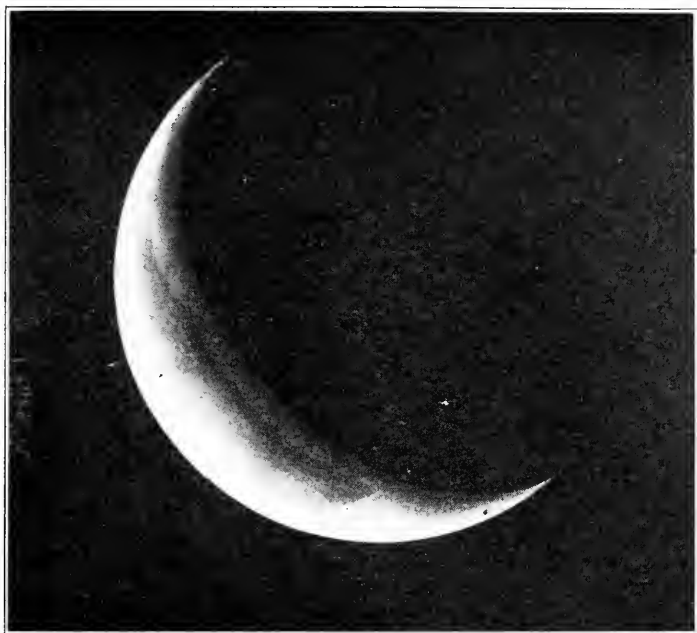
Conditions on the moon are widely different from those on earth. A lunar day, for instance, lasts about fifteen of our days, and a lunar night is of the same duration. The surface is heated to probably above the boiling point during the long day, while in the lunar night it falls to at least 100 degrees below zero. A human body on the moon would weigh only about one-sixth as much as on the earth.

But our entire solar system is itself only a relatively insignificant unit in the cosmos. The starry heavens, the contemplation of which so deeply stirred the mind of the philosopher Kant, offer on a cloudless night the most glorious of spectacles. The vast dome of the sky is, as it were, spangled with brilliant jewels—diamonds, emeralds, sapphires, topazes, turquoises, and rubies. Some of them are arranged in curious and intricate patterns, such as the Big Dipper in *Ursus Major*, the semi-circle in *Corona Borealis*, the diamond in *Delphinus*, the cross in *Cygnus*, and so on.

Each of the innumerable stars is an immense sun, many almost inconceivably larger than our own. *Betelgeuse*, for instance, measured by the interferometer, has been found to be twenty-seven million times as great in volume as our sun, which itself is a million times larger than the earth. The star known as *Red Antares* is even larger than *Betelgeuze*. It is conceivable that these other suns may have families of planets circling round them; but in any case, they would be invisible with the most powerful telescopes.

The story of stellar evolution is told in the colors of the stars,

which range from a dull red, through yellow and bluish-white and back again to red. Our own sun is in the yellow stage; it is well along in life, but still far from old. Doubtless there are many black,



VENUS, AS SEEN BY E. E. BARNARD, LICK OBSERVATORY.  
(Note resemblance to new moon.)

burnt-out suns drifting dead and cold in the abysses of space. Occasionally such a dead sun will collide with another sun, either living or dead, and the terrific impact will turn the colliding bodies into an incandescent state, to begin another life cycle. From time to time astronomers witness a conflagration suddenly blaze up where no star was observed before. The new star may have been born thousands of years ago, and its light, traversing the gulfs of space at the rate of 186,000 miles a second, is just reaching us.<sup>2</sup>

About 5,000 stars are visible with the unaided eye. But powerful telescopes reveal myriads more. At least 500,000,000 stars are

<sup>2</sup> Some stars are of such almost incredible density that a cupful of their material, according to a recent statement by Professor Frost, would weigh many tons.

now known to astronomers. A photograph of some parts of the sky, as seen through a large telescope, will show innumerable points of light packed so closely together that they form an almost solid mass; yet each of the little dots is actually millions times millions of miles distant from its nearest neighbor.

To form an idea of the distance between the stars, let us imagine a sphere with the earth as its center, the sphere having a radius of 200,000 times 100,000,000 miles in all directions. There would be no star within that sphere except our own sun.

One of the latest triumphs of astronomy is the mapping of the position of our solar system. "Our sun," says Dr. Moulton, "lies deep in a galaxy shaped like a lens or a watch. This galaxy consists of at least a thousand million suns comparable to our own. About half of them are in most respects very much like our own sun, but some of them radiate thousands of times as much light, and and some of them are millions of times as great in volume.

"The thickness of this galaxy is the distance that light travels in twenty or thirty thousand years. Its distance through, from edge to edge, is approximately ten times this distance, or that which light travels in 200,000 or 300,000 years.

"Outside of our galaxy are other galaxies in enormous numbers. Only recently have we been able to measure the distance to them. The nearest, which has been known as the Andromeda Nebula, was found by Hubble to be distant about 1,000,000 light years. Most of them are much farther from us than the Andromeda Nebula. We photograph some that are so far away that light has been on its way to us millions of years, and we see them as they were at that long ago epoch.

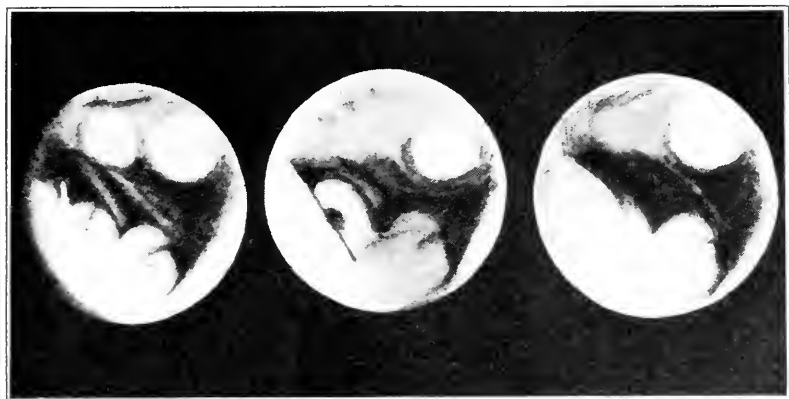
"It may be that these galaxies in great numbers together form a super-galaxy, just as myriads of stars together constitute our galaxy, and it is quite possible that many super-galaxies make up a larger cosmic unit which may be called a super-galaxy of the second order. Even then we probably have not reached the limit, for super-galaxies of higher and higher orders may exist without end."

Dr. Moulton, when discussing astronomy, warms up to his subject in a contagious way. "I used to think, when a boy," he said reminiscently, "that the days of adventure and discovery were over, and I felt sorry for it, as there seemed to be nothing left for the explorer to do. But when I became an astronomer I found that



Columbus never had such an adventure as a person gets when he explores the depths of the universe. Now I am glad that I did not live any earlier, because of the marvelous riches that science has brought to us in our own day, which make life really worth living.

"With our powerful telescopes," he continued, "we sweep the heavens, and millions of stars are revealed to us which the naked



VIEWS OF MARS, BY BARNARD, AT LICK OBSERVATORY.

eye never sees. Many stars, indeed, are so distant that they can be detected only by long exposure of delicate photographic plates.

"Every star, of course, is a sun. We have called the stars fixed, just as we used to speak of *the eternal hills*; but only poets now speak of the eternal hills, for we know that to-morrow, geologically speaking, they will disappear. So the stars are moving, but they are moving so slowly from our point of view that it takes a long time to detect the movement even with the most powerful telescopes. But we know from their distribution, from the forces operating on them, and from the underlying laws controlling them, that they are moving around among each other like bees in a swarm, or people on State Street on a busy afternoon.

"If we watch these suns for only two hundred years, we find that they seem to be moving in straight lines, but if we could watch them for 20,000 or perhaps 200,000 years, we should observe a curvature in their paths. Our sun moves, with respect to other

stars, about 400,000,000 miles per year. The distance of the stars from us is so vast that it is best expressed in light-years, which



THE FULL MOON  
Yerkes Observatory

means the time that it takes their light, traveling at nearly 200,000 miles per second, to reach the earth. Many of the stars are millions of light-years distant.

"One naturally recoils from these bewildering figures. The thing seems unreal because it is unfamiliar. But to those of us who

are familiar with it and are mathematicians the difficulties are not serious. There are more mental difficulties in comprehending an atom than there are in these great stellar galaxies. I might say that there is as much mystery in the radio. Is it not hard to conceive of the marvellous amplification by the audion of those feeble impulses that go through the ether?"

We know not only the distances, the sizes, and the ages of the stars, but also of what elements they are composed. A great philosopher once declared that the latter was one of the few things which mankind would never know.

"Every kind of substance," Dr. Moulton pointed out, in explaining the operation of spectrum analysis, "gives forth a certain kind of light. Iron, sodium, calcium, and so on, each gives its own special light. If there is a certain character of light that travels twenty feet in the laboratory, it will be the same if it comes millions of miles from the sun. So from the character of light that comes from the sun, as registered by the lines in the spectrum, we can determine what is in the sun. We know that there are iron, nickel, and cobalt in the sun, and in fact most of the common elements. The gas called *helium*, now known to exist on the earth and produced commercially, was first discovered in the sun. The sun and the earth are composed of the same things, though perhaps not in the same proportions. That is not so startling, however, for all the elements are made of electrons, and it may be that all the elements we have are all that can exist."

Our solar system, the earth, and man himself are reduced to insignificance, from a quantitative standpoint, when we go with an astronomer like Dr. Moulton on a mental exploration trip through the vast reaches of the universe, passing on the way myriads of flaming suns which could swallow our own, and glimpse far beyond our own universe the boundaries of other universes of whose existence a few years ago we were unaware. But then one thinks of the human intelligence which measures these distant suns and charts the depths of cosmic space. The study of astronomy humbles man, but paradoxically it gives one a new sense of human dignity and worth.

## LEIF ERIKSON OF THE SAGAS

BY CORNELIA STEKETEE HULST

### III. Leif Erikson's Vinland

WHEN men of New England came to realize vividly that Leif Erikson had discovered their country, had built a house on their soil and spent a winter there, followed by members of his family immediately and by members of his race for centuries, that he was ours as Columbus was, they were deeply moved and proceeded to express their enthusiasm for this heroic past in such a way that the world and future generations might know. Their first interest had been enlisted some forty years before and had died down for lack of nourishing, but in 1876 it was revived and brought to fruition in the Monument which they erected to Leif Erikson in Boston, on Commonwealth Avenue, by public subscription. At just that time the enthusiasm for Ole Bull, the great Norwegian violinist, was at its height, and the two enthusiasms were so closely united and related that it would be hard to decide whether the great Discoverer or the great Violinist of the North were the more honored in that observance. Even in the heroic statue which crowns the shaft this question rises, for the sculptor used Ole Bull as the model of the statue of Leif Erikson.

Be the answer what it may to these questions, that relation between the two is another story, a very beautiful story in which Boston, and New England, are revealed in one of the highest and happiest moods and a circle of their distinguished men are seen to great advantage—Longfellow, more than any other in the locality, had opened the way for the adventure, and Edward Everett Hale had moved the formation of the Committee, the Norsemen Memorial Committee of New England, to take the raising of funds in charge for the erection of a fit Monument.

It was a very distinguished Committee, but that, also, belongs

to the other story, except the fact that one of its members was Professor Eben Norton Horsford, who is the hero of this particular story because he undertook the search for Leif Erikson's Vinland and made some most interesting discoveries, which will be recounted here.

When Professor Horsford served on the Norsemen Memorial Committee in 1876, he became so thoroughly interested in evidences that the Norsemen had been in New England that he took up this subject as a Quest and spared no effort or expense in following trails in his study to the end. A chemist by profession, the Professor of Chemistry in Harvard University, he became expert in the history of the Norsemen both before and after they discovered America, and in his search for Leif Erikson's Vinland he developed into a keen archaeologist.

In preparation for his investigations, Professor Horsford studied the Sagas and all other literature that he could obtain bearing on the subject of the Northmen, their history, their habits, their customs, their architecture, and the like, as well as what pertained to the American past, including accounts of the French Voyageurs who used to visit the New England Coast. Nothing that might have a bearing on the subject was foreign to him, and he even went to the length of engaging a scholar from Iceland to come to this country and assist him in translations and in covering the whole ground. Then he applied this knowledge in his search for the spot where Leif Erikson and his men made their landing, built their house, had spent the winter of 1000-1001, taking the whole field into consideration.

