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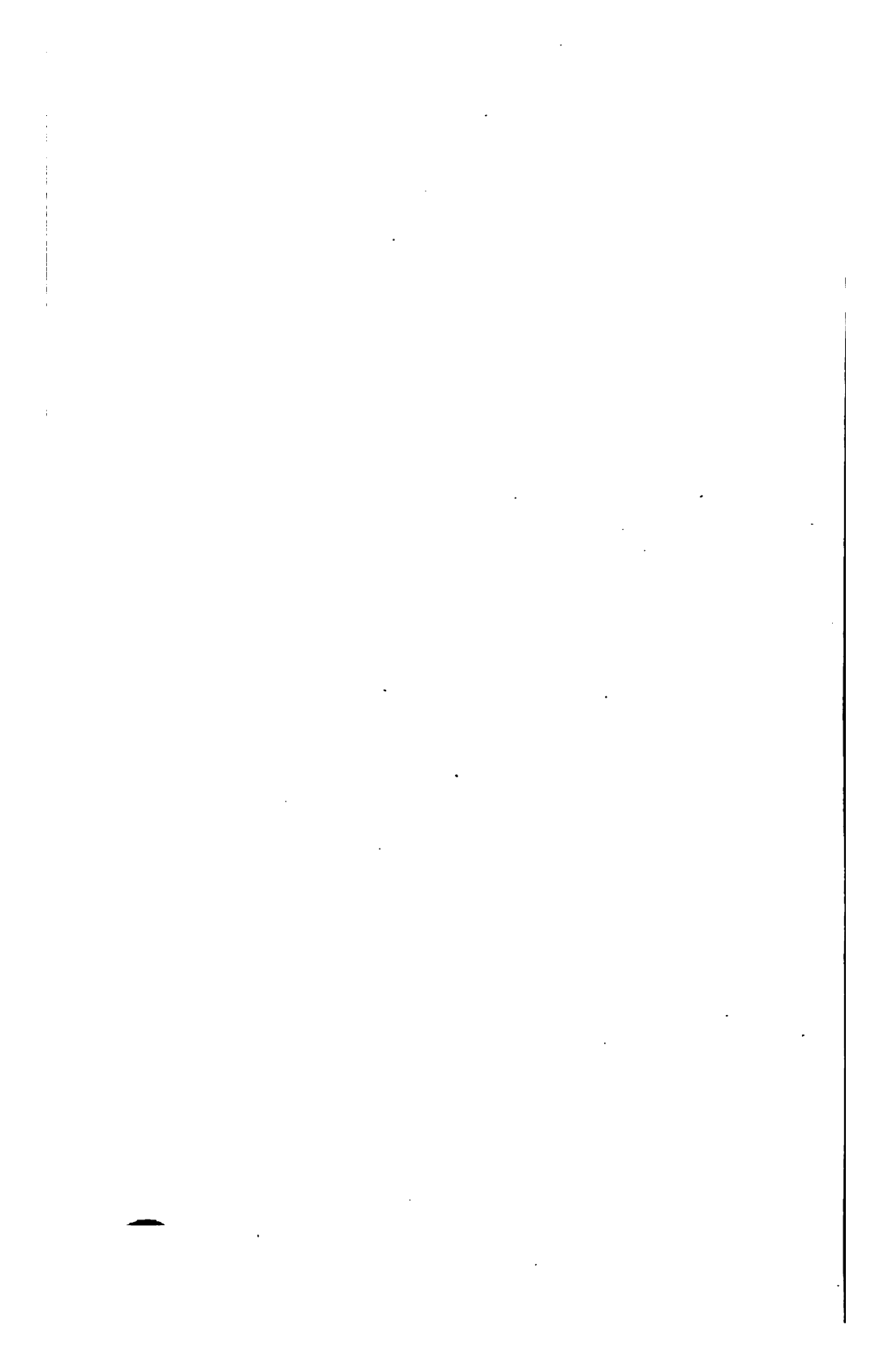
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THE UNITY OF THE SCIENCES.



THE UNITY OF THE SCIENCES.

A LECTURE

DELIVERED AT THE

*OPENING OF THE WINTER SESSION OF THE
UNIVERSITY OF GLASGOW.*

NOVEMBER 3, 1874.

BY

JOHN CAIRD, D.D.,

PRINCIPAL OF THE UNIVERSITY.

