

## THE EFFECT OF SCIENTIFIC STUDY UPON RELIGIOUS BELIEFS.



SCIENTIFIC study has so richly increased the content of human knowledge, it is so practical in its results, and so fascinating in its practice, that its methods and spirit are rapidly pervading every field of intellectual activity. It is, therefore, of no small importance to those who are just beginning to train for life's struggle to consider what they have to lose and what to gain in the exercise of this dominant characteristic of modern thought. We enter the race but once; when the struggle comes, it will be success or defeat, and final for each of us. If we want strong bodies, we are well aware that proper exercise is the way to attain strength. We develop our intellects by thinking. If we would develop character, how shall we do it?

If we seek to distinguish man from the animals and matter with which he shares most of his attributes, we find him certainly superior to all others in his intellectual functions; but as a religious animal mankind stands forth essentially distinct from all other animals. We doubtless inherit much from our ancestors, functions as well as habits, and in both these respects mankind develops with the ages.

But when I speak of religion or religious beliefs as affected by scientific study, I do not mean the metaphysical abstraction, but a concrete system of beliefs and emotions regarding God. This I find essential to my purpose. If I were discussing the effects of unlimited suffrage, it would not be practicable to examine an abstract citizen of no particular age, without sex or color, and having no local habitation, and to observe what effects suffrage might have upon him, though any citizen possessing such definite qualities would be an exceptional citizen. So I find it impracticable to consider scientific study in relation to a religion without qualities, and select the Christian religion as the one concrete religion with which I am familiar, though I use it, if you please, as an example of religion in the abstract.

As exemplified in Christianity, I must assume that we are all more or less acquainted with religion, and scientific study is an occupation so familiar that it requires no definition. The question is, What effect does the exercise of scientific study normally have upon the religious beliefs of the student? Doubtless all who read

this discussion have some religious beliefs; it is not necessary to inquire specifically what they are. But I raise the question, Does scientific study develop them, make them clearer, more distinct, and fuller in content, or does it tend to dissipate them, cause us to hold them in less high esteem, dwarf them, and ultimately trample them underfoot? If the normal effect is deleterious, how are we to counteract this effect and preserve a healthy, vigorous development of both our religious and scientific faculties? If we ascertain the effect upon our particular beliefs, we may infer what will be the effect upon any religious beliefs.

In order to understand the relations which exist between science and religion, let us examine the sources of confidence in our scientific and religious convictions.

To begin with, we may assume the truth of the fundamental proposition, "I exist"; I think no one will deny this for himself. Upon analysis we find that, practically, we apprehend somewhat that is not ourselves in two ways. We become conscious, through what we call *sensations*, of a world outside ourselves, which we call the material universe. We become conscious, through what we call *emotions*, of a somewhat which is not ourselves, to which, however, in every analysis of experience we are unable to find ourselves unrelated. In my analysis this latter somewhat is conceived of as having various attributes. As matter is conceived of as extended, as exhibiting differences in weight, as it impresses me through the different sense-channels of sight, hearing, and taste, so this other somewhat has qualities of truth, of beauty, of goodness, perceived through the various emotions I exercise. And if at any moment I find my mind wavering in doubt as to the validity of my conceptions of the latter kind, I am brought to reason by the thought that if any reliance may be placed on the inference that behind the sensations of form, weight, color, and so forth, there really does exist substantial matter, with the same degree of confidence I may infer that behind the emotions of love and hate, of hope and fear, and of faith, there is a substantial ground of which the emotions themselves testify. The substantial ground of our emotions is contrasted with matter under the names spirit and spiritual, but when it is contrasted with the material universe it is God. As Jesus said to the woman at the well of Samaria, "God is a spirit: and they that worship him must wor-

ship him in spirit and in truth,"—"in truth" implying accord, true communion requiring spiritual harmony.

By this analysis we find that each of us is a conscious ego, oriented, through our sensations, in the midst of a universe of matter, the limits of which we are unable to apprehend; this ego is also oriented, through our emotions, in the midst of an infinity of God, the limits of which in like manner we are unable to apprehend. Starting thus with the conscious self, of the existence of which we are more certain than of anything beside, we attain a conviction regarding the existence of matter and regarding the existence of God *immediately*, but by different modes of consciousness.

The definitions we apply to the universe of matter are only analyses of the relations we bear to matter through our senses; and the definitions we apply to God are only analyses of the relations we bear to God through our emotions.