In addition to this expert knowledge of the Norse facts relating to his subject, Professor Horsford had for his equipment an uncommon knowledge of the Indian language, life, and affairs, for his father had been a missionary among the Indians and had known their language so well that he translated a part of the Bible into the Indian tongue. It was his knowledge of the Indian language which enabled him, as will be seen, to solve incidentally one of the questions that had long vexed historians, the question of Norumbega, which had been considered previously only in connection with the Voyageurs but now proved to be related to the Norsemen also. As used by the French Voyageurs in the 16th Century, the name *Norumbega* applied to a place that they visited at the head waters of a river, which river they also called the Norumbega. Early his-

torians had been agreed that the Norumbega was the Penobscot River, in Maine, and later historians had come to believe that it was the Hudson River.

Professor Horsford proceeded to investigate the head waters of all of the larger rivers that enter the Atlantic Ocean, trying to identify the physical features that were mentioned in the Saga, where it is told that Leif Erikson (1) sailed into a Bay, (2) then entered a River, (3) crossed a Lake, (4) again entered the River above, and navigated it as far as it would float his ship, to its head waters. At that spot he beached his boat and built his house, to shelter his thirty-five men for the winter.

Going over the ground very carefully, Professor Horsford concluded that all of these physical features, (1) Bay, (2) River, (3) Lake, (4) River to head waters, were not found in any of the other rivers entering the Atlantic, but were found in the Charles River, which showed exactly the physical features mentioned, these being identified as (1) Boston Bay, (2) the Charles River between Boston and Cambridge, (3) the Back Bay, (4) and the Charles River up to Gerry's Landing. These were many and distinctive points which corresponded, and there was not one point which failed to correspond with those mentioned in the Saga, therefore the location of Vinland seemed to have been discovered.

But could this be verified by any other process, making assurance doubly sure? Professor Horsford proceeded to investigate a piece of land that he knew of, which lies at the junction of Stony Brook with the Charles River near Waltham, a few miles above Cambridge. At this point there had been, from time immemorial, and before the arrival of the English settlers, a cobblestone pavement of considerable extent, and, on the upper bank of Stony Brook, a stone wall which extended up the stream for a considerable distance. From the first, it had been supposed that these were of Indian origin.

But Professor Horsford knew that Indians had never been known to do such work as this cobblestone pavement and this stone wall showed, and he knew that the Norse people made stone pavements like this to dry their fish on and also that they built stone walls. The Norsemen had valued Vinland for its timber, and this wall was such as they would need in lumbering, to keep the debries from filling Stony Brook when logs were being floated down it into the Charles River, after which there would be no difficulty in float-

ing them. Here, then, were two excellent pieces of objective evidence locating Leif Erikson's Vinland, and here was the very spot where the Norsemen had dried their fish and obtained their supplies of timber.

And now he could unlock the mystery of *Norumbega*, also, which place had lain at the head waters of a river, as had Leif Erikson's camp. His knowledge of the old Norse language of the Saga and his knowledge of the Indian language enabled him to see that *Norumbega* was an Indian rendering of the name, derived from the Norse form, *Norvegr*, which was the name of *Norway* as spelled in the ancient Sagas. He also saw that this change in form had occurred because the Indians had no *v* in their language and could not pronounce that letter, but would have to substitute a *b* for it. Introducing this *b* with their characteristic mumbling sound, *um*, they would make the name of their visitors *Norumbegr*, the name of the camp and the river becoming *Norumbega*.

Professor Horsford might well have exclaimed, "Eureka!", "I have found it!", for he had solved the double problem of the location of the camp of the Northmen and the stopping place of the Voyageurs, while the name *Norumbega*, as the Voyageurs used it, supplied added proof that the Norsemen's camp had been at this spot. It also supplied an additional fact, that so late as the 16th Century it had been known among the French by the Norsemen's name.

The large tract of land at the mouth of Stony Brook, including the pavement and the stone wall, were now purchased by Professor Horsford and presented as a Park to the people of the State of Massachusetts, the most significant spot being marked with a lofty stone tower, which bears an elaborate inscription telling of the relation of the Norsemen to this place from 1000 to 1347. Inside the tower, a winding stairway leads to the top, where visitors may climb up and look out upon the Vinland of Leif Erikson.

Could any further proof be found, to put seal of finality upon these theories and conclusions? Could the spot where Leif Erikson's house had stood be located? With the instinct of a Schliemann locating a buried Troy, Professor Horsford turned to Gerry's Landing, where there was a treeless Commons that had been used as a Commons in that condition from the arrival of the first English settlers. The spot had never had trees, and no house had

ever been built on it within the memory of living men. It was a very significant fact that it had had no trees *though in a wooded country*; that no house had ever been built on it had not been fully proved.

Here was a case for a Sherlock Holmes, and a Sherlock Holmes Professor Horsford now proved himself to be. First, he engaged experts to examine all records of the locality, to find out whether a house had ever been built on this land since English colonists had settled there. The result was negative. Now he was certain that if investigation brought the foundation of a house to light, it would be that of Leif Erikson, for Indians did not build houses with foundations. He made the investigation. In the sod which overgrew the place he found a raised ridge of land, rectangular in shape, and large enough to provide floorspace for the thirty-five men in Leif Erikson's company. Again, he must have exclaimed, "Eureka!"

Could any other possible test be applied, of an objective nature, to put seal upon seal to his conclusions? Yes; one. From his study of ancient Norse houses, Professor Horsford knew that Leif Erikson's house would have no chimney and no windows, but that it would have an opening in the center of the roof to let in the air and let out the smoke, and that the place for the fire would be located just under this opening, in the central spot of the floor, where diagonal lines from the corners crossed. He therefore reasoned that excavation at this central spot within the raised ridges which marked the foundation wall would bring to light the fireplace built by Leif Erikson for his house, and possibly even traces of his fires. He made ready to excavate.

Professor Horsford was a man of sentiment and deep feeling as well as of penetration and logic, and he decided that the moment of this final test should be heightened by a fitting ceremony. His daughter, Miss Cornelia Horsford, had given him tireless assistance and the keenest sympathy in his former investigations, so he chose her to preside at this discovery, for he had no doubt that it would be a crowning discovery. Accordingly, Miss Cornelia Horsford occupied the seat of honor on the appointed day and directed the workmen where to put in their picks and shovels. In the central spot in the floor, where diagonals crossed, placed in such a way as to hold a fire, they unearthed a cluster of stones. And, among the stones there were still traces of the fires that had been built there . . .



It will be observed that Professor Horsford's discoveries presented a perfect sequence:

(1) The physical features of the Charles River, including Boston Bay, Charles River, Back Bay, and Gerry's Landing satisfied the features mentioned in the Saga exactly, as the features of no other locality did;

(2) The stone pavement and wall at Stony Brook, at a spot that corresponded to that which the Saga told of, were evidence that fish and timber had been cared for in the Norwegian way in that place;

(3) The name *Norumbega*, derived from *Norvegr*, gave evidence from the Indian and the French language of what race had been there;

(4) The raised ridge of sod surrounded by the treeless Commons presented exactly such conditions as would have been shown by the foundation of Leif Erikson's house and the clearing around it, the floorspace being large enough to accommodate Leif Erikson's men;

(5) The fireplace was found in the center of the floorspace and the stones were arranged as the ancient Norsemen would have arranged them, but as later settlers would not.

Professor Horsford wrote out an account of what he had discovered and presented copies of his book to libraries in this country and abroad, thus contributing a worthy chapter to the story of the Norsemen in America. His work was finished about 1890, and to him it had been a great joy.

One of Professor Horsford's days that was particularly happy may serve as an end to this story of his achievements, a day spent in company with a kindred spirit, a day that brought a new confirmation of his conclusion as to the location of Leif Erikson's house. It was that on which Professor Rasmus B. Anderson, of Madison, Wisconsin, visited him, the author of the book *America Not Discovered by Columbus*, in which Leif Erikson was shown as the earlier Discoverer, a fact that had been known, but was not appreciated. This book had aroused great interest in the Seventies, following a course of lectures which Professor Anderson had given in the Sixties, when he had had the great success of winning Ole Bull to an enthusiasm for Leif Erikson. This was an en-

thusiasm which was soon to be awakened in Longfellow, a reverent friend of Ole Bull's, and in the other members of the New England Memorial Committee of 1876, including Professor Horsford, who was to take upon himself the work that has been recounted.

It was Professor Anderson, thus, who had given the initial impulse that ended in the studies of Professor Horsford and the discoveries that these had led to, and it was a Red Letter Day for both when they walked together over the ground of Leif Erikson's Vinland—for they had no doubt that what Professor Horsford had found was Leif Erikson's Vinland. As they stood on the Commons at Gerry's Landing, Professor Horsford said, "Now I will not point out to you just where the house of Leif Erikson stood, but you may make the discovery for yourself." It was not a hard thing to do, for out of the level sod of the Commons rose the well defined rectangular ridge, also grass-grown.

This Commons at Gerry's Landing was public property, owned by Cambridge, so Professor Horsford could not buy it and present it as another State Park, as he had bought the land at Stony Brook and presented it to the people of Massachusetts, but he obtained permission from the authorities to mark the spot suitably, protected it properly by fencing it in, and placed a marker there to tell its history.

## HOW CAN YOU HELP BELIEVING?

BY T. SWANN HARDING

**I**T was my pleasure but recently to hear a lecture by a Scottish gentleman who was a Vice President of the American Society for Psychical Research. He seemed to be the hard-headed sort, difficult to convince, slow to believe, and he was distinctly above average in intelligence and education. Yet his ready capacity for belief almost made me feel that he might say any minute—"Tell me something preposterous—no matter what—and I'll believe it right away!" Given his premises, he built up an extremely logical and convincing case for the existence in the "invisible parts of this world" of disembodied spirits of the departed who could, with proper human cooperation, communicate with those of us who have not yet passed on into dematerialization. Fraud he brushed aside with a mere gesture, telling us that any alert investigator could easily detect fraud after two or three sittings. The "facts" he presented were those of Home and of Piper, of aerial guitars and violins being played without human contact but at human command and, finally, the case of deceased brother Walter who worked through sister Marjorie in Boston.

Walter was proved by experiment to breathe carbon dioxide—when he desired to respire; he whistled while the mouths of his audience were proven closed by a method that seemed convincing in the telling; he sang and told jokes and finally produced his finger prints in suitable wax. The finger prints were certified to be Walter's, and not those of any present at the seance, by a "government expert," and experts at various police headquarters. This sounded imposing and, though irrelevant to the basic matter at issue, seemed to prove "scientifically" convincing.

Eventually the lecturer summarized. He concluded from these facts, attested to be such by eminent scientific men, that disembodied spirits do exist, that they do communicate with living human beings under proper conditions, that immortality is an undeniable scientific fact, and that the persistence of the personality after death is scientifically established. Naturally he adduced such men as Crooks, Wallace, James, Hyslop, Flammarion, Lodge and Meyers as pure scientists who were convinced of these things, and the authority of their unassailable scientific achievements was expected to convince us, the lecturer's hearers, about matters remote from their specialized field. Yet the scientist's normal problems and training perhaps render him even more gullible by magical or psychic sharpers than the ordinary man of intelligence who has not so rigorously concentrated his attention upon material reality.

I was left with a perfectly overwhelming astonishment at the ability of people to believe. Belief remains unregulated as yet in civilized society. All tribes everywhere have found it necessary to restrict the powerful sex urge by some means or other, and civilized men have built thereupon a very ideal and almost ethereal structure of romantic love. Most men have erected about the pure hunger urge limitations which have finally produced an edifice that is almost esthetic regarding what is basically a very ordinary and slightly repulsive physiological act. But about this equally powerful urge to believe we have done almost nothing, and even scientists tend over and over again merely to find facts to support their personal prejudices, or bad reasons for believing what they believe on instinct anyway. The urge to believe badly needs regulation, restriction and scientific management.

It became quite plain to me as the lecturer spoke that he neither knew scientists nor did he have any practical experience with scientific method. Eighteen years in laboratories of chemical research have all but convinced me that it is quite possible for a man to take any belief whatever and find more than adequate facts and reasons to support it—right at the same time that other scientists believe the opposite and find facts and reasons apparently just as adequate to support them. Secondly I have discovered that scientists are not—even the greatest of them—competent critics of all things. They are usually quite narrow specialists who, while alert and highly critical in restricted segments of experience, may readily be imposed

upon elsewhere, while their views about matters remote from their specialty are usually no more profound or wise than those of a chiropractor on economics or of a dentist or a motorman on the Einstein theory.