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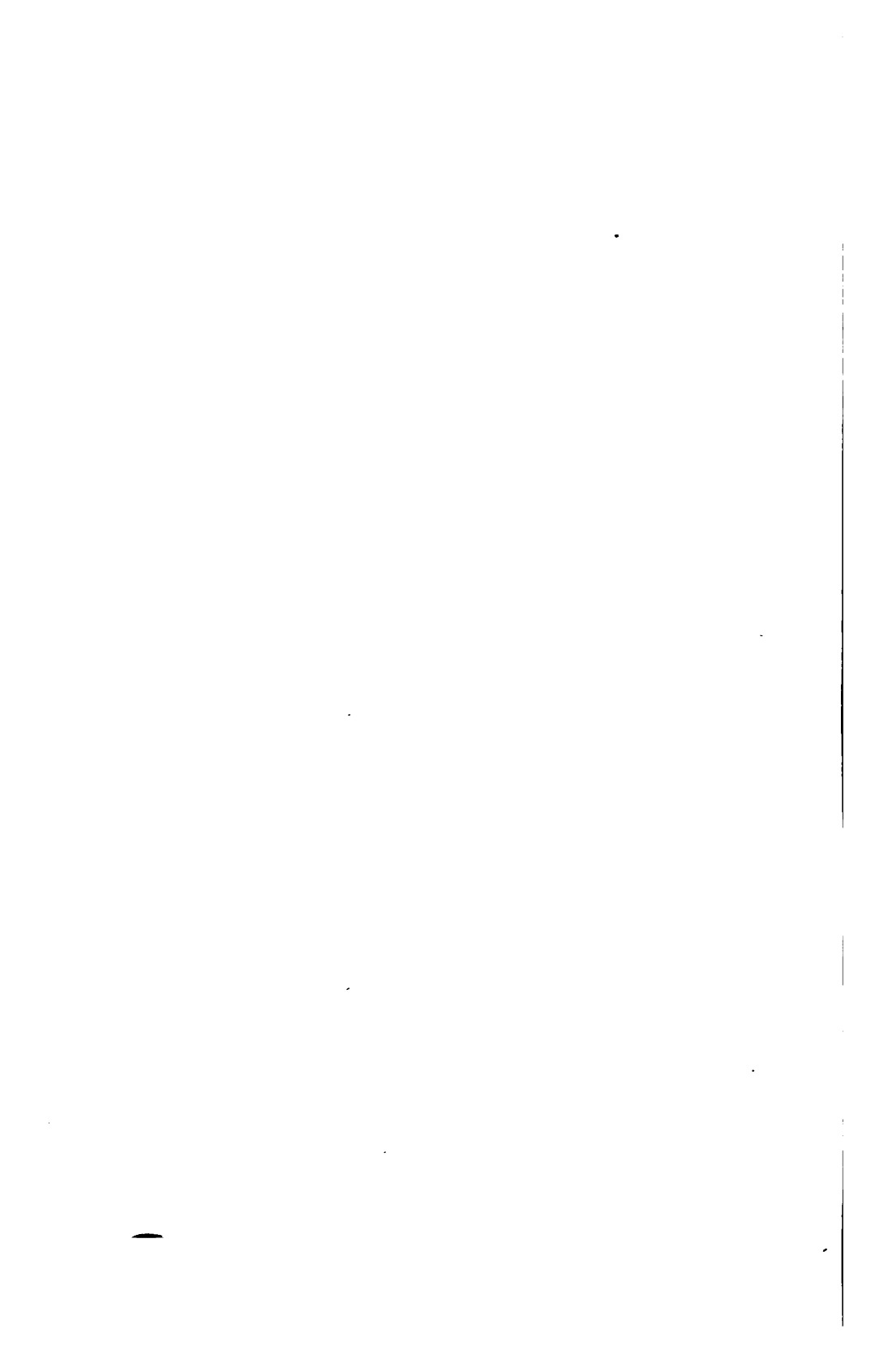
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DEDICATED
TO
THE STUDENTS
OF
THE UNIVERSITY OF GLASGOW.



Vignaud
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LECTURE.

GENTLEMEN,—In taking leave of you last session, I referred at some length to various incidents that had occurred in the course of the session, and to various changes, past and prospective, affecting the welfare and progress of the University. I shall defer any remarks of a similar kind that might now be made till a like period of the session comes round again, believing, as I do, that I can make a better use of the present opportunity of addressing you, by directing your attention to some subject of a more general character, but which, from its relation to your studies, may be supposed to possess some interest for University men. If, in doing so, I trespass a little longer than some would like on your patience, I trust that, as I have not many opportunities of repeating the offence, I may bespeak, on this occasion, your kind indulgence.

In what respect does a University, as a place of education, differ from other and kindred institutions? What are its peculiar functions? or, if we regard the communication of knowledge as the most important of these, what is that special kind of knowledge which it is its office to communicate? Wherein does the knowledge it teaches, either in itself or as regards the conditions under which it is taught, differ from knowledge acquired elsewhere—in schools, from individual teachers, from books, by private study?