Science is engaged in the consideration of matter, and although the methods of intellectual thought which are called forth in such analysis may be applied in the discussion of any propositions we may formulate, science particularly deals with the experience of our sense-organs, and therefore differs essentially from religion in the same way that sensations differ from emotions. The study of science begins very early. The infant in its first stages of consciousness does not grasp the fundamental distinctions of science, and reaches for the moon with the same spontaneous avidity with which it grasps an orange. The difference between the infant and the astronomer is that the latter has learned how to interpret sensations into relative distance, and the infant has not. Sensations are immediate, but the formulation of sensations into a universe is the result of scientific study. The astronomer who tells us that the moon is 240,000 miles distant is giving us a brief formulated expression for the innumerable and complex sensations of eye and touch which have been made in the measurement of standards, and in the computation of the distance to the moon.

Again, the child does not at first know that a piece of coal on the floor is not good to eat, nor, having tasted only sugar, can he distinguish sugar from salt. The chemist knows more, only by his own or others' sense experience of the qualities of each.

The method of reaching such scientific knowledge from the state of ignorant consciousness of the infant is one of accumulating sense impressions, of their coördination and classification, and of the intellectual formulating of them into language. It is a process of close observation, of noting the differences and likenesses, or, in general, of noting the relations

between the various sense impressions. The confidence we place in the results of scientific study, resting fundamentally in the confidence that our senses always tell us the truth regarding the universe of matter outside, causes scientific study to magnify the importance of sensations as a means of apprehending truth.

Not only this, but the constant, minute, and rigid application of the mind to the scientific analysis of sensations so absorbs and fascinates the attention of the scientist that nothing else seems real to him; the increasing margin of darkness humiliates him, and he presses forward with redoubled energy, oblivious to all beside. Meanwhile, his emotional nature, at first neglected, soon becomes torpid, and finally reaches that state of atrophy so calmly depicted in the confessions of the greatest of our modern scientists—a state as pitifully abnormal as the paralysis of the permanently uplifted arm of the Hindu fakir.

As I compare my present attitude with that I used to occupy, I find my reverence for God has grown, while I have lost a kind of sense of familiarity with God. The change impresses me as similar to the change of attitude toward my father. As a very young child, I remember sitting on his lap, his telling me interesting tales, singing lullabys to me, and his attitude of sympathy with my childish views. As we grew older, the dignity with which he treated me, the reverence with which I treated him, both increased. For a time the more I grew in knowledge, the more his greater knowledge and judgment impressed me. Still later I approached nearer to him, but here the analogy ceases; in boyhood the first effect of growth was removal from the familiarity of childhood. Such a change, I conceive, has taken place in my relation to God. I was brought up to have profound respect for the authority of the Word of God; and with unquestioning faith, whether I understood it or not, it was a law to me; in every particular its account of natural facts was accepted as the type of truth.

My studies of science—that is, of the phenomenal universe—gave me another witness, which at first I did not recognize as another form of the Word of God. In my first conception of geology I believed that the world was made in six ordinary days. When I learned to read the world, I read there that it was made in thousands and millions of years. The discrepancy did not permanently disturb me; it enlarged my conception of God. This will, I presume, be a strange confession to some minds; but again I remember what it is to take the little doll of my baby in my arms, sing to it, put it in bed, and tell her, "Hush, my child; don't wake the dolly."

Is this deception? Is it even poetry? What do I mean when I thus say that cold or noise

will disturb a china doll? There is no deception—no poetry: the child knows precisely what I mean. To her it means, "He loves me, can enter into my thoughts, and sympathize in my greatest pleasure," and that is precisely what my words communicate to her, and not any information regarding the nature of the bit of clay which is the precious dolly of her childish mind. And we all know what this is; we speak to children in children's language, not in scientific Latin. So I take it that no revelation can reach our minds unless it be expressed in terms which we can understand. And when I look into the old books of the Bible, I do not expect to find instruction in those things which I know cannot now be understood except as the result of exhaustive scientific research. Nature is open to us, but her secrets must be sought out and interpreted. Nature never tells us a lie, but we often misinterpret her; and this gives us no ground for doubt. As we have become better acquainted with science, our formulas have changed, but nature has not changed, nor has the content of her revelation changed. Phlogiston expressed in the seventeenth century all that was known of the principle of fire. Heat will some day as imperfectly hold the story of the burning coal as phlogiston does to-day. Hence I conclude that the genuineness of a written revelation purporting to come from God is to be determined not by the scientific precision of its language, but by the perfection with which it portrays the religious content which it sets out to reveal.