Thirdly—and what is so frequently neglected by laymen—a research investigator does not attain gigantic and gargantuan conclusions from groups of startling but essentially uncorrelated phenomena even after he has encountered such phenomena for thirty or forty years. He is not impelled to brush aside objections, assume fraud is impossible (i. e. that his shrewdness is matchless) and reach positive conclusions of tremendous import in the face of curious facts which elude his comprehension. In short even I, with my modest laboratory experience, known too well how easily inanimate things can completely baffle or deceive the investigator in physical science to permit me to believe psychic hypotheses very readily. The lecturer spoke on “scientific proofs of immortality;” he presumed to be following scientific method; he made it plain that he had no accurate conception of scientific method at all.

Returning to the lecture: There were adduced certain events and certain people certainly saw certain mysterious things. These events were the effects of causes unknown. Yet from the effects the lecturer hypothecated the cause; he then at once hypothecated from the hypothetical cause an entire system of broad philosophical views. This astounding procedure he presented to us as scientific. As a matter of fact it was not even a good caricature of scientific procedure, and yet it is increasingly evident to me that for some reason such procedures pass current among quite intelligent people today as thoroughly grounded in scientific method.

In the first place no true scientist casually brushes aside the possibility of fraud or error. He is very self-critical and self-analytical and realizes that even the hardest material facts repeatedly impose upon his judgment. In the second place he is very careful how he hypothecates causes when he is faced with what is a mere heterogenous collection of happenings or effects. Thirdly, he is definitely opposed to the process of drawing broad, general philosophical conclusions from his work, so much so that he at times tends to ignore the encroachments of other metaphysical systems which seriously threaten his method and the continuation of his researches.

The amazing capacity of human beings for belief, however, astounds me more than anything else. Something ought to be done about it! I repeatedly determine not to be astounded by it and yet just as repeatedly find myself astounded all over again. After eighteen years of research chemistry I found that I knew a little about a narrowly segregated field of the chemistry of the sugars and, later, a little bit about the chemistry of the endocrine glands and of nutrition. Lead me but a step or two from my narrow pasture, even though you still have me in the field of organic or biological chemistry, and you could readily fool me. As to spiritualistic phenomena, while the lecturer I heard brushed fraud aside with a mere gesture. I have read many books by apparently careful, sincere and honest investigators who declared that it was almost impossible to guard against fraud while the books that I have read on magic continually attest to the great ease with which the very wisest people, including scientists, may be so utterly fooled by shrewd magicians that they will make the most grotesque assertions as their positive beliefs.

The more I think about it the more I am convinced that science is on the wrong track. Its attempt is to be completely impersonal, objective and unprejudiced, yet a man can no more get away from his mental preconceptions than he can get away from gravitation or atmospheric pressure, while his attempt to do this tends to render science as remote from and irrelevant to life as a new system of magic. Scientists should direct their efforts rather to the attempt first to sleuth out their own human prejudices and to make allowances for them. They need to be more human. Then they need to study the reason why people believe what they do and their processes of accumulating knowledge. It is well known that no two people exposed to the same phenomena will ever believe exactly the same about them, yet science tends to proceed in an air tight compartment where the contrary assumption is made or implied.

No two scientists can read the same instrument of refined precision alike. No two can get precisely the same identical results when they perform simple chemical analyses. They know this—they distrust their senses and strive for "true" results by making allowances for innate personal errors and by averaging dozens of results secured by various investigators. Even then it is not uncommon for a

scientist to write in his published paper, "It seems very strange to us that a solution of ecstatic acid should behave so differently in Dr. Blob's laboratory from the way it behaves in ours." The assumption is that Dr. Blob either does not know what he is doing, unavoidably gets wrong results, is simply careless or else too unintelligent to interpret his own data. All this—and yet how easily psychic investigators reach momentous "scientific" conclusions in a field infinitely more complex!

The question science must solve is—why do these same facts, why does this same phenomenon, result in such diverse beliefs? The greatest difficulty all of us have to face is that tendency we all have to believe before the facts justify belief, and to set up a dogma before we know half enough to attempt that. The hardest task we shall have is that of indulging in sufficient self-analysis to smoke out our own wishful desires and to see wherein and how much they motivate our beliefs. These basic human problems science should cease to ignore but attend immediately.

The lecturer I heard was operating in a sphere where I can have no beliefs. If it took me two years to ferret out only in part one very minute fact about the chemistry of milk production in a cow—only to raise more problems in the process than I could solve in ten years more—I am unwilling to believe that any committee of scientists could possibly be justified in making the conclusions the lecturer attributed to them, until they had spent at least two or three hundred years on the investigation. The lecturer remarked that all skeptics became convinced by the phenomena as the years passed and that after twenty years of investigation the most redoubtable of them became firm believers. I may counter this by remarking that after eighteen years' work in the field of a science which is child's play in simplicity compared to psychic research I believe so much less than when I began that I can merely survey the mass of my ignorance in humility and awe. Yet I was surveying a square inch with a microscope while psychic research embraces the universe as its field.

My amazement remains that this hard-headed, intelligent Scottish gentleman I heard speak could possibly believe so much and so easily. I constantly marvel at the ease with which people believe all sorts of things and declare that their beliefs are founded upon science. I certainly have had more experience with science than 90

per cent of them and yet I cannot possibly learn this trick. The more I study science, in fact, the more difficult it becomes for me to be facile in belief.

In his work on *Contemporary Sociological Theories* Sororkin emphasizes the chaotic condition of the social sciences. Odum, in *Man's Quest for Social Guidance* found—with the greatest ease—more than five hundred ideal systems of government carefully embalmed in books and quite consistently irrelevant to the actual problems of human society. So long has it been the custom for a man to believe certain things and then to pull the system out of his head and embalm it in a book as “the principles” of economics, politics or sociology, that consultation with the facts has all but ceased to occur or to be considered necessary. Such people, in common with most writers who claim to base their theories on science, merely pick out facts to support their contentions, ignore inimical facts and send their book or article to print.

Yet it is very apparent that the social sciences, which are in chaos because so many facts still need to be ascertained, are much simpler than the “science” of psychism, which is not only tremendously complex but remains in a rudimentary state. It therefore seems wisest in considering belief to approach something simpler than even the social sciences. I suggest medicine.

Every faith healer and quack produces indubitable effects. From these effects millions of people reason that the therapeutic procedure, which may have been totally irrelevant, was actually causative of renewed health. Actually the simple, unassisted processes of nature may have accomplished what was accomplished, or else the restoration of confidence by some impressive procedure, no matter what, worked organically and chemically according to known natural laws to accomplish healing.

When we enter the portals of orthodox medicine we do not leave this process behind by any means. Consider but one disease which I happen to have studied a little—rickets. In 1892 one doctor considered cod liver oil excellent for rickets, but he was absolutely positive that this was because of its highly digestible and nutritious fat content. In 1897 certain Germans cured case after case of rickets by administering phosphorus. In 1845, however, the disease was known to be caused by impure and damp air and to be cured by eating no starch and dosing up on iron, soda, quinine and port wine.



In 1819 experts declared rickets was far less prevalent than formerly because cold baths for children had become more common.

As late as 1911 rickets was pronounced by one expert to be due to an excessive secretion of the sexual glands of cows giving the milk used by its victims, and could be cured by administering the milk from castrated cows. A little before that electric treatments, medicated baths, iron tonics, the respiration of condensed air, olive oil and dog's milk had all been found remedial, and each physician could present, and did, his group of cases cured by the procedure he recommended.

About 1916 it became evident that a lack of vitamins caused rickets; by 1921 the specific vitamin was located and proven to be present in cod liver oil. About the same time it was found that sunlight, and a little later that ultra violet rays from mercury vapor lamps would cure rickets. Finally it was found that ultra violet rays would turn a certain fat in part into the vitamin required. At all times it is now assumed that calcium, phosphorus and vitamins A and D must be present in proper proportions to prevent rickets, and to insure normal bone building.

At the same time, however, reliable investigators present work which demonstrates that cod liver oil repeatedly fails in the treatment of rickets. Secondly, work is presented to show that cod liver oil often has very poisonous side effects. Thirdly, work is presented to show that the activated fat mentioned above is to be distrusted as it is so concentrated in the vitamin that it may do great harm. Fourthly, work has been presented to show that twins of the same mother on the same breast milk may in one case develop rickets and in the other case be immune. Lastly, one set of investigators has presented apparently incontrovertible evidence to show that cod liver oil in certain dosages causes all sorts of degenerative changes in mice, while another set of investigators, using the same cod liver oil in the same dosages, avers it cannot reproduce the results claimed. So it goes. Had the lecturer had much experience in science I firmly believe that his faculty of belief would have atrophied somewhat!

Bleeding was once a very effective therapeutic procedure. It must have been. All physicians used it and it "cured" their patients. Today it is scarcely ever invoked at all; we are informed that its use is unscientific. Today people become invigorated living in rooms

glazed with an ultra violet ray transmitting glass which will in twenty hours of direct exposure give them less ultra violet irradiation than they would get in five minutes out of doors in direct sunlight; but they feel invigorated and believe in the glass.

Other people are cured of various diseases by the "ultra violet rays" from lamps which actually transmit no such rays at all, but the effects are produced and they believe in the lamps. I can very readily find you just as much apparently sound evidence against as in favor of the theories that autointoxication, bad teeth and infected tonsils cause all manner of diseases, but I know plenty of doctors who believe in these things. They have seen certain effects. They produce their case histories and their clinical pictures. They publish their articles. They and their patients believe. What are you going to do about it? I am sure I don't know, but isn't it interesting?

Turning to natural science, bodies once burned because they contained phlogiston. Now they burn because they contain substances that unite with the oxygen of the air at a fast and furious rate. The burning was the same in both instances but consider the difference in the belief. In the former case bodies should practically disappear when burned for the phlogiston was lost and nothing remained but a little ash. Someone thought to measure and see if everything was destroyed. He found that nothing at all was destroyed in burning and away flew phlogiston into oblivion.

The lecturer I heard told me baffling things. Then he casually explained them. Then he reached final conclusions. Many people tell me astounding things. During late 1928 many people told me perfectly amazing things about one of the candidates for the Presidency of the United States, and, in spite of the fact that their tales so conflicted that they could not possibly all have been true, they believed them implicitly. They had the evidence of their senses. As in the case of Roosevelt years ago, someone had seen someone who saw a big blue glass of what actually was milk go to his dining room and it was at once apparent and quite true that it was whiskey and that he was drunken and debauched!

I do not have to go to politics though. Perfectly astounding things constantly happened to me in the laboratory. I once mixed two sugars together. I dissolved them in water. I added a certain salt known to unite with one of them quantitatively. I then took out the precipitate I got and broke it up and found that sugar there

quantitatively. But the second sugar I never did find. It was not in the original water; it was not in the precipitate. I did this experiment over and over again. I still believe that that sugar did not dematerialize into thin air, but I never found where it went. It is very hard to forestall the formation of a theory in such cases, as our lecturer demonstrated, but I have none.

Here is another case from material science. Proteins are made up of some twenty simpler compounds called amino acids. Milk proteins are so composed. Amino acids circulate in the blood of an animal and one of them is called cystine. Milk is formed in the mammary gland; its proteins are built there from amino acids the gland takes out of the blood. Hence if you could get a sample of a cow's blood before and after it perfused her mammary gland, and could measure the loss in amino acids you could easily calculate which ones, and how much, the gland used to make its proteins. All right. That was once my problem. I wanted to know if a cow used cystine from the blood in manufacturing milk in her mammary gland and, if so, how much.

First I had to have a method of determining the amino acid. I was to do this by the color it produced when mixed with certain chemicals. You clarify and filter the blood, then add a small quantity of it to a solution of four or five chemicals, let it stand and measure the amount of blue color the solution then contains against the color in a solution of known strength. That is a comparatively simple research problem. Now what could I believe?

In the first place every chemical had to be tested; then the effect of every chemical on every other chemical used in the method had to be tested. Then the effects of time of standing and the temperature had to be tested. Then the instrument used to estimate the color had to be standardized. Finally it was found that the color of the solution into which the blood filtrate went never would exactly match the color of the solution containing only the pure amino acid, cystine. Then there was the problem of clarifying that blood—did I lose some of the cystine in clarifying it? If so, how could I tell, since the only way of determining the cystine in blood involved clarification as an initial step?