Waiving any discussion as to the historic meaning of the name, it may help us to answer these questions if we say in general, that it is the peculiar function of a University to teach *Science*, or the universal element in human knowledge; and, again, that in bringing together in one institution teachers of the various branches of science, if it does not pretend to embrace all knowledge, it yet further justifies the name of a University, by representing and treating each separate and limited department not as a whole in itself, but in its organic relation to the other branches of knowledge. Preparatory training elsewhere may supply the student with the mere implements of study, may discipline his mental powers into a capacity for scientific culture, and may furnish him with much elementary know-

ledge in an arbitrary and authoritative shape ; but it is the province of the higher education to bring the mind, by the exercise of its own independent efforts, to the knowledge, not of the net results of inquiry on any subject or class of subjects, but of the principles on which they depend, and the processes which lead to them,—to enable the student, in other words, to discern and to acquire the habit of seeking after, in every province of investigation, that which alone constitutes thorough and exhaustive knowledge,—the knowledge of the reality under the mask of appearances, of the principles and laws that underlie the chaos of the senses, the transient and meaningless aspects of the phenomenal world, and the rude generalizations of popular thought. A University, if we may so express it, has for its function the cultivation of the scientific habit of mind—the faculty of grasping the universal element in all human knowledge. And then, as I have said, it has this as a further characteristic, that it visibly represents the systematic or organic unity of the various departments of knowledge, not merely by the juxtaposition in a common seat of learning of the teachers of these departments, but by the subjection of the whole work of education carried on within its halls to a common idea or system ; so that each particular

subject has its own place, significance, and value in its relation to the totality of knowledge of which it is a component member. In one word, according to this view, what lends distinctive significance to the name University is, that it is an institution which teaches, or professes to teach, what is universal in all departments of knowledge, and each separate department in its relation to universal knowledge.

These two aspects of University teaching, however, are, in one point of view, reducible to one and the same. You cannot teach the different departments of knowledge scientifically without teaching them in their relations to each other as parts of one organic whole. To know any one subject thoroughly, you must know many more. The most superficial acquaintance with science, in any of its great provinces, suggests to us by how many links of reciprocal interdependence what we call the particular sciences are connected with each other. The student of biology, for instance, cannot pursue his investigations independently of the researches of the chemist; nor the geologist, or palæontologist, without reference to the results of the inquiries of both, or without taking into account those cosmical phenomena and laws which astronomy unfolds; nor the latter, again, without

regard to those researches into optical, electrical, thermal, and other phenomena, which belong to the domain of physical science. The physiologist cannot treat of the phenomena and functions of animal life without regard to the present or past terrestrial conditions under which they exist, or to those laws of the molecular forces of matter into which, according to some theorists, they are ultimately reducible. How closely, again, many of the sciences of experience are connected with, and how much of their advancement they owe to, that great science which deals with the necessary relations of space and number, no one here needs to be told. Whenever any science has reached the point at which its mechanical data can be stated in exact terms of quantity, mathematical science lends to it its all powerful aid as an instrument of deduction. "The command of geometry over the relations of space, the far reaching power which symbolic reasoning confers," and the vast success which, in the field of physical science, has attended the employment of both, whether as means of discovery, or in reaping the fruits of discoveries already made, constitute one of the most remarkable points in the history of modern science. Thus, not to multiply examples, we can see to a certain extent, even in this outward and empirical

way, how closely interwoven many of the various departments of human knowledge are with each other.

But it is not merely in this empirical way that the idea of the correlation of the various departments of scientific knowledge, and the necessity therefore of treating them in connexion with each other, is brought before us. This correlation is implied *in the very idea of science*, and it is that to which the scientific impulse may be said ever to point. Science, in one point of view, is just the search for unity; the endeavour to reproduce in thought that systematic order, harmony, unity, which we believe to exist in things. The presupposition which is the secret stimulus of intelligence and of the desire for knowledge, is the possibility of finding reason, rational coherence, connexion, system in all things; the conviction that in the whole realm of being, in nature and in man, in matter and spirit, from the least and lowest material object up to the highest intelligence, there can exist no dualism, no contradiction, no contingency, no gap or gulf which it is impossible for thought to bridge; and this is virtually the notion that there is really only one science, of which the various special sciences are but arbitrary divisions or degrees. That, therefore, which the special sciences

do, each for that limited group of facts or phenomena with which it deals, a higher science, or science taking a wider field, must seek to do for them. The scientific impulse is not satisfied with leaving the physical sciences in isolation from each other, or these from those which deal with organization and life, or both from that which takes special cognizance of self-conscious mind. It longs to give explicit insight into that continuity, that bond of causation which it implicitly believes to bind, by firmer than iron links, the whole round world together.

The aspiration after unity may indeed, in its ardour, snatch too hastily at results, attempt to forestall the slow march of discovery, and betray even the most able and trained scientific thinkers into grasping at a premature and false simplicity. The gaps between even sciences of the same order may be too hastily filled up by presumptuous guesses;—as when the evolutionist overleaps the lacunae between different kinds of phenomena, and rashly resolves organization and life into the results of chemical combination. Or, again, the great gulf that seems to ordinary thought to divide the material world from the spiritual, the realm of nature from the realm of mind, may be lightly explained away, by the subjective idealist on the one hand, by the materialist on the other; the former sup-

pressing all objectivity that is not the mere projection of his own individual thought, the latter suppressing all subjectivity that is not the mere function of matter and material organization. Or, to give only one other example, that which has been the grand problem of philosophy, and at which the highest minds of the race have age after age been trying—the relation of the finite to the infinite, of nature and man to God—the vulgar religionist may seem to himself and his compeers to settle by the interjection of a *deus ex machina*, an arbitrary anthropomorphic creator outside of the world, fabricating matter and mind after the manner of a maker of machines; not reflecting that arbitrary power or will is but a meaningless phrase substituted for thought, an explanation which, being itself unthinkable, explains nothing; and that, in having recourse to it, he is only imposing on himself, and all others whose intellectual hunger is capable of being appeased by big words.