When I say, then, that I can discharge the mathematical element from the story of creation in Genesis without discarding it as a revelation, I treat it only as I am accustomed to treat nature, only as I act out my life. So in using the Bible, we should treat it as a revelation of truth, as I treat nature as a revelation of truth; and I am not interested in either case to find out the thousand ways in which it can be misconstrued.

The scientific student never thinks that the universe of matter is merely a substantialization of his sensations; so, to suppose that God is a personifying of our emotions does not appear to me reasonable. In both cases we build up by intellectual processes the fuller fields of our experience, and when thus elaborated, the one is science, and the other is religion. They are contrasted outside; they meet within our consciousness. In religion, faith, hope, love, righteousness, glory, peace, joy are terms expressing with as great degree of certainty a reality objective to our emotions as sweet, sour, hard, soft, bright, blue, yellow express a reality objective to our senses.

But if these are objective realities, how do we learn of them? As formulated science is

the result of the observations made by thousands of sense-observers, accumulating and comparing their experiences of the relations of matter, so formulated religion is the result of the communings of thousands of holy men who have recorded the results of their religious communings with God. For us the record of these communings is called revelation, and is preserved in the sacred writings called the Bible.

A difficulty, and I am often of the opinion that it is one of the greatest difficulties the earnest scientific student meets in his religious life, is to believe in the accuracy of the Bible. The scientific student is accustomed to accuracy of statement. He says it is not accurate to call an apple blue, or to say that iron is lighter than water, but allows that it is not untrue to state that the sun rises and sets, although the scientist knows that the relative motion thus indicated is directly due to the revolution of the earth. Nevertheless, the fact is, that statements are found in the Bible which, as scientific statements, cannot be explained as even apparently true. Statements appear which can be explained, scientifically, in only one of two ways: either they are inaccurate statements of the facts, or the facts recorded differ from those now known to science as natural; as the account of Eve's creation, the sun standing still for Joshua, the account of Jonah, and others. The part of these stories which is unscientific cannot be explained away without destruction of the plain intent of the story itself.

What shall we do with such inconsistencies? Shall we continue to believe in the validity of a Bible which makes inaccurate statements? I say, Yes, with full understanding of the apparently unscientific attitude taken. But I do it as a scientific student seeking to get whatever truth there may be revealed in the Bible. And to explain why, let me take you to a picture-gallery. We find on the canvas representations of men, faces, figures, or scenes of various kinds which we call pictures. If we analyze them scientifically, we find only canvas covered with variously colored paints. To-day we can all recall such a picture of Washington.<sup>1</sup> We may study the picture in many ways; each element on the canvas may be dissected; each individual spot is of some particular color, which scientifically we may define as a color of a certain position in the spectrum; it is mathematically expressed as so many vibrations in the thousandth of a second; and the color on the canvas may not agree scientifically with any color seen in the human face. Again, we may examine the mode of putting on the paint, the artist's technic, his method of producing an effect, and criticize it as de-

<sup>1</sup> This address was first delivered on Washington's Birthday.

ficient in tone, and consider its faults or beauties as a painting. Again we may examine it as a reproduction of anatomy. It is well or ill drawn, it has given wrong curves or expressions to features, the nose is too thin, one eye is higher than the other. In any of these aspects the picture may be criticized, and it is probable that no picture on any canvas can escape such criticism unscathed. But we have not yet seen in the picture that which alone the picture is. We look at it again to find what Washington was, what it was the artist painted. And when we examine it for this purpose, we find it essential to put it in a particular light; we must stand before it in the attitude intended by the artist, and even then we must have the artistic sense to interpret it truthfully. When we have done all this, we find that the artist did not photograph the face he was reproducing. The artist studied the man, saw him in his various moods and postures, and became filled with a conception of Washington—Washington the general—the president of an infant republic—the founder of a nation—Washington the man: such is the conception portrayed on the canvas. No photograph could catch that with which the artist was inspired; the canvas preserves his inspiration, and all else is trivial compared with it. Until we have seen that, we have not seen the picture, and there is no other purpose in the picture.