Ultimately I made an actual test on a milch cow and the blood did seem to lose twenty-five per cent of this amino acid. Cystine apparently went into the gland to make milk protein. I tried a sec-

ond and a third and a fourth cow and each time got lessening amounts of the amino acid disappearing from the blood. I then tried three dry cows which should have given no results at all, as they were not making milk, but they did (two of them) give positive results! And last of all I found that I was not dealing with cystine anyway but with a combination of it with two or maybe three other amino acids and that in that case—if so much disappeared from the blood in one trip through the mammary gland, it was five or six times too much to make the milk the cow was actually giving. Then I started to devise a method of preparing the unknown compound from cow's blood. I spent another year devising that method.

Precisely at that point I ceased laboratory work and began to edit the papers of other scientists for publication. It is now my pleasure to see them contradict each other. I do not for an instant impugn their sincerity. I believe they often honestly believe in their results. They calmly attack each other, show how the earlier workers erred, demonstrate how final their own results are, give their apparently irrefutable proofs and next week some other scientist comes along and contradicts them. Many of them also speak as if they were saying the final word of truth about the proposition and that no more could possibly be learned. They would make good psychic researchers, for remember—immortality is a scientifically established fact according to my lecturer.

But this is not the usual thing. Usually scientists conclude quite tentatively, saying if this and that and the other are so, we may tentatively assume so-and-so. They seem to realize that they may have been tricked by their own prejudices or by the simple recalcitrance of natural facts without deliberately tricking themselves. The difficulties of this sort of thing are not, I am convinced, realized by these careless people who are always remarking, "I will give you the facts and you can see for yourself that the theory I present is scientifically true."

The lecturer I mentioned above had adopted the very subtle method of depending rather upon the final reports of committees of scientists as to the authenticity of psychic phenomena than upon specific case histories. This was accepted by his audience as creditable scientific proof. Yet what did it mean? When a group of men who, we shall assume, have been deceived write up their conclusions in abstract and solemn terms, eliminating all personal and human qualities, the end result is more impressive than plain Bill Jones'

assertion that he saw a ghost or heard a guitar played untouched by human hands. But is it really any more valuable?

For years various scientists in various lands have sought to prove that electricity favorably effects plant growth. An investigator demonstrated, for instance, that potted plants grew more rapidly if the soil in the pot was connected with the earth by a wire; but no other investigator could duplicate his results and that proved to be the case with all similar work.

Finally an investigator in the U. S. Department of Agriculture undertook to see whether weak electric currents would accelerate the growth of maize plants in wooden boxes. He got what was undeniably a positive correlation after a considerable series of experiments, provided the current was applied at night, and would have been perfectly justified in reporting his successful results couched in solemn, objective language. But he was a natural born skeptic, though he figured there was but one chance in a hundred that he was wrong.

The boxes in which he grew his plants had numbers arbitrarily stenciled on them as they were made. He then shifted them about arbitrarily, putting low and high numbered boxes together, whether the plants in them had had electrical treatment or not, and measured the growth of the plants in such groups. To his astonishment he got a still better correlation between this profoundly irrelevant factor and plant growth than between electrical currents and plant growth. He then began to examine the boxes. It ultimately proved that by pure chance the boxes which bore low stencil numbers differed from those that bore high numbers in capacity to retain moisture in the soil inside them.

The boxes were all made of the same wood at the same time, and were of exactly the same size, yet pure chance and an actual difference in the properties of the boxes operated as stated. The scientist after further trials with absolutely comparable boxes, discovered that weak currents of electricity had no accelerating effect on plant growth and so reported.<sup>1</sup> Compare this with the "scientific method"

<sup>1</sup>It is a curious if not a significant fact that the original English investigator whose positive conclusions on the beneficial effects of electricity on the growth of plants moved the Americans to challenge and confute the work, was none other than Sir Oliver Lodge. Sir Oliver was here plainly fooled by material phenomena, however incapable he is of being deluded by super-sensible and intangible psychic phenomena. See "Electric Stimulation of Plant Growth," G. N. Collins, L. H. Flint and J. W. McLane, *Journal of Agricultural Research*, June 1, 1929, 585-600.

of a man who postulates unknown causes and from these an unknown ultimate cause for irrelevant and heterogeneous facts which, it is more than probable, are no more facts than the initial "facts" adduced tentatively by this material scientist to "prove" that weak electric currents would accelerate plant growth.

I who have spent years trying to discover and accurately describe a few unimportant and very illusive little facts in a restricted field of scientific endeavor pause in almost reverential awe before the tremendous scope and power of belief exhibited by such persons as the lecturer I just heard. I think of the extreme care we used in the laboratory, of the very restricted field in which we worked, of the meticulousness with which we tried to examine every microscopic portion of it, of the slowness with which we decided anything, of our extreme reluctance to trust our senses with regard to matters the average person would consider obvious, of the tentativeness of our conclusions, and I am rendered almost aghast at the power the Scot and others show to believe the most extraordinary things and to brush aside possibilities of error with a gesture.

A plausible case could be made out for the idea that science is the process of finding bad evidence to support notions you already have in your head, just as Bradley described metaphysics as the science of finding bad reasons for what you believe on instinct anyway. Many scientists have actually refused point blank even to consider or have explained to them facts which seemed to militate against their set notions—just as Liebig refused to discuss the theory of spontaneous generation, in which he believed, with Pasteur who demolished it. But there is a real and undeniable tendency on the part of all scientists to try to catch themselves rashly believing, to try to trip their theories up, to test all things and hold fast only to that which can withstand the very harshest critical usage they or their colleagues can possibly give it. This is the tendency we need to cultivate more and more but it is extremely difficult to get even a hearing for it so long as the most ridiculously unprovable theories are calmly and casually presented to audiences as "scientifically true" beyond all peradventure.

I could conclude with a painful peroration on what scientific truth really is, but my experience forbids. I might grow facetious. I prefer only to adumbrate what it decidedly is not and to hint that whenever a person warms to his views with affection and begins to

meet opposing ideas with resentment he is no longer receptive to scientific truth. Thus the fact that investigators in psychic research invariably sooner or later become convinced by the "scientific proof" of personal survival after death, as the lecturer held, is, if true, enough to demonstrate that such investigations are open to grave objection. For a scientist never becomes permanently and firmly convinced of anything except the notion that this is a complex universe open to all sorts of misinterpretations. When he makes an absolute dogma even of that notion he loses much of his usefulness, but when he forgets it he is lost to scientific truth. The lecturer asked—"How can you help believing?" I ask continually "How can you believe so much that probably isn't so anyway?" In short, since nature as mere dirt in flower boxes can be so utterly cantankerous as to delude careful investigators, I find it a hundred fold more difficult to believe the esoteric revelations of inspired mystics and their credulous devotees.

## THE DEVIL-COMPACT IN TRADITION AND BELIEF

BY MAXIMILIAN RUDWIN

THE tradition of the devil-compact, which figures as an important factor in demonology, is of great antiquity.<sup>1</sup> This notion of a bargain with Beelzebub is of Oriental origin, and is traceable as far back as the Persian sacred writings. In the Zend-Avesta, Ahriman fails in his efforts to tempt Zoroaster. But Iblis has greater success in this direction. In the *Shah-Nameh* of Firdusi,<sup>2</sup> this demon promises the Arabian prince Zohak to place him higher than the sun if he will sign a pact with him. The offer is accepted without much hesitation, and Iblis consecrates the pact by a kiss on both of Zohak's shoulders, from which spring forth two black serpents that no man can destroy. At last, the demon himself appears in the guise of a learned physician, and recommends that the serpents be given human brains to eat. Zohak kills his father and succeeds him on the throne, but he finally pays the penalty for the evil deeds committed by him with the demon's aid.

This Persian belief in a devil-compact forced its way into the religion of the Jews during the period of their Babylonian captivity under Zoroastrian rulers, and was transmitted by the Jews to the Christians.

The devil-compact is clearly mentioned in the book of Enoch, the Talmud and the Kabbala and is besides evident from a number of biblical passages. The temptation of Eve in Eden may perhaps be regarded as the first germ of this idea.<sup>3</sup> It is evident that the ac-

<sup>1</sup> The first attempt to treat this subject critically is J. A. Rinneberg's study *De pactis hominum cum diabolo* (17th century).

<sup>2</sup> Aboul-Casem or Abul Kasim Mansur, called also Ferdoussi, Ferdausi or Ferdusi, celebrated Persian epic poet, author of the *Shah-Nameh* or *Book of Kings* (c. 941 - c. 1021).

<sup>3</sup> Cf. E. G. Holland: "Who was the first Faust?" *Appleton's Journal*, XIV (1875), 80-81.



count of the temptation of Jesus in the wilderness is based upon a belief in the possibility of an agreement of reciprocal obligations or relations between man and the Devil and upon the recognition of the Devil's great power in this world.<sup>4</sup> This idea is particularly noted in the words which Satan addresses to Jesus in showing him all the kingdoms of the world: "All these things will I give thee, if thou wilt fall down and worship me" (Matt. iv. 9; cf. Luke iv. 6-7).

The term "New Testament," which meant to the early Christians and still means, in the original Greek, the "New Contract" or the "New Covenant," furnished the theologians with additional scriptural support for the belief in the possibility of man entering into a formal contract or covenant with the Devil, who was represented by the Church fathers as the replica of the Deity. The Adversary, wishing in every respect to counterfeit the acts of the Almighty, naturally also attempts to form a compact with men.

St. Jerome accepted this belief in a devil-compact to explain the expressions "a covenant with death" and "an agreement with hell" used by the prophet Isaiah in reproaching the rulers of Jerusalem for their unconcern about the impending peril for their city. The passage runs as follows:

"Wherefore hear the word of the Lord, ye scornful men, that rule this people which is in Jerusalem. Because ye have said, We have made a covenant with death, and with hell are we at agreement: when the overflowing scourge shall pass through, it shall not come unto us: for we have made lies our refuge, and under falsehood have we hid ourselves. Therefore saith the Lord God, Behold . . . the hail shall sweep away the refuge of lies, and the waters shall overflow the hiding place. And your covenant with death shall be disannulled, and your agreement with hell shall not stand: when the overflowing scourge shall pass through, then ye shall be trodden down by it" (Is. xxviii. 14-18).

The belief in a devil-compact was supported by many other prominent Church fathers. St. Augustine treats the notion at great length. St. Basil the Great, bishop of Cæsaria (370-379), tells in his *Dialogues* of a compact which his own servant Proterius closed with the Fiend. According to the account of this legend given in the *Alphabet of Tales*, written in fifteenth-century English, this young man sold himself to the Devil for the love of a woman.

Naturally enough, the diabolical pacts of the first centuries of our era must be taken not in the apocalyptic but in the Hellenic

<sup>4</sup> Cf. [Gustav] Georg Roskoff: *Geschichte des Teufels* (Leipzig, 1869), I, 201, note 9.

sense. It was purely a question of conversion to the old pagan divinities, whom the Christians had reduced to devils. Even the famous devil-compact of St. Theophilus, of the sixth century, must have differed considerably from the medieval diabolical pacts by which Diabolus won everything and his human partner nothing but the prospect of the rack or the stake.

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The idea of the devil-compact penetrated from Asia into Europe through the intermediary of Byzantium, and was merged with beliefs that were similar and perhaps originally related. The old Northern demon, according to Jacob Grimm, also formed a pact with men, although he did not exact a written agreement.<sup>5</sup> In fact, the agreement in writing can only have originated in a period during which Roman legal forms had arrived to the peoples of the West.

It is not always possible for us to detect in folk-lore what is indigenous and what belongs to foreign nationalities. The identity of the beliefs and practices of primitive peoples the world over can be explained in two ways: If we assume that they were of independent origin, we must explain their identity by the uniformity of the human mind; but if, on the other hand, we hold to the belief of their common origin and beginnings from a common geographic center, it follows that their dissemination throughout the world must have come about through migration or mixture of races.<sup>6</sup>

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The idea of the devil-compact among the Northern peoples included various elements. First of all, it was derived from the manner in which men negotiated in heathen times with the hearth-spirits of the most varied character. The Nords in ancient days dealt with sprites just as the farmers now treat their hired help. Terms of service were arranged by our ancestors with Cobolds as with human beings. They were hired and "fired" as the need presented itself or ceased to exist. When the demons of hell assumed the heritage of the ancient household-spirits among the Northern

<sup>5</sup> Cf. Jacob Grimm: *Deutsche Mythologie*. 4. Aufl. Berlin 1875-78. Translated from the German (*Teutonic Mythology*) by J. S. Stallybrass. 4 vols. London, 1882-88.