But though in these and other cases endeavours after scientific unity may prove unsuccessful, the conviction which is their motive is nevertheless the fundamental instinct of science—the conviction that there *is* a unity of principle underlying all diversity and apparent contradiction of things.

And, further, though they may fail as yet to attain the result of which they boast, yet are not the efforts of many scientific observers, in our day at least, pointing out to us the direction in which it lies? For, the unity of the world which they are in search is a unity, not of aggregation or juxtaposition or mere coexistence of component elements, but a unity of *process* or *development*—of a system in which the first and lowest step implies, prophesies, and virtually contains all the successive steps up to the last and highest; and the last is that which presupposes, comprehends, and justifies all that preceded it. If we are ever to get at the true explanation of the world, will it not be one in which there will be no arbitrary leap from one order of existences or of forces to another, but the transition from the mechanical to the chemical, from the inorganic to the organic, from lower to higher forms of life, will, every single step of it, be seen to be that of intelligible succession and law? May we not hope to see how each lower class of relations prepares for and points to the higher, and the higher as we rise to it is the ever deeper and deeper explanation of the lower? Nor need we be afraid to say that when,—from the highest summit of nature, from organization and life in the most developed of the lower creatures,—we rise to the

self-conscious mind that thinks them, here again we shall not find any element of unreason, any dualistic opposition, any arbitrary gap which law and science can never bridge, but a transition which, as we can at least presume now to be, so intelligent insight may yet discern to be, determined by absolute necessity and law. To think thus, as we shall immediately see, is very far from involving a materialistic theory of the universe. But, meantime, we surely need not be restrained by any bugbear of materialism from recognizing in the system of the universe that process of development from the animal to the rational which, as a matter of fact, we see exemplified in each individual life. There was a time in the history of each individual man when he was an existence without sensation, without feeling, without personality, without thought—lower not merely than the higher specimens of brute organisms, but on a level with the very lowest of them. Nor can we say, as we watch the line of development, at what moment of time he rose out of dumb insensibility and unconsciousness, a mere germinating unity of organic forces, into sensibility; or again, at what precise moment the tremendous step was taken by which a self-conscious personality emerged out of the animal, and the mere life of feeling and sensation

silently passed into the higher life of thought. But what this individual history brings before us is the fact of a progression without cleft or arbitrary leap, if not from mere material atoms and forces, at least from the animal to the rational, from the highest product of Nature to that which consummates and transcends Nature, the life of self-conscious man. How organization is connected with life and thought, how dumb feeling effloresces into self-consciousness, science may be utterly unable to tell us—and we may add, if it start with the presupposition of the absolute and essential difference of mind and matter, nature and spirit, it never shall be able to tell us. But, at least, the scientific conviction is not chimerical and groundless which assures the observer that the connexion which yet baffles explanation is not an arbitrary one; that as there is no disharmony, no hard and fast division between the sciences which treat of mechanical forces and those which deal with chemical affinities and combinations, and between these again and the biological sciences, so between all of these and the science which passes beyond nature unto the realm of spirit, of ideas, of moral and spiritual intelligence, there is no breach of systematic continuity, no irrational gap which

only arbitrary will can tie together, but intelligible sequence, coherence, correlation. And so we come back to that idea with which we started, and which a great school of learning such as this represents and in some measure realizes,—the idea at once of the diversity and the unity of the sciences. Analysis, abstraction, division, are necessary for knowledge; but we should ever keep in mind that these are only means to a higher synthesis, to the reproduction of a more rich and perfect unity. To the unreflecting mind science may have an aspect of crabbedness and harshness. The abstracting intellect seems to break up the unity and beauty of the world, to divide and dissect and separate part from part, member from member, and to substitute for the inartificial simplicity and harmony which we intuitively recognize in nature, dry and repulsive classifications and abstractions. The soft, rounded symmetry, the spontaneous grace and loveliness, seems to fall away from the fair face and form of nature before the touch of analysis, and there is left for us only a bare and rigid skeleton, from which the life, the harmony, the unity are gone. But it is not so. The superficial, sensuous unity which science dissolves, it is ever seeking in a deeper way to restore; or rather, its perpetual aim is to give us

back, instead of the rude unities of popular observation, the real and profounder unity of thought, of order, of law, of identity of principle under endless diversities of form and aspect; of relation, process, organic development, beneath seeming disorder and aimless, endless change. And so, when we rightly consider the matter, science presents to us no rugged and ungainly aspect, but is radiant with a diviner beauty than meets the eye; and, instead of being "harsh and crabbed, as dull fools suppose," there is no harmony so true, so sweet, as that which falls on the ear and penetrates the soul of her earnest votaries. Follow where she leads with a loyal and indefatigable spirit; and though the path along which she conducts may often seem a rugged and toilsome one, it leads to a region raised above the grosser pleasures, the vulgarizing aims, and the petty distractions of common life. To the domain of science we may apply those lofty words in which Hegel has spoken of that of religion: "It is a region in which the
" spirit disburdens itself of its finiteness, and re-
" lates itself to that which is unlimited and infinite
" —where its attitude is no longer that of dependence
" but of freedom, and where the individual has no
" longer to do with himself, his interests, his vanity,
" but only with absolute truth. The things which