Scientific study has made the Bible a gallery of such portraits for me. Until I get out of the Bible those truths with which its writers were inspired, I get nothing; and apprehending them, I care nothing for the criticisms of the artist's methods, or of the materials with which he worked. His very disregard of details which a soulless photograph would have preserved only emphasizes his meaning. What he leaves out, and what, with coarse brush, he dashes in for color, are alike essential to the expression of those profound truths which only holy men as they were inspired of God have ever been able to portray. I fear no criticism of the imperfections of this gallery of paintings. The microscope of the scientist, or of the philologist, or of the historian, may detect many a flaw, but the very flaws help us to catch more truthfully the artist's meaning.

Too many generations of noble human folk have looked on those written pictures and caught new glimpses of God. The light coming from them is too brilliantly reflected in all that is good in Christendom to leave any doubt as to their reality. If the undevout astronomer is mad, what shall we say of the geologist who can despise that unique portrait of Elohim creating the universe, because it makes no place for the Cambrian fauna? What grander or more divine conception of the creation was ever framed than that which likens the origi-

nal materialization of the universe to the vocal articulation of thought? In the beginning God spoke, and it was.

While I realize a growing appreciation of the Bible, and estimate its every detail as of priceless value, it seems to me true that as a body of formulas it is essential to translate the original in other ways than into the English language. In the old attitude there is a definite belief that there is something fixed, and formulated, and perfected long ago in regard to beliefs, what they are and what they should be regarding God and regarding religious things. As Saul found in the law and the ritual of the Pharisees a sharply defined body of law to which he conscientiously sought to conform his actions, so to-day there is a devout reverence for the particular details of form and shade of belief as they are taught in formulated creeds. The fundamental difference which I notice between this and the attitude of the scientific student is that he considers no formulated expressions of belief as permanently satisfactory.

This, I think, is a direct result of the study of science; for my study of science has demonstrated to me that although the laws of nature are so permanent that the very thought of a possibility of their irregularity would produce a mental vertigo destructive to thought, the most precise formulas of science defining these laws are only imperfect expressions of the truth. As we run back in history and compare them, we find that one after another of these formulas has changed, and indeed the most convincing proof of the change is seen in the fact that we now are studying more earnestly than ever, and constantly adjusting our formulas so as better to express the truth. If, then, we know science but imperfectly, if the coming generation will modify the best expressions of knowledge that we can now formulate, it is difficult to escape the inference that no formulations can be framed by man which do not hold the imperfection of the general thought of the time when they were composed. Underlying this view is the more general one, that while it is conceivable that there is absolute truth, all representations of it are imperfect; that the attempt to formulate any conception is but the emphasizing of what are to the man formulating it the chief or primary elements of the conception. That which determines which are primary, and which are less or more important, is the attitude of the man, his particular view; hence any formulation must reflect in some measure the point of view of its author, or of the age when it was framed.

Formulated truth, then, has become to me a body of evidence that requires constant adjustment to modern thought. We must constantly study such formulated truth as that in the Christian Bible, so as to adjust it to our growing

understanding. The content remains the same, but the use of words, force in illustration, the real, thought-transmitting capacity of language, each is modified by the environment; just as the transmission of electricity is modified by the condition of the wire. And as language is purely symbolic, the receiver's knowledge of the symbols determines his capacity to receive what was sent by the transmitter.

Formulas are not at fault, but scientific study begets a changed attitude toward formulas. The study of science begets a respect for truth itself. In the study of nature we become so accustomed to having the truth always told us,—we are so constantly reminded that if an error occurs in our results it is our error, not an error of nature,—that we are looking constantly and everywhere for the truth. And the real student of science expects everything that exists to have something concealed to reveal to him who is able to question it aright. By the real student of science, I do not mean the man who has merely a quick, retentive memory for form and color, and is a mere observer, filled with knowledge of outward things; but I mean the man who, becoming acquainted with her phenomena, invites nature inside his senses, and there communes with her. Reverence for truth so dominates such a man that he cannot consciously entertain a lie. To misrepresent is to him a sin, and the thought that any one could knowingly formulate as true that which is false is repugnant to him. Hence we cannot conceive honestly framed formulas as untruthful, but when we get no truth from them the scientific attitude is that we do not understand the formula.