<sup>6</sup> M. Gaster in his paper, "Folk-Lore in the Old Testament," *Folk-Lore*, XXX (1919), 75, believes that the latter view is now being more and more recognized.

peoples, they also negotiated with men agreements of mutual service and promise. They, too, served their masters for stipulated periods in return for certain rewards, chief among which were human souls. The services exacted from the demons of hell by our ancestors increased, however, in proportion to the increase of their power. When the Devil was given unlimited sway over the world, the demands placed upon him and his underlings knew no limitations.

The conception of the devil-compact can also be explained as a survival of the old blood-bond with the titular deity.<sup>7</sup> It was believed in ancient days that a bond by blood-transfusion could be formed with spiritual as well as with human beings. This will account for the part which the red vital fluid plays in the diabolical pact. The writing or signing by man of the required document with blood drawn from his own veins as earnest-money of future full payment—his soul—is an addition which grew out of a misconception of the original meaning of this covenant with the trusted divinity. The use of blood in the devil-compact to bind man's promise to the powers of hell may also be explained by the idea found in the Old Testament that strength and feeling dwelt in the blood, which was considered the seat of all life.<sup>8</sup> In fact, blood already played a part in the evocations of the evil spirits practised by the Jews of the post-exilic period.

The idea of the blood-signed devil-compact may also have derived a few points from the Odin cult, in which men signed acts of self-dedication to the deity by marking their arms with the spear-point. This custom was traditionally derived from the conduct of the god himself, who is said to have marked himself with a javelin point, as he neared his end while he was envisaged as a king ruling over Sweden.

The selling of a man's soul to Satan is, furthermore, of cannibalistic inception. It is vestigially of the old sacrificial cult. The divinity with whom man covenanted was supposed to absorb the soul of his human ally when he devoured his body. The psychical was a part of the physical nutrition. Man's soul was transferred to the divinity together with his flesh. This will account for the medieval belief that the demons devoured the souls of the damned

<sup>7</sup> Concerning the idea of the old blood-bond, see H. C. Trumbull: *The Blood Covenant*, Philadelphia, 1893.

<sup>8</sup> Cf. Georg Roskoff, *op. cit.*, I, 347.

in hell. This idea probably is of Oriental origin. The seven Assyrian evil spirits had a predilection for human flesh and blood. Ghouls and vampires belong to this class of demons. Edgar Allan Poe, in his story "Bon-Bon" (1835), represents the demons as preparing in hell all sorts of fancy dishes made of human souls. When the original idea of cannibalism disappeared, the pledging of the human soul to the spirit was understood to mean the extension of his kingdom. It was reserved for Christianity to interpret the dedication by man of his soul to his titular divinity as the loss of his salvation.<sup>9</sup>

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Although the Christian belief in devil-compacts goes back, as has been shown, to the fourth century, it was not prevalent until the Middle Ages when it took a great hold on the minds of men. For three hundred years the idea was universal throughout the civilized world. Pope Innocent VIII, in his famous bull, "Summis desiderantes," issued on December 5, 1484, officially recognized the possibility for man to form of his own free will a pact with the powers of hell. The Reformation, which was a movement of progress in so many respects, still increased the popular belief that man could covenant with the demons of hell. In fact, the century of the Reformation even brought the belief in demonology and witchcraft to its height. According to Jean Bodin, author of *la Démonomanie des sorciers* (1580), a Paris lawyer was hanged in 1571 for having signed a bond with the Devil. In Germany, an edict of the Elector Augustus of Saxony of the year 1572 proclaimed the penalty of death by fire against whomsoever "in forgetfulness of his Christian faith shall have entered into a compact, or hold converse or intercourse, with the Devil. . . ." In England, as late as 1643, a certain Thomas Browne was indicted before a Middlesex jury for selling his soul to an evil spirit for an annuity of £1000 but was acquitted. This belief was also carried over to the New World. Increase Mather, the New England preacher, likewise affirmed that many men made "cursed covenants with the Prince of Darkness."

<sup>9</sup> Cf. Julius Lippert: *Christentum, Volksglaube und Volksbrauch* (Berlin, 1882), p. 563.

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The belief as it prevailed among our medieval ancestors was to the effect that man could enter with the Devil into a compact by which he obtained from hell whatever he desired for a certain period—later fixed at twenty-four years—at the expiration of which term he was to deliver his soul to the Devil. It was supposed that Diabolus, wishing to draw man away from the Deity, assured for himself by this means man's soul while its owner was still living—*vivente corpore*, as it is related in Edgar Allan Poe's story "Bon-Bon" already mentioned. In his anxiety to obtain human souls, the Fiend felt no hesitancy in paying even hard cash for them, as it is expressed by Victor Hugo in his novel *Han d'Islande* (1822). The deed of transfer had to be written or at least signed by man with blood drawn from his own veins.

The man who wished to enter into business relations with the Devil generally applied to a Jew to act as intermediary. It was believed that only Jews could enter into communication with the Devil through the arts of magic. In the Theophilus-legend, the Jew who acts as a go-between is a sort of sorcerer who is disloyal to his own religion. When Chateaubriand, in his novel *les Martyrs* (1809), employs a Jew as an agent of hell, he also represents him as a Jew who has renounced the faith of his fathers. The zealot in one religion prefers a zealot to a liberal even in an opposing religion. In later legends, the sorcerer or sorceress, who brings about the meeting between man and the emissary of hell, is not always descended from the seed of Abraham.

In many literary works wherein is employed the tradition of a man selling his soul to Satan, the shadow, regarded as an emanation, an extension, so to say a "part," of the personality, is symbolically used for the soul. In Chamisso's *Peter Schlemihl* (1814), the title-character sells his shadow to the Devil for the purse of Fortunatus, and then, putting on the seven-leagued boots, diverts his mind from unpleasant thoughts by running about the world. Edgar Allan Poe offers an example of the identification of the shadow with the soul in "Bon-Bon." Oscar Wilde, in his tale "The Fisherman and his Soul" (1891), likewise considers the shadow of the body as the body of the soul.

Man could even sell to Satan a part of his body. Alphonse Karr, in "la Main du diable" (1855), narrates the suffering of a man who

offered his right hand to the Devil in exchange for his brother's life. His brother recovered from his illness, and to fulfill his part of the agreement, he cut his right hand off and paid with his own life for the remission of his brother's.

It is further known that man could surrender to Satan not only his own soul, but also that of a person over whom he had authority. The medieval legend of the knight who sold his wife to the Devil is well known.<sup>10</sup>

Satan entered into the possession of man's soul when the term ran out by killing man's body. Man thus paid the penalty for his bargain with Beelzebub with violent death. The Devil usually inflicted death upon his victim by tearing his flesh with his sharp claws and teeth. It must be observed, however, that the Devil has no interest whatever in man's body. If he kills the man, it is only to obtain his soul. "When the term [of the devil-pact] is over," Victor Hugo tells us in his novel *Notre-Dame de Paris* (1831), "the Devil destroys the body in taking the soul, just as a monkey cracks the shell to eat the nut."

The Devil, notwithstanding the great power he possesses over the bodies and minds of mortals, is, however, not potent enough to put a man to death, unless his victim has blasphemed or renounced the Lord.<sup>11</sup> This idea probably sprang out of the limitation imposed by the Almighty upon the power of Satan during the temptation of Job and out of the advice given the great sufferer by his well-meaning wife: "Curse God, and die" (Job ii. 9). It is only in such cases that the Devil has over men "the power of death" (Hebr. ii. 14; 1 Cor. v. 5). In view of this limitation of his power over the body of man, Diabolus exacted from his partner in the bond, which assigned the victim's soul to hell, a formal denial of the Christian faith, a rejection of Christian symbols and a renunciation of the Lord and his saints. The Devil was particularly anxious about his

<sup>10</sup> This medieval legend of the knight and his wife has been retold by W. Carew Hazlitt in his collection *Tales and Legends of National Origin* (London: Macmillan, 1899).

<sup>11</sup> In Bürgers ballad "Lenore" (1774), a young girl curses God for having robbed her of her lover William, who had fought at the side of King Frederick at the battle of Prague and died on that occasion. She is then carried off by the Devil, who appears on horseback at midnight beneath Lenore's window in the form of her lover and calls her to ride with him to their wedding-bed. Another illustration of the Devil's power over a man, who has cursed God, is furnished in Victor Hugo's ballad "les Deux archers" (1825), in which two archers, who blasphemed God, are immediately killed and carried off to hell by the Devil.

partner's repudiation of his baptism, the first sacrament which wipes away the original stain, which sacrament is man's safeguard against Satan. The man not only was expected to deny his baptism, but he had to accept another sacrament of baptism from hell. He also was forced to express a hatred for all Christians and a promise to resist all attempts to convert him.

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The contract-stories differ as to the objects which the human party to the agreement designed to derive from it. Position, power, protection, and pleasure were for the most part the objects for which man sold his soul to Satan. Wealth and learning, which figured so frequently in the contracts formed by man with the Fiend, were intended to provide man with the power for which he craved. Man aimed often to obtain, through contact or contract with the spirits of hell, such powers as would put him in a position to accomplish things beyond the ordinary conditions of humanity. He wished to batter down the walls of natural limitations imposed upon all mortals, and thus gain mastery of the world.

As prince of this world, the Devil could without any difficulty grant even the most extravagant wishes of man. He often even promised to place his magic powers at the service of the contracting party. "It was usually by means of contracts with the Devil," says Professor Ward, "that in a number of medieval legends men were said to have obtained a full command over the objects of those passions which it was the task of the Christian religion to repress or repel. Thus they were thought to have been enabled to drink to the dregs the cup of sensual indulgence, to satisfy the cravings of earthly ambition, to glut the accursed hunger for gold and for all that gold can buy, and to gratify the desire for knowledge of all things good and evil and for the power which knowledge insures."<sup>12</sup>

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Generally a pact with the Devil cost man his eternal salvation. But Diabolus often found a man who was clever enough to outwit

<sup>12</sup> Cf. A. W. Ward: *Old English Drama* (4th ed., Oxford, 1901), pp. xiii-xiv.

the purchaser of his soul.<sup>13</sup> Although Satan is called the arch-deceiver, he can easily be deceived and hoodwinked. Popular belief, in fact, often represents the Devil as a trusting fool who is outwitted by the shallowest forms of trickery and dishonesty. Man has no scruples about his breach of contract with Beelzebub. He feels no hesitancy whatever in avoiding his part of the obligations mutually incurred by the two contracting parties. In violation of the written pact, he often cheats the Devil out of his legal due by technical squabbles. Man considers the legal document signed with his own blood as "a scrap of paper." "But still the pact is with the Enemy," says Henry Osborne Taylor: "the man is not bound beyond the letter, and may escape by any trick. It still is the ethics of war; we are very close to the principle that a man by strategem or narrow observance of the letter may escape the eternal retribution which God decrees conditionally and the Devil delights in."<sup>14</sup>

The Devil, on the other hand, is never known to have tried evading the fulfilment of his share of the agreement. Although he is said to be a liar, Satan has never attempted to cheat his stipulators.<sup>15</sup> In regard to the fulfilment of his word, the father of lies has always set an example in honesty to his Christian negotiators.<sup>16</sup> There is a universal belief that the Fiend invariably fulfils his part of the obligations. It is a fact well worth noting that, although the Devil insists that his human negotiator sign the deed with his blood, he himself never has been required to sign it even in ink. The human party to the transaction has always had full confidence in the Devil's word. "It is peculiar to the German tradition," says Gustav Freytag, "that the Devil, in the compacts which he makes with men, endeavors to fulfill zealously and honestly the terms of agreement to the letter; the defaulter is man."<sup>17</sup> But the Germans have no

<sup>13</sup> The Gascon, who always has had a reputation for shrewdness in France, may, in the opinion of Anatole France, safely make a pact with the Devil, "for you may be sure that it is the Devil who will be duped" (*la Rôtisserie de la*

<sup>14</sup> Henry Osborne Taylor: *The Mediæval Mind* (2 vols., London, 1911), I, 489.

<sup>15</sup> The German writer, Grabbe, in *Don Juan und Faust* (1822), runs counter to popular tradition when he says, "Wer mit dem Teufel dingt, der wird betrogen" (He who negociates with the Devil is cheated).

<sup>16</sup> Bret Harte, in his poem "A Legend of Cologne," assures us that it has never been heard that the "Father of Lies" ever broke his word, and that the Devil has left "this position in every tradition to be taken by the 'truth-loving' Christian." *Reine Pédouque*, 1893).

