A System Of Logic, Ratiocinative And Inductive

by

John Stuart Mill

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A SYSTEM OF LOGIC, RATIOCINATIVE AND INDUCTIVE,

BEING A CONNECTED VIEW OF THE
PRINCIPLES OF EVIDENCE,
AND THE
METHODS OF SCIENTIFIC INVESTIGATION.

by

JOHN STUART MILL.

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Book VI.

On The Logic Of The Moral Sciences.

> "Si l'homme peut prédire, avec une assurance presque entière, les phénomènes dont il connaît les lois; si lors même qu'elles lui sont inconnues, il peut, d'après l'expérience, prévoir avec une grande probabilité les événements de l'avenir; pourquoi regarderait-on comme une entreprise chimérique, celle de tracer avec quelque vraisemblance le tableau des destinées futures de l'espèce humaine, d'après les résultats de son histoire? Le seul fondement de croyance dans les sciences naturelles, est cette idée, que les lois générales, connues ou ignorées, qui règlent les phénomènes de l'univers, sont nécessaires et constantes; et par quelle raison ce principe serait-il moins vrai pour le développement des facultés intellectuelles et morales de l'homme, que pour les autres opérations de la nature? Enfin, puisque des opinions formées d'après l'expérience ... sont la seule règle de la conduite des hommes les plus sages, pourquoi interdirait-on au philosophe d'appuyer ses conjectures sur cette même base, pourvu qu'il ne leur attribue pas une certitude supérieure à celle qui peut naître du nombre, de la constance, de l'exactitude des observations?"—CONDORCET, *Esquisse d'un Tableau Historique des Progrès de l'Esprit Humain*.

Chapter I.

Introductory Remarks.

§ 1. Principles of Evidence and Theories of Method are not to be constructed *a priori*. The laws of our rational faculty, like those of every other natural agency, are only learned by seeing the agent at work. The earlier achievements of science were made without the conscious observance of any Scientific Method; and we should never have known by what process truth is to be ascertained, if we had not previously ascertained many truths. But it was only the easier problems which could be thus resolved: natural sagacity, when it tried its strength against the more difficult ones, either failed altogether, or, if it succeeded here and there in obtaining a solution, had no sure means of convincing others that its solution was correct. In scientific investigation, as in all other works of human skill, the way of obtaining the end is seen as it were instinctively by superior minds in some comparatively simple case, and is then, by judicious generalization, adapted to the variety of complex cases. We learn to do a thing in difficult circumstances, by attending to the manner in