The result of deep scientific study, it seems to me, is to develop precision in distinguishing true from false formulations of our conceptions, to such a degree that the personal elements of religious belief become more sharply distinguished, so that the devout scientist may be constantly growing in the fullness of his religious belief, and still, all along the way, be dropping out tenets which he had held to—dropping them as he found them not elements of the truth which he grasped. The richness of his religious conceptions will grow by study, as those of his sensuous conceptions grow with his scientific study. But the study which brings development is study of the religious emotions, which must be experienced if we would get the truth. The mere study of theological dogmas is no better than the mere study of text-books on science: in both cases it is only a study of formulas. The man who would grow in knowledge of religious truth must exercise his religious faculties.

This is the direct teaching of scientific study. No man can become acquainted with even the rudiments of science without exercising his sense-faculties—without meeting nature face

to face, and noting, analyzing, and formulating the results of such experience. Can we expect more easily to get acquainted with religious truth? Can we expect to find out God without communing with him? For their healthy development the emotions also require exercise and training, and this development will be purely sensuous unless it be religious. We cannot learn science at second hand, but must seek nature directly if we would be true scientists; so metaphysical speculations about our emotions are far from religious exercises. Religion does not consist of emotions any more than science consists of sensations. God, and our relations to him, must be conceived before emotions become religious.

While science may assist in developing correct morals, it is the province of religion to reveal to us the rightness and wrongness of emotions, and to kindle right emotions within us. The qualities of rightness and wrongness bear the same relation to an emotion that truthness and falseness do to our scientific conceptions. The cultivation of right emotions—this is the practice of religion. What are these emotions? They are faith, hope, love, as generic groups; kindness, appreciation, sympathy, and a thousand other species that are named in the vocabulary of the perfect Christian. These are not morals: morals have to do with the objective acts; these are emotions or affections of the soul, and they can be conceived of entirely separate from works; but they have moral value. The ultimate object of these emotions religion formulates under the name of God. Perfect loveliness, the perfect object of trust, the perfect end of all hope, what are these but attributes of God alone?

The scientist is accustomed to such conceptions. He defines matter as the ultimate essence of light, the ultimate essence of sound, the pure basis of his senses of feeling; but is God more an abstraction than is matter? Is the analysis which science gives us of our sensations to be accorded any greater credence than the analysis which religion gives us of our emotions? These thoughts lead us down into the inner depths of the soul, and there we may best answer these questions for ourselves.

Science exercises and develops functions which are not essentially antagonistic to religion; but they are *not* the functions of religion, and if they be given first place in our interest, religious growth must deteriorate in proportion to its neglect. The functions of religion must be exercised, or they will become incapable of action; they must be educated or they will become weak and useless. Scientific study, though extremely fascinating, though it fills us with exalted notions of the complexity of the universe, and of the wonderful harmony of its

correlations, leads us to no hope ; we find in it only stern, relentless law ; it has no feeling, and its end is certain death.

And what does it profit unless we keep alive those religious functions which conduct us to that other world of religious belief? As Mr. Howells has so perfectly said :

If I lay waste and wither up with doubt  
The blessed field of heaven where once my faith  
Possessed itself serenely safe from death ;  
If I deny the things past finding out ;  
Or if I orphan my own soul of One  
That seemed a Father, and make void the place  
Within me where he dwelt in power and grace,  
What do I gain, that am myself undone ?

*H. S. Williams.*



### THE GIPSY TRAIL.

THE white moth to the closing bine,  
The bee to the opened clover,  
And the gipsy blood to the gipsy blood  
Ever the wide world over.

Ever the wide world over, lass,  
Ever the trail held true,  
Over the world and under the world,  
And back at the last to you.

Out of the dark of the gorgio camp,  
Out of the grime and the gray  
(Morning waits at the end of the world),  
Gipsy, come away!

The wild boar to the sun-dried swamp,  
The red crane to her reed,  
And the Romany lass to the Romany lad  
By the tie of a roving breed.

Morning waits at the end of the world,  
Where winds unhaltered play,  
Nipping the flanks of their plunging ranks  
Till the white sea-horses neigh.

The pied snake to the rifted rock,  
The buck to the stony plain,  
And the Romany lass to the Romany lad,  
And both to the road again.

Both to the road again, again !  
Out on a clean sea-track —  
Follow the cross of the gipsy trail  
Over the world and back !

Follow the Romany patteran  
North where the blue bergs sail,  
And the bows are gray with the frozen spray,  
And the masts are shod with mail.

Follow the Romany patteran  
Sheer to the Austral Light,  
Where the besom of God is the wild west wind,  
Sweeping the sea-floors white.