<sup>17</sup> Cf. Gustav Freytag: *The Devil in Germany During the Sixteenth Century*. Transl. from the German by Wm. A. Hervey (New York, 1893), p. 12.



monopoly to this belief. Already in the *Golden Legend*,<sup>18</sup> we find it reported that Satan once bitterly complained of the manner in which men try to evade their obligations towards him, whereas he always faithfully fulfils his part of the pact. "The Christians," he complained, "are cheats; they make all sorts of promises so long as they want me, and then leave me in the lurch, and reconcile themselves with Christ as soon as, by my help, they have got what they want."

We can now understand why in Eugene Field's story, "Daniel and the Devil" (1893), it seems so strange to Satan that he should be asked for a written guarantee that he would fulfil his part of the contract. Evidently this was the first time that the Devil had any transaction with an American businessman, who has not even faith in Old Nick.

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The medieval Church itself provided man with the means of evading the terms of his contract with the Devil. The bold contractor knew full well that he could count upon the Church to save him from the jaws of hell and force the Devil to surrender his rights to man's soul. In fact, prior to the Reformation, the Devil was nearly always cheated of his bargain through the instrumentalities of the Church.

The surest way for medieval man to avoid paying the penalty of his rash action in compacting with the powers of hell was to appeal to the Holy Virgin, who was always ready to fight the Fiend. The votary of the Virgin could especially count upon the Mother of all Mercies to help him break the contract with the Enemy if he omitted her in his general renunciation of the saints of Heaven.

The Virgin had in the Middle Ages almost as much power as the Trinity. As has well been remarked by Karl Pearson, she was the vindication of the right of the common folk to a goddess of their own kind.<sup>19</sup> In the medieval drama, Christ gives his mother, upon her assumption to heaven, a crown and scepter with full power over the Devil.<sup>20</sup> It is the Queen of Heaven rather than her Son

<sup>18</sup> The *Golden Legend* (*Legenda aurca sive historia Lombardica*), a collection of stories of the saints taken partly from books partly from verbal accounts, was compiled about 1275 by Jacobus de Voragine, a Dominican archbishop of Genoa. Longfellow has chosen this title for the second part of his *Christus: A Mystery* (1873).

<sup>19</sup> Cf. Karl Pearson: *The Chances of Death and Other Studies in Evolution* (London, 1897), II, 351.

<sup>20</sup> In Ostendorfer's woodcut, the Virgin carries the keys of heaven and hell.

who breaks the bolts and bonds of hell and binds the Enemy with all his crew. The Blessed Virgin was a sort of valkyr or amazon, always at war with the demons to snatch the pacts and the souls of the repentant sinners from them. The medieval poets call her for this reason Noah's Ark which carries mankind over the hell-flood.<sup>21</sup> The stories of the pitying interposition of the Mother of Christ on behalf of the repentant sinners are, according to Henry Osborne Taylor, among "the fragrant flowers of the mediæval spirit."<sup>22</sup> The Polish writer, Ignace Matuszewski, explains the rôle which is assigned to the Virgin in Catholic legend as a psychological atavism, a heritage of the mystic faith of the primitive peoples in the influence of the woman over the demon.<sup>23</sup> In pagan times the woman already possessed power over the evil spirits. In Hindu mythology, Kali or Durga interceded in the fight between her husband Siva and the demon Darida. The mother of all men was told by the Lord that she could crush the serpent's head. The predominance of drollery, however, soon altered this poetic conception of woman. It is then the old toothless hag, spindle in hand, the very sight of whom puts the Devil in flight. The woman appears in this rôle in the mediæval *fabliaux* and farces.<sup>24</sup>

The Blessed Virgin snatched from the jaws of hell Merlin,<sup>25</sup> Theophilus,<sup>26</sup> and Robert the Devil.<sup>27</sup> In the mediæval story of the

<sup>21</sup> In a Spanish play *Mascaron* of the thirteenth century, the Holy Virgin appears in defence of the human race against the charges brought by the demon Mascaron.

<sup>22</sup> Cf. Henry Osborne Taylor, *op. cit.*, I, 490.

<sup>23</sup> Cf. Ignace Matuszewski: *Dyabel w poezyi* (2nd ed., Warsaw, 1899), p. 105.

<sup>24</sup> Read in this connection the ballad "The Devil and the Scold" in the collection *English and Scottish Ballads* (Boston: Houghton, 1858), VIII, 257-8.

<sup>25</sup> Merlin, a legendary diviner, plays a very important part in the Celtic legends and the mediæval tales of chivalry as the friend of King Arthur, who was, according to Cæsarius of Heisterbach, the son of a demon and a nun. Through the intervention of the Virgin, he did not follow in his father's footsteps and was finally saved from perdition.

<sup>26</sup> The Theophilus-legend will be treated in the next paper.

<sup>27</sup> Robert the Devil, the son of a duke and duchess of Normandy, was counted among the great progeny of Satan. He was born, according to the confession of his own mother, in answer to prayers addressed to the Devil. According to another version of this legend, the Devil was Robert's physical father. However, when Robert learned of his diabolical descent, he turned from his father to God. After he had repented of his misdeeds, the Blessed Virgin took pity on him, secured his pardon and had him married to the daughter of the emperor of Sicily, with whom he was in love. During his courageous defense of Rome against the besieging Saracens, an angel bestowed upon this penitent celestial weapons with which he was given power to rout his enemies. The mediæval legend of Robert the Devil has been retold by W. Carew Hazlitt in the book already mentioned.

knight who sold his spouse to Satan, the Mother of God, to whom the victim addressed herself on her way to the Devil, assumed her form and accompanied the knight in her stead to the Devil and forced him to return the deed to the knight. Many later works also represent the woman as victor over the demons of hell. Cyprian in Calderón's play, *El Mágico prodigioso* (1663), is saved through the instrumentality of a woman, whose spirit of innocence defies and defeats the Devil's power. Goethe, in *Faust* (1808-32), has woman, not a particular woman, but the Eternal Womanly—*das Ewig Weibliche*—draw Faust onward and upward in the end and redeem him from hell.<sup>28</sup>

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The Devil, notwithstanding all the disappointments these commercial transactions have brought him, evidently has up to this day not renounced this poorly paying business of purchasing human souls. The shrewd dealer should realize that he possesses the human soul without any contract or any special document and without paying a penny for it. In fact, a man can surrender his soul to Satan under no necessity of signing a document. Thus Don Joan lost himself to the Devil through his bad deeds, without entering into any special contract. When a man commits a sin, he falls into the power of the Enemy. Each evil deed is an act of acquiescence to Satan's will, which is equivalent to an alliance with him. "Give up your soul to Satan's darling sins," it has been said by a clergyman, "and he will help you for a season until he has his claims carefully wound around you. When his links are carefully closed, he seizes his victim, who has no longer any power to resist." Carlyle has also said: "Follow the Devil faithfully, you are sure enough to go to the Devil; whither else can you go?"

<sup>28</sup> A very interesting modern version of this idea of woman's victory over the Devil will be found in Frederick Beecher Perkins's story, *Devil-Puzzlers* (1871), which has been reprinted in the present writer's anthology of *Devil Stories* (New York: Knopf, 1921).

## SUGGESTIONS FOR A THEORY OF RELIGIOUS DEVELOPMENT\*

BY PROF. A. K. SHARMA

PERHAPS the greatest want, under which the Science of Religion labours at the present day is that of a theory of development. Archaeology, Ethnology, and Anthropology have collected a large quantity of materials for the study of religion; these have been sifted, compared, and arranged; religious origins have been determined in some measure; beliefs have been classified into varying degrees of higher and lower; but the law according to which a belief, lower in the scale, grows into a higher one, is yet to be discovered. The Historical School, ever shy of speculation, is nearly satisfied with the description of facts, and the Theoretical School, unencumbered by inconvenient facts, offers conclusions which are over-weighted by *a priori* assumptions. It would appear that the former has no theories to offer, and that those advanced by the latter are abstract, empty, *jejune*. And the human mind is so constituted that it would accept any theory rather than none.

Properly to estimate the value of a true theory is indeed difficult. That a theory, if true, adds to our knowledge, and has value as such, is obvious enough. Apart from this, it has a certain practical importance. Wherever a thing is the result of a process, its full significance is understood only when the process itself is understood. In such a case the present interpenetrates with the past, nay, it is the transmutation of the past: its significance is derived from the process of which it is the culmination, and can be made clear only in reference to its context. A religious belief is no more an exception to this than a biological organism or a political institution. Who can understand, for instance, the Christian sacrament of the Lord's Supper, without any knowledge of its origin? The pious "Pagan"

\* A paper read at the World's Oriental Conference, Oxford, August, 1928, by Prof. A. K. Sharma, M. A., Patiala, India.

in the old story, who visited the church on the day set apart for the Holy Communion, came out with the idea that the worshippers were a set of cannibals trying to eat the flesh and drink the blood of their very Lord. What a different significance the Sacrament would have to him, if he had only known how it came to be instituted!

It is however in connection with current theological problems that the need for a theory of development is keenly felt. If the intellectual form, which belief in God has taken at the present day, could be characterised by one word, that word would be "immanence." Philosophers spin theories about it, theologians dogmatise on it, but very few tell us the full import of the term. Is God present in the whole world of experience? If so, how are we to decide the question of freedom, moral initiative, and the origin of evil? If He is present only in a part of the world, which is that part? Nature, says one; moral life, says another; reason, says the third. Whatever it be, how are we to reconcile the part where He is present with the part where He is not? Again, is immanence true in fact as well as in meaning? What, then, becomes of personality, divine and human? These questions are answered in diverse ways, and in the confusion of tongues, no voice is distinctly heard.

But in the light of a true theory, these and other problems can be seen in proper perspectives. In the first place, it will acquaint us with the Socio-psychological conditions of the origin of particular beliefs; and the knowledge of these conditions will enable us to formulate our questions precisely, and to see whether our answers are adequate enough. In the second place, it will disclose the principle underlying new formations; and when once this is grasped the application will not be difficult. In the third place, it will show that spiritual evolution has been going on in two divergent channels, the Moral and the Intellectual, the one culminating in the conception of Transcendence and the other in that Immanence. And as an important Corollary, it will place at our disposal the spiritual experiences of our ancestors. It will be surprising to many a mind, whose vision has been limited, hitherto, by huge racial, national, or religious blinkers, to be told that Immanence is not a new idea, peculiar to our age, that some of our fore-fathers had hopes and fears, aspirations and fulfilments, similiar to ours, and that ours is the same old question only presented in modern settings. Certainly it will be of advantage, if we can know how these questions were once asked and what answers were then given.

## II.

The failure to discover a law of development is due, in part to the limitation imposed by facts themselves. The data hitherto collected—or one may be permitted to remark—attended to, consist of beliefs scattered in various communities, in different places, and in diverse periods. There is no continuity observable among these disparate elements. The task would be easier indeed, if we could catch beliefs in transitions and in an order of succession, in the life of one and the same community. Are these conditions fulfilled anywhere? “No country can be compared to India as offering opportunities for a real study of the genesis and growth of religion. . . . What we can catch and study in India better than anywhere else, is, how religious thought and language arise, how they gain force, how from mind to mind, yet always retaining some point of contiguity they spread, changing their forms as they pass from mouth to mouth, with the springs from which they rose at first. I do not think therefore that I am exaggerating when I say that the sacred books of India offer for a study of religion in general, and particularly for the study of the origin and growth of religion, the same peculiar and unexpected advantages which the language of India, Sanskrit, has offered for the study of the origin and growth of human speech.”<sup>1</sup>

Not the sacred books alone. Religious practices which originated in prehistoric times are still lingering in the outskirts of Indian Civilisation, and the observations of them will verify, and to some extent supplement, what is found in ancient books. “For whereas primitive paganism . . . has been utterly extinguished many centuries ago in Europe and through-out Western Asia, yet wherever and whenever we cross the border, or land on the shore of India, we may find going on before our very eyes things of which we read in ancient books. We seem to step suddenly out of the modern world of formal definite creeds back into the disorderly super-naturalism of pre-Christian ages . . . we may still fancy that in looking over India we catch a reflection of classic polytheism.”<sup>2</sup>

<sup>1</sup> Max Muller: *Origin of Religion*, p. 135.

<sup>2</sup> Lyall: *Asiatic Studies*. Part I, p. 303.