“ occasion anxiety and doubt, all petty cares and
“ troubles, all narrow and selfish interests, we leave
“ behind us on the sandbank of time. In this pure
“ region we penetrate through the external, deceitful
“ shows and semblances of the world, and all things
“ become revealed to us, transfigured in the pure light
“ of truth, and softened in its atmosphere of eternal
“ peace and rest.” *

To give any detailed illustration of the subject to which I have now referred—the correlation of the various sciences, and their unity as members of one organic whole or system of thought—is beyond the scope of such an address as the present. I will content myself, in the few words I have yet to say, with offering you one or two illustrations of a single branch of the subject—viz., the connexion and reciprocal obligations of the Physical and the Metaphysical sciences—of those sciences, that is, which treat of outward Nature, its phenomena and laws; and those sciences which treat of Thought or Mind, and especially that which deals with its fundamental notions or categories, their genesis and development.

Now, if we ask what is the debt which empirical sciences owe to metaphysics, there are not a few highly able and accomplished men in our day who

* *Philosophie der Religion*, I, s. 5.

will tell you that that debt is simply *nil*. Matter and material forces, their conditions and laws, facts and phenomena, their coexistences and successions—with these alone has science to do; and anything beyond that is a mere intrusion of metaphysical fictions into its proper province. So long as we are dealing with the irrefragable data of observation and experience, and with those laws which, as they are only generalizations from experience, can be satisfactorily verified by it, we are on solid ground. But when you attempt to go beyond this—to carry us into speculations about noumena and phenomena, substances and essences, causes, efficient and final, and so forth—you are dragging us into a region to which the methods and tests of experience no longer apply, and from which we derive absolutely no help in explaining it. There are those, too, who will go even further than this, and not content simply with disowning for positive science all aid from the metaphysical sciences—from Logic, Psychology, Philosophy—are disposed to expunge the latter class altogether from the realm of human knowledge. Instead of deriving from the science of ideas any help towards the explanation of nature, any contribution to the physical sciences, they would maintain, with more or less confidence, the doctrine that ideas themselves are but a product of nature; that

mind is but a mode, mental activity but a function of matter ; or, again, that the principle of the convertibility of force applies to the phenomena of consciousness and thought, in common with those of nature ; and, as mechanical force is transformable into chemical, and the latter may be shown, in any given case, to be the exact equivalent of the former, so, in like manner, organic or vital force is but transformed chemical ; and, finally, we only reach another stage of the same process, or manifestation of the same law, when vital energy is converted into sensation, feeling, and the other phenomena of consciousness. Instead, therefore, of bewildering himself with the baseless and unscientific speculations of the so-called science of metaphysics, what the truly scientific investigator, who would understand the universe in which he is placed, has now to do, is simply, by the sure method of observation and experiment, to trace, in every sphere of inquiry, the manifestations and the transformations of force.

Now, to this tendency to ignore metaphysics, to begin and end with material facts, and to supersede thought and a science of thought, the general answer is that those who try to do so are attempting to perform an impossible feat. You cannot build up a world out of experience without regard to thought and its laws ; for, in the very effort, you

tacitly presuppose what you are trying to ignore. *You cannot reach mind as an ultimate product of matter and force; for in doing so you have already begun with mind*, the earliest step of the inquiry involves categories of mind, and it is in terms of mind that the very problem you are investigating can be so much as stated. Even if you could really start with bare, self-identical, objective facts, stripped of every ideal element or contribution from thought, even then you could go no farther, your first step would be your last, you would be no nearer to an ordered world than a loose heap of printer's types is to an epic poem or a scientific treatise. But you cannot start with such facts. For the least and lowest fact of outward observation is not a bare fact, an independent entity, fact *minus* mind, and out of which mind may be got somehow or other to emerge; but it is fact as it appears to an observing mind, fact as object or in the medium of thought, interpenetrated and suffused with thought, having mind or thought as an inseparable factor of it. Whether there be such a thing as an absolute world outside of thought, whether there be such things as matter and material atoms existing in themselves before any mind begins to perceive or think about them, is not to the purpose. If there be such atoms,

at any rate you, before you begin to make anything of them, must think them, and you can never, by thinking about atoms or by thinking about anything, prove that there is no such thing as thought. Before you reach thought as a last result, you would need to eliminate it from the data of the problem with which you start; and that you can never do, any more than you can stand on your own shoulders or outstrip your own shadow.

The fundamental vice, then, of materialism, is that that out of which mind is to be extracted is itself the creation of mind and already involves its existence as an originating power.

This will be rendered still more obvious, if, passing from the general statement of the contradiction, or vicious circle which materialism involves, we illustrate by one or two examples the share which mind or thought has in those things, or that progressive series of things, out of which it is supposed to be evolved. For, consciously or unconsciously, we are all of us, in our sensible experience, in our ordinary or our scientific observations—in our inductive or deductive reasonings—in our judgments, comparisons, generalizations—clothing outward objects with the forms, and weaving together the rude data of experience into coherent unities and relations, by means of the categories of thought. The ordinary

and unreflecting observer seems to himself to be confronted by a world of realities existing apart in themselves, just as he perceives them, and of which he is simply the passive spectator. And all that he knows of them, their solidity, extension, figure, number, weight, measure, distance, their permanent identity, their likenesses and differences, nay, their varied colours, sounds, tastes, &c., are *there*, existing and given in nature, and simply and immediately reflected on the passive mirror of his own consciousness.

The more cultured observer has, of course, got beyond any such blind sensationalism, admitting, as he does and must, that something at least of what ordinary thought ascribes to nature and external objects exists only relatively to the sensibility of the observer. But he, too, not seldom, in a more elaborate though still unconscious way, is betrayed into the same error, of transferring to the phenomenal world or to outward experience what is due to and presupposes the originating power of thought. He will look at the actual world as it is before him. He will accept nothing that is not given by observation and experience. Nothing for him shall have any further import or validity than it can be shown to have from the most careful observation of nature. He will simply record, at

most, classify and generalize her facts and phenomena, and have nothing to do with empty abstractions and subjective fictions. Yet here too there is often the same illusion to which I have referred. The empiricist or materialist, while supposing himself to be dealing with hard material facts and experiences, is to be found employing such abstractions as *force, law, matter*, as if they were on the same level with sensuous things, and intruding with them in his investigations and reasonings as real entities, immediately given, apart from the activity of thought to which they truly belong. Or, again, whilst contemning all that is supersensible, he is continually using, and cannot advance a single step without using—though often in a hap-hazard and uncritical manner—categories such as unity, multiplicity, identity, difference, cause, effect, substance, properties, &c., which are pure metaphysical creations unconsciously subsumed, without proof or determination, from that realm of ideas which he ignores or denies. The empiricist, in short, is, and cannot help being, an unconscious metaphysician, the materialist an unconscious spiritualist.

Let me briefly illustrate this. All our knowledge of nature, let it be conceded, is derived from experience. But experience itself depends on something

that is not given by sensible experience, and without which it could not exist. I have said that, in one sense, knowledge begins with analysis, takes the unities roughly given in common consciousness or observation and breaks them up by abstraction, so as to reconstruct them in a truer unity, according to their hidden but real relations and laws. But this is only an imperfect account of the process. The analysis with which we seem to start depends on a prior synthesis. It is by our organs of sense that we converse with nature. The utmost, however, which, by this means, we can attain is simply isolated and transient sensations. But isolated sensations are not knowledge. If this were all, our consciousness would be but the stage athwart which flitted an endless series of fugitive impressions, transient, unrelated, incoherent, chasing and obliterating each other, incapable of being arrested, so as to be compared or combined, or of constituting the smallest object of real knowledge, much less of being built up into a solid framework of science. No repetition or reproduction could make these dumb phantoms articulate, for there would be nothing to give them the capacity of self-identification, the power of reporting or explaining their own recurrence. To do this we must have the presence of some permanent amidst the variable—some unify-

ing, concentrating power amidst this flux of impressions, to reclaim them from chaos, to identify, relate, compare, co-ordinate them into coherent objects of knowledge. And this constant amidst the variable, not given by them, but above them, this unifying power is, and can only be, that spiritual self, that self-conscious Ego, which is not given by sense, which is not in this or that sensation, but common to them all, to which they are each and all referred, and which locks them together in the unity of thought. In one word, to constitute the reality of the outward world, the lowest fraction or minimum of knowledge, nay, the very existence of things, or even of molecules and atoms, you must needs presuppose that thought or thinking Self, which some would persuade us is to be educed or evolved from them.

The existence and originating power of thought, then, is implied, or presupposed, in order to gain even that point of departure for science which is involved in the existence of outward things or facts, —no relations being predicable save of objects that have each a definite identity.

It is only a wider expression of the same synthetic principle when we connect things or facts together, in an ordered system or cosmos, by the notion of Cause and Effect. The particular sciences are only a following out, deliberately and systemati-

cally, of the process by which, at the outset of experience, thought correlates isolated sensations.

Interpret nature, we are told, from itself. Never attempt to superinduce your *à priori* conceptions on the facts of experience. What experience gives is always true; anything you add to its facts and realities must be mere subjective fiction. Compare and generalize, if you will, and reproduce, in scientific form, the data presented to you in the outward world; but if you try to read anything into or between them—any mysterious tie of causation or power between the successions of phenomena which observation presents—you are substituting for science a mere metaphysical illusion. Habit may lead you to expect that the same or a similar antecedent will always be followed, as heretofore, by the same or a similar consequent; but this is merely the effect of custom. All that nature contains is simply successions of phenomena; and any mysterious link between them is a pure invention.

I answer, every carefully conducted experiment is a proof that you discern more in nature than mere sensible experience gives—something which is not the mere creation of association or custom, linking together events often observed in succession. For, if this were all, why is it that in a crucial experiment

the notion of necessity, or of necessary sequence, is given the very first time the succession is presented? Why is it that all other and prior experiences of succession inconsistent with this one experience are set aside as delusive; or that, in future, any result different from this that seems, or is alleged, to be given under the same conditions you at once and confidently deny? A single instance in which you know exactly what precedes and follows, suffices to establish necessity of sequence; and it does so because, independent of frequency or custom, you see something more there than arbitrary succession, something more than sense gives or can give: you see the phenomena locked together by the absolute necessity of causation. And, in general, the notion or belief in a uniform order of nature, on which all science rests, is one which is not built up by experience; for it not only presents itself in the case of a single crucial experiment, but it is presupposed in order to any experience, to any one act of scientific observation. For in the very endeavour to account for any change, we imply that it is a change in an order which is by supposition constant; and only because of that presupposition does it require to be accounted for. Alteration that is not referred to what does *not* alter, to an invariable or uniform

system, is the alteration of nothing.* In other words, science, in order to its very existence, rests on an idea, not indeed brought to or superimposed on nature, but perceived in nature, yet which mere sensible experience could never give us—an idea which enables us to rise above experience, and gives unity and permanence to the endless flux of events—the idea, namely, of necessary causation which mind or thought supplies. Reason is seen in nature, because we have reason to see it. And so, again, we recur to the principle, that out of nature, of things and forces, of her so-called material realities, you can never evolve thought; for in order to any knowledge of these, nay, as an element of the very existence and essence of these, thought is already presupposed. To make thought a function of matter, is simply to make thought a function of itself.

The limits of this Lecture debar me from any further illustration of the principle on which I am insisting. But enough, perhaps, has been said to enable us to see the fallacy which lurks in the attempted proof or suggestion, on physical grounds, of the material origin and nature of mind. "If," writes one of the most eminent of modern

* See on this subject the admirable criticism of the sensational philosophy contained in Mr. Green's "General Introduction" to his recent edition of Hume's *Treatise on Human Nature*; in particular, sections 284 and ff.

biologists — “ If the properties of water may
“ properly be said to result from the nature and
“ disposition of its component molecules, I can find
“ no intelligible ground for refusing to say that
“ the properties of protoplasm result from the
“ nature and disposition of its molecules. . . .
“ If (again) the protoplasm of a fungus is essentially
“ identical with, and most readily converted into,
“ that of any animal, I can discover no logical
“ halting-place between the admission that such
“ is the case, and the further conception that all
“ vital action may, with equal propriety, be said
“ to be the result of the molecular forces of the
“ protoplasm which displays it. And, if so, it
“ must be true in the same sense, and to the
“ same extent, that the thoughts to which I am
“ now giving utterance, and your thoughts regard-
“ ing them, are the expression of molecular changes
“ in the matter of life, which is the source of other
“ vital phenomena.”* The implied argument here
is, that as the phenomena of life may be ultimately
resolvable into those of chemical affinity, and these,
again, into molecular force ; so, and to precisely the
same extent, the phenomena of consciousness, sensa-
tion, feeling, intelligence, will, may be resolvable into
the physical organization of the thinking agent.

* Huxley's *Lay Sermons*, p. 138.

But suppose the former steps in this series of transformations were no longer mere conjecture but demonstrated truth, there is an enormous gap between this concession and the final step of the supposed process—namely, the resolution of thought into a result of vital organization. Suppose we accept to the fullest extent the physiologist's account of the matter, what proof, or scintillation of proof, have we here that organization is prior to thought? Prior to thought it may be, in the sense that neither he nor I, this accidental individuality, would be able to think unless we had a brain and nervous system of a particular structure. But a theory of the physical conditions of thought is not an explanation of the nature and origin of thought itself. In another sense, to say that organization is prior to thought, is to give utterance to a contradiction in terms. Not only is it true, in general, that neither organization nor anything else can have, or be conceived to have, any existence save as thinkable existence; but life and organization, or an organic structure, involve in their very essence a whole host of ideas or categories,—those which I have above discussed, and many others. It is thought, therefore, which is, and must be, prior to them, seeing it enters into their very being and essence. Before the physiologist reaches mind, that out of which mind

is to be made, or from which it is to be evolved, is suffused with thought, swimming in an atmosphere of thought. It is possible, indeed, for you, or any one, to observe, and investigate, and experiment about the structure and functions of the human organization, before thinking about mind or ideas, or without ever thinking about them at all; but that is saying no more than when you say that a man may walk without studying anatomy, or eat and drink without thinking about his digestive and nutritive organs. It is not the less true that every step he takes, and every morsel he eats, implies the existence and activity of the physical organs concerned in the process. And so the unconscious use of ideas, categories, reason, intelligence, is no disproof, but the reverse, of the priority of thought. It is only a proof that, in the steps of the rational process, or in the stages of that education through which each human spirit passes in order to the attainment of knowledge, thought must begin to live in the outward world before it falls back on itself. The dream-life of childhood, in which mind wanders abroad, and lives a mere life of objectivity and self-estrangement, must precede the conscious life of intellectual manhood. We must, and do, think objects of thought before we think the mind that

thinks them: but any way, consciously or unconsciously, that which thinks the outward is prior to the outward. Thought cannot be the function of organization or of anything else in the universe, for it is the *prius* of organization and of all things.

I have taxed your patience too long, gentlemen, with this somewhat dry discussion; and in what I have said I have not even touched on the question as to the bearing of the views I have attempted to criticise in the province of religion and theology. On this subject it is, of course, at present impossible to enter. But I will hazard on it a single remark in conclusion. I have spoken of the priority of thought or mind to matter. But the priority I have claimed for it is not, and cannot be, that of your individual thought or mine. In the case of the individual, finite thinker, that is not first which is spiritual, but that which is natural. A great poet has said that "in *our* life does nature live." But it is not so. There was a time when our thought was not; and the world and all that is therein, the round ocean, the living air, the blue sky, the fair and wondrous order of nature, would be as real and as fair though we, and myriads such as we, were not here to perceive and know it. But

though nature lives not in our life, what I have said as to the priority of thought to nature is still not the less true. Nay, just because it is not true of your thought or mine, the principle contains in it the strongest, the deepest, the one irrefragable proof of the existence of a thought, a mind which is before and beyond all finite thought, or rather with reference to which the words "before" and "after" have no longer any meaning—the one eternal thought on which all being and all knowing rest. And this, as it is the surest proof of the existence, is also that which gives to us the grandest conception of the nature of God. The distinguished representatives of modern scientific thought, to whom I have above referred, have denied—and who shall presume to question the sincerity of their denial—that the tendency of their doctrines is atheistic. But the only conception of God, of which, avowedly, their speculations admit, is a God outside of knowledge, the dark impenetrable back-ground of the phenomenal world, our only relation to whom is not intelligent admiration or love, but simply that awe and submission we feel before the unknown and the unknowable. The object of religion, we are told, is "the mystery from which we have emerged,

“and which each succeeding age is free to fashion in accordance with its own needs.”* “It will be wise,” we are advised, “to recognize the various religions of the world as the forms of a force, mischievous if permitted to intrude on the region of knowledge over which it holds no command, but capable of being guided to noble issues in the region of emotion.”† But, if this be the only God to whom science points, and with the notion of whom it proposes to meet and satisfy the infinite aspirations and inextinguishable longings of the spirit of man, the boon it brings is one for which I, for one, cannot pay it the poor tribute of my gratitude. I cannot bow before this blank inscrutability, of whom you help me neither to affirm nor deny anything, and for whom, therefore, I can feel no rational reverence. I cannot, will not, submit my will to that of which I know, and can know, nothing; of which, or of whom, I cannot tell whether, if I did know him, the proper attitude might not be—not love and veneration and obedience—but resistance and abhorrence. Not such is He the God to whom the principle I have imperfectly illustrated points—the Being who is not banished beyond the

* Tyndall's *Address to the British Association*, p. 61. † *Ibid*, p. 61.

bright domain of intelligence, but who is Himself the light of all our seeing, the Infinite Thought which, though it transcends all thinking things, all objects of all thought, reveals itself in all that human thought can grasp, and discloses itself more and more with every step in the ever onward tread of human intelligence. The God of whom we can thus conceive is no blank mystery, no veiled divinity on whose face the eye of human intelligence can never rest, with whom the conscious spirit of man can hold no communion. It is not left us, as the highest attitude of our religious nature, after we have found noblest intellectual satisfaction in tracing back to their farthest sequences the phenomena and laws of this fair and ordered world, to stand dumb and silent before that portentous veil which for ever wraps the Invisible from our view, and to say, "Behind that—perhaps—is God; you can never see Him, never know Him, but fancy and imagination may disport themselves at their own wayward will in shaping out fantastic notions of Him, all alike erroneous and illusive." It is some reward of a truer speculation if it enables us to put away this phantom of nescience, and to think God as the God of truth and science, the Being whose dwelling place is not thick darkness,

but wherever knowledge sheds its kindly light over the paths of men—whom every true thought, every fresh discovery, every idea of the wise, and every intuition of the good, are helping us to know more fully—the Being, in one word, who is Himself the Truth, absolute and inexhaustible, after which the greatest of the sons of men have sought with a thirst that is unquenchable, and which, when they have in any measure grasped it, is the crown and consummation of their efforts.