## III.

To yield fruitful results our investigation should be pursued by a method altogether different from the usual ones. In the Science of Religion there are two methods in vogue, the Historical and the *a priori*. The former is confined to the discovery of facts as they are, and is not concerned with any theory about them. The latter starts with an initial assumption and proceeds to squeeze facts into a ready made frame-work; recalcitrant facts are either mutilated beyond recognition, or discarded altogether as useless. To enter into a criticism of either is not relevant to the purpose of the present enquiry, but it is necessary to point out that both are vitiated by one common defect. The advocates of these methods seem to be inspired by the belief that the only data necessary for the study of the origin and growth of religion is a set of religious ideas, to be critically collected by the one, and to be rationally connected by the other. It does not seem to have occurred to them that ideas do not explain themselves. A living mind casts the object of its religious experience in the intellectual mould, so to say, and the product is a religious idea; a ritual is the practical expression of the emotional attitude of the same mind towards the same object; both are subject to modifications in the course of spiritual experience; and relatively speaking they are more or less inert. To know how they arise and under what circumstances they become changed, it is necessary to go to the root of the experience itself, and to explore the mind to which they belong. And as religion is essentially a socio-psychological phenomenon, a theory of its development should be based on the nature of the Socio-psyche in its continuous evolution. If this is so, the method most adequate to the purpose is the Socio-psychological method.

This method is essentially scientific in character. It starts with the discovery of certain facts, and proceeds to extract from them their psychic significance. Out of the elements so extracted, it attempts to reconstruct the nature and the evolution of the Socio-psyche. Lastly, from the nature of the Socio-psyche, it makes the further attempt to discover the law of the genesis and growth of religious ideas. The resemblance between the Historical method, and the first part of our method is merely superficial, for the Historical method is interested in facts for their own sake, while the

Socio-psychological method is interested only in such facts as have a psychical significance.

The Socio-psyche is revealed only through its expressions. For the sake of clearness, these may be roughly distinguished as external and internal. The external expression consists of migration and settlement, of war and conquest, of agriculture, industry, and trade, of social, legal, and political organisations, in short of all those activities which are economical in character. The internal expression consists of language, of literature of various kinds, of religious and moral ideas and institutions, of arts, plastic and decorative, of music, of painting, of dancing. To collect the records of these facts should be our first task.

At this point we may be told that the ancient literature of India contains very little of history, and that, therefore, neither the changing forms assumed by the Socio-psyche in the course of its development, can be described clearly, nor its activities arranged in an order necessary for the reconstruction of an evolutionary process out of them. Granted, that the genius of India has so masked herself in mythological symbols, that it is difficult to read the lineaments of her features at any stage of her life; granted, further, that, in spite of all the questionings of historians, she has preserved a silence, inscrutable, puzzling, nay, oppressive: yet one may hold that the difficulty is only plausible, at any rate not insuperable. The sort of composite picture of ancient life which this literature portrays, should be sufficient for our purpose. It is not through facts, which can be collected exhaustively and dated with precision, but through those which are typical and illustrative of life in different periods, that we should attempt to lift the veil of mystery, by which the genius of India has shrouded her early life.

Our next task is to describe the nature of the Socio-psyche by the aid of its expressions. These expressions will reveal certain psychical characteristics. These would be nearly the same as might be arrived at by the analysis of the socio-psyche, if such a process were originally possible. Some of these characteristics will be of the same kind; for this reason they can be considered as forming one group; and in like manner, all of them can be disposed of in various groups. When two groups contain common or similar characteristics, they are to be placed side by side, as indicating an order of succession in the series; and it is in terms of these characteristics that the transitional stage between one group and another



is to be described. Each group, then, when the characteristics contained in it are synthesised, will give us a picture of the socio-psyche at one stage of the development, and by means of the series we can visualise the process of its growth. But in each group there will be one characteristic standing pre-eminently over others, a ruling quality, if it be so, which is foundational to the rest. In other words, the socio-psyche assumes, at every stage, a new phase, and there emerges also a fresh *dominant*. Any particular phase, its peculiar tone, its unique look, the motif immanent in it, and the fountain-spring of all its changes can be characterised only in terms of this *dominant*. All this would give us not only snapshots of the physiognomy of the socio-psyche as it changes from stage to stage, not only a clue to the principle of its structure, but also a general view of the process as a whole.

The method so far outlined, that is to say, so far as the first two stages are concerned, is not altogether new. Karl Lamprecht employed it for the first time; and though he has not given a systematic exposition of it, he has applied it, with great success, in his study of the growth of the German Nation. In the view of this Savant, the history of the German Nation, considered as a socio-psychological process, comprises five distinct stages, viz, the Symbolic, the Typical, the Conventional, the Individualistic, and the Subjectivistic.

Human nature, whether it be in the Teuton, or in the Anglo-Saxon, or in the Semite, or in the Indo-Aryan, remains the same in fundamentals; therefore the general psychological laws deduced from the life of one typical nation should hold good in other cases as well. So far, the method, as worked out by the German Historian, is adequate enough. But when it is applied to the Historian, of Religious thought, it requires amplification, by the inclusion in it of a further consideration of the experience of the Socio-psyche.

#### IV.

We should therefore try to discover, if possible, the genetic relation between the experience of the Socio-psyche and its religious ideas. On ultimate analysis, this experience is resolvable into two terms—contact with environments, and reaction on them. In normal conditions this process of stimulus-response goes on as a matter of course; and when it is interfered with, there arises an emotion. It may be that of fear, or that of anger, or that of any other kind

according as the interference is felt as a hindrance or as a help. In this case the object of the emotion is more or less a familiar one, and it is therefore apprehended very definitely. Such an experience is an every-day affair. But something extra-ordinary might happen. Suppose that the course of this usual life of the psyche is thwarted by something never experienced before, that is to say, by some agency, power, or force, which is as yet mysterious and unknown, what would happen? The Socio-psyche would double on itself, and its attention would be diverted from the object of the original activity to the new mysterious power. Not knowing whence or what this power is, it would wonder; not being able to control it, it would feel helpless; if the interference is unfriendly, it would fear; in this manner the complex emotion of awe would stir it to the very depths. If, on the other hand, the interference is felt as friendly, wonder and helplessness would be combined with gratitude, and there would arise the complex emotion of reverence. At a much later stage in the development of the Socio-psyche, the emotive agent might become an object of even adoration and love. The distinction between the old experience and the new lies in the fact that, while the first is directed towards the natural, the habitual, and the work-a-day object of the world, the second is directed towards something mysterious and super-natural. With the emergence of the experience of the psychically felt presence of the super-natural, the Socio-psyche has entered the path of religion. Religious experience then, is the result of the dissociation of normal experience, and it is distinguished by a deep emotion and the awareness of the presence of a mysterious power.

What is this power? It cannot be seen, nor is it tangible; it is elusive, and yet it is very real. Since it has been experienced along with natural objects, could it be behind them or within them? The problem is intriguing. Natural objects are envisaged with a view to get into touch with the elusive power, and this gives rise to what is miscalled Nature-religion. Meanwhile the Socio-psyche is impelled from within, and an attempt is made to get some notion of this hidden power. The only way open is to bring all normal experiences to bear on the problem, and thus to read the unknown in terms of the known. Among the known there is one object which occupies a pre-eminent position; it takes initiative, at times it thwarts normal activity, and it is also capable of becoming a friend or a foe; and this object is the human self. No wonder that from the earliest

times, God has been interpreted in terms of the self. There is much psychological truth in the formula that the idea of God, in any community, is the reflex of the idea of the self, prevalent in that community.

The form given to the idea, whether it be the idea of self or that of God, depends upon the organ of apprehension with which the psyche is endowed. At the Symbolic stage, it possesses only perceptual organs and self or God is understood only in physical terms: strictly speaking there is no idea at all at this stage. At the *Typai* Stage intellect is evolved and real ideation begins. There is no fresh organ involved at the Conventional and the Individualistic stages, the new experiences being apprehended only by the intellect. At the Subjectivistic stage the capacity for intuition is evolved, and along with it comes a different way of apprehending objects. In this manner the idea of God is seen to be the function of experience and of the organ by which experience is apprehended.

## V.

In the preceding sections we gave a brief sketch of the Socio-Psychological method. Before applying it to investigate the religion of Ancient Aryans, it is necessary, in order to avoid all possible confusion and misunderstandings, to point out the limitations of this paper. Religion, considered as an objective matter of study, includes a conception of God as its most important element; further, it includes certainly, an idea of future life, probably some notion of the relation between God and man, possibly a view of human society, and perhaps also a theodicy. In addition to all this, some religions contain a belief in pre-existence, and some others an idea of incarnation. This paper is confined to the attempt to trace the origin and development of the idea of God, as contained in the sacred literature of India. This idea occupies the Central place in religion and it is the pivot on which all other religious ideas hang. The knowledge of the evolution of this idea is bound to throw light not only on the evolution of religion in general, but also on the growth of allied religious ideas.

The second limitation pertains to the choice between diverging lines of evolution. It was indicated, in a previous section that religious evolution has been going on in two divergent lines, the intellectual and the moral. At present our attempt is to trace the process, from its very beginning up to the point at which it diverges in two directions, and then to go along the line which leads to the

idea of immanence. The Psychological laws underlying this branch of religious evolution are the same as those underlying the moral branch which leads to the idea of transcendence. The culmination of the intellectual line would give us only an aspect of God; and if our idea should be concrete and complete, if such were possible, the idea of immanence should be reconciled, and, if necessary, synthesised with that of transcendence. But with this task we are not concerned for the present.

## VI.

The Indo-European life of the Aryan People is lost in obscurity. Where they lived, whether it was in the North of Europe, or on the steppes of Southern Russia or in the fertile fields to the west of the Carpathians, is a question on which there does not seem to be any measure of unanimity among historians. But it is safe to infer, from certain known facts, that they formed a homogenous Community, just hovering on the borderland between the nomadic life and the agricultural. They tended the ox and the cow, they also raised corn; the patriarchal system was in vogue in their families; and their religion consisted in the worship of two nebulous objects the Earth and the Sky.

Exigencies of circumstances or the spirit of adventure, drove them gradually to the plateau of Iran; and after hard fights with the local inhabitants, they settled down to peaceful avocations. That there was a cultural relation between the ancient people of Mesopotamia and those who composed the Vedas, was evidenced by the German excavations at Boghaz-Koi and the famous letters from Tel elamarna.<sup>3</sup> It was left to Dr. Waddel to make the astounding discovery that the list of kings and seers mentioned in Sumerian inscriptions, is exactly the same as recorded in the Vedas, and that therefore, the Sumerians "were the long lost early Aryans in race speech and script."<sup>4</sup> The recent discovery of Sumerian seals on the banks of the Indus has placed the cope-stone on the theory so ably advocated by Dr. Waddel. The Sumerians were also known as the Phoenicians, and they called themselves by various other names—the Amorite, the Goth, and the Scyth.<sup>5</sup>

In their new Asiatic home they did not show any advance over

<sup>3</sup> Cambridge *History of Ancient India*, pp. 72 and 76.

<sup>4</sup> Waddel. *Sumerian Seals Deciphered*, p. i.

<sup>5</sup> Waddel. *Sumerian Seals Deciphered*, p. vii.

their earlier life. From the socio-psychological point of view, the Indo-European stage and the early Iranian stage should be taken together as constituting one stage in development, for the whole period is essentially one of symbolism. The Community remained homogenous; agriculture had slightly improved, trade had just commenced in the shape of barter; and the medium of exchange was still the corn. The most powerful man was elected king, and he represented the various activities of the community; in war he led the army, in time of peace he functioned as magistrate; and on ceremonial occasions he officiated as priest. The planning of houses and villages was based on symbolism,<sup>6</sup> and this is continued even to-day in India. Land belonged indirectly to the community; no man could retain it except when he happened to be a patriarch, and it could not be alienated either by gift or by sale. During festivals they drank hard; their favourite sports were hunting and chariot-racing; and their chief game was gambling, in which they would wager anything, even their children, their wives, and if necessary themselves.

The same psychic quality was revealed in their inner life. Marriage was the symbolic union between Soma (Moon) and the daughter of Surya (Sun). A legalistic symbolism took the place of morality; and the chief crimes were theft and robbery. There was no reasoning from premise to conclusion, but only analogical inference based on physical resemblances. There was neither precision, nor balance, nor proportion in the working of the mind; and no wonder prose was unknown. Poetry, the language of imagination, was the only medium of expression, and its metre was the symbolism of the rhythm of Physical movement. Alphabet was non-existent, and teaching was carried on from mouth to mouth.

Energy, adventure, and imagination gluttoned life; but there was no sense of personal worth, the individual being lost and merged in the community. Lamprecht's description of the psychic condition of the Germanic tribe in the last centuries before the birth of Christ, applies equally well to the Aryans on the Euphrates valley. That the former took a long time to develop the same quality as was present in the latter at a much earlier age, may be accounted for by the fact that, while these acquired new experiences due to migration, the other tribe remained home-keeping youths with their wits very much retarded in growth. "Their imagination, to begin with this

<sup>6</sup> Havel. *History of Aryan Rule in India*, pp. 22 to 32.

most symptomatic of all psychic functions, rich in accordance with the output of their strength, does not show itself in any poem, any drama, any musical composition, any piece of sculpture or painting. And yet it is active in the highest degree. It includes, at bottom, all the above-named kinds of imaginative activity at one and the same time; there was no song that was not accompanied by gesticulation and plastic pose of the body, as by a musical handling of the language; no solemn function that did not take a poetically musical form, no creation of plastic art in which mimic motives suggesting speech and modulation had not made themselves felt. . . . To them the world was not yet something conceivable, capable of portrayal, but only such as they saw before them, and hence the image of it in their mind was simple, palpable. No matter what important affair of life was dealt with psychically, it was not described in definite terms and made fast by convictions. It was reproduced allegorically, and its meaning repeated in psychic functions which expressed it externally by means of symbols."<sup>7</sup>

Our chief interest is in their religion. At the Indo-European stage, religion must have consisted, as we suggested already, in the feeling of a cosmic power, vague, nebulous, an all-enveloping mystery, a "blooming, buzzing, confusion."

This vague feeling differentiated itself into two, Deus and Nerthus. The former developed into the idea of Zeus in Greece, of Jupiter in Rome, and of Dyauspitar in India; and the latter pervaded the thought of all Indo-European tribes and became Prithvi in Hindustan. Nerthus-worship, as described by Tacitus, bears a genetic relation to the worship of Durga in India.<sup>8</sup>

These names are retained in language; but at the Iranic stage the experiences signified by them were further differentiated into what Max Muller called the semi-tangible and the intangible objects, —like rivers, mountains, trees, the earth, the wind and the storm on the one hand, and the Sun, the Moon, the stars, and the lightning, on the other. "The Gods were not personifications of light, or of the phenomena of nature, but the worship was directed towards primeval forces and potencies, behind which more or less vague personalities were seen. . . . Everywhere man had to reckon with such forces, everywhere he might be confronted with uncontrollable mystic power."<sup>9</sup> This is not animism for animism presupposes the

<sup>7</sup> Lamprecht; *What is History?* pp. 41 and 43.

<sup>8</sup> Sten Kenow; Article in *Viswabharati Quarterly*, July, 1925, p. iii.

<sup>9</sup> Sten Kenow; Article in *Viswabharati Quarterly*, July, 1925, p. 3.

distinction between spirit and matter, and there was no such distinction at the stage we are considering.

These objects were called Devas (The bright ones). A deva is not a deity, as most orientalists suppose; it is the stuff out of which a deity is manufactured at a later stage; and at best it can be translated only as a proto-deity. The History of the idea of God in the religion of the Indo-Aryans is but the history of the attempt to determine the real meaning of the term Deva.

Agni (fire) and Indra (rain) were the chief Devas. The attitude towards the Devas was rather strange; they could be propitiated by sacrifice, they could be coaxed into friendship, and they might even be coerced into submission.

Since the only organ of apprehension with which the psyche was endowed at this stage, was perception, two consequences were bound to follow. In the first place the Devas could be described only in physical terms. Indra was just rain, Marut was just the storm as felt, Surya was just the shining object, and so on with the rest. The force behind these exactly coincided with their physical appearances. Secondly, these objects could not be unified in any way. Perception has not the capacity to unify itself; perceptual experience is essentially pluralistic; and therefore perceived objects as such, remain loose, unconnected, unsynthesised. Hence the belief prevalent in certain quarters, that a Deva is a consciously conceived manifestation of the Absolute, does not accord with facts, and can be explained only as due to a confusion of thought. In this connection we may note the surprising fact that there is no fetish-worship in Indo-Aryan religion. This is easily explained. Perception being the test of the reality of the mystic power, the more precise and definite a perceived object is, the less the impulse to consider it as the home of mystery, and the more the tendency to discard it in favour of semi-perceived objects. What turn this process of elimination took and what it ultimately led to, we shall see in the sections that are to follow.

(To Be Continued.)

## THE LIVERY OF PROTEUS

BY LLOYD MORRIS

**O**N a Scandinavian promontory fretted by a gray sea whose waters are never utterly tranquil, stands a forgotten stimulus, and the crudely set architecture of a cyclopean memorial.

Sometimes the girdling ocean heaves slowly in long swells, and out of the white mists that wrap about its breast comes a low moan, as if a multitudinous dead lying within its sombre depths was stirring restlessly, and complaining through a heavy sleep. Rarely its surface shimmers into quick ripples; often the storm-wind tramples over its wrinkled face, and towering walls of dark water crested with white, come roaring in wild succession to burst upon the shore and, sweeping far up the strand, hiss among the dune-grass and smite with javelins of spray, the dumb witness of dead men signalling down the clangorous years of change.

All the magic of ancient legend and shadowy history lingers about the solitary mounds and tumbled menhirs, many an one such as this, to be seen arching up against the sky-line from the bare fell-sides of the countries of northern Europe: eastward from Ireland to the Baltic strand.

Love and devotion built them; and before the driven brine was launched against them in aerial attack, salt tears had fallen upon them; and from their freshly heaped sides were tossed back upon the night, wild farewells and the flaring lights of failing torches.

In fear and defiance their runic characters were graven; that memory of the dead might not pass from time; nor knowledge of their hardily-won faiths, which upheld them above the brute-beast, from succour of the generation of men—devoured by the laughing mystery of the ocean; and the travailing of deep with deep as some shuddering purpose went forth to unfold.



How great an interment was here: something more than warrior, something stranger than skald; and to mark the decease, but the green mound and some waving grasses.

Here in these tumuli the warrior sleeps with dented helm and blunted spear. Here the aged skald is laid, his pagan rhyme muted in dust that was once his lips. Snowed over by snows, beaten with rains, they lie within sound of the strife of wind and ocean; and the brine-laden gale whistles over them the music to which they sang with a great pagan joy of life; to which they tugged at the long sweeps of their leaping ships; and to which they slept on the unsleeping waters.

Here, too, in these barrows was borne to sepulture a colossal mythology. Together in the adventure of life, pagan and paganism were exposed to the final hazard: every hurtling arrow menaced the gods; the circling axe shattered a heaven; and with every warrior borne from stricken field to his tomb, were carried his gods, his jotuns and his hereafter, already sepultured in a lifeless brain.

There are none now that call upon Odin; the altars of Thor are shattered—and the peaceful peasant wends his way to the Lutheran church on the hill.

There are none that see the elves tripping lightly in the moonlight, nor the nixies rise from the translucent water and, with fair breasts gleaming in the light of the moon, sing their seductive song and comb their blonde hairs with pink shells. There are none who stare through the night affrighted at the ruddy light of Thor's red beard flaring across the sky, and the tumult of his chariot wheels rolling down the west. None see the Valkmeyjar, the battle-maids whose riding is as the riding of gods and heroes, ride out on the tempest: their helms of gold, and a red dew dripping from the tossing manes of their steeds as they summon the warrior fiercely exultant to his last mortal combat, and happy entry into the hall of Odin lit with shields and wainscoted with spears; where dead men rise up ever, and all the airs that blow, are shouts of joyous battle and wassail that know no satiety nor end.

All, all, that titanic imagery wherein the primitive Scandinavian mind expressed so earnestly its ideas of good and evil is become as the music of a pleasing tale—and the peasant plodding a lonely way to market, hears nothing in the wind but the wind; sees only a storm-wrack sweeping across the sky, and a ripple on the water.

Here indeed were matter for the moralist; from which to recite brave tales on the superior altitude of present human understanding. Here, too, might the cynic point a disturbing finger and say that History repeats itself. Here might the pensive traveller stay his step and wonder over the fashion of some morrow leashing its little moment beside the shapes of today and, in ironic little tributes to the antique fantasies of us dead and gone, pronounce the doom of its own faiths; and all the cherishments of an infinite generation of men foetal in eternity.

Can no thought be so fine but that Time shall respect its fairness; no belief so earnest but for all the days it shall be true? The wonder of eras becomes an era's sport; the dearest hopes of nations at last by peoples are despised; and the agonies and tumults of aspiring epochs recede to senseless symbols recording an effluxion of dimensioned time.

The possibilities of Time crowd us down; vociferous modernities in an infinity of repetition deride the elder days for that they muttered and shouted and lo, there was only foolishness; they clutched and behold nothing was in their futile hands.

Goes there not, also, some pilgrim through eternity, telling above the sweeping crescendo of life's vast integrations, that the finalities nourished in yesterdays shone in their hour as steadfastly and true upon the unknown, as do in their turn the effulgencies of futurity's more sumptuous years. Sounds there, also, no far utterance calling from epoch to epoch over sundering oblivions of finite disquietudes that the ignorance of humanity is habitual; that there is in the slightest weed wherewith the hedgerow is green a secret that is the tyranny of time; that in the wind is more than the wind; and on the face of the waters a going forth that has no wap nor wan.

Though the things that we wrought, the hands that shaped, and the brain that directed be resolved again into constituent parts beneath mounded earth; yet the abyssal intention that projected them has no solemn funerals there. Though ever for ever to-morrow's shapes of splendour dim the lustre of today's accomplishment till they be but faded rustling wreaths garlanding Time's greedy adornment; yet the thread upon which they are strung remains impalpable, irrefragable, infinite.

For the virtue of creation does not lie at the point of the biolo-

gist's knife, nor is sealed in any test tube. It is superior to any combination of pigments laid upon canvas; and all our cabbala holds no incantation potent enough to conjure it into terms of sensual perception.

The poem has yet to be written, the harmony evolved, the marble chipped, the theorem erected and ethic or philosophy enunciated which shall incarnate that profound in all things and ever unbeheld; which speaking all tongues informs no ear; is fugitive to the understanding and known to the lad whistling along the furrow—the elusive residuum of research and vivifying principle gliding through History.

We are conscious of it nodding from you to itself in me; manifesting itself subjectively in the happy ideals of happy hours before sorrow laid its first harsh stricture upon our boyish days; in our crescive arrogancies before the certitudes of our prime crumbled in the crucible of experience; in the bland sagacities of our mellowed autumn, before age imposed its tyranny upon an humbleness that asks at last but that the sun's bright rays, and delicate warm airs may fall gently, and the food be soft to mumble in the mouths of poor Harlequin and Pantaloon.

From swaddling band to winding sheet, a litter of discarded spiritual clothing marks the passage of the individual human entity. Objectively, also, we gaze with pensive eye of wonderment or dilated stare of the apalled trembling upon the giddy verge of ecstasy, at the already unrolled tapestry of Time's expression, and at the stupendous adumbration of things yet to be as the ineffable out-folds through gross animalism to mental abstraction; and returns again unto itself in ratiocinations too remote for perception.

The hues of physical glory, the deliquescence of disgusting rotteness; tiny splotch of protoplasm, human brain; the riot of material abandon, the austerities of spiritual extremities, are but the sport and play of its circumstantial masquerades.

Fetish, totem, runic stave; pictograph, Tintoretto; Elgin Marbles, Pauline Epistles; Buddhist dagops, Christian shrine; pagan altar and shrieking sacrifice, stately cathedral, solemn chaunt and the reverential ear inclined to the worshipful mass as sunbeams slanting through glowing windows stain with borrowed tints heads bowed to prayer; the Unkulunkulu of the Amazulu, Brahman Veda, Zor-

astorian Avesta, Buddhist Tripitaka, Alcoran, the Kings of Confucius—these, and such as these are its liveries.

Here, too, in this northern land where over the grave of skald and warrior and mythology, stars glint like frosted sword-blades in the deep blue dome of Odin's halls; here was a Livery of Proteus—not a mean and dishonored habiliment, but a tapestry whose fashion once of gold, now is silver warp in today's tailorings; and yet shall be sober thread in the woof of imperfect shadows of gigantic happenings in a realm beyond the present mind; wherein the Supernal weaves and weaves and weaves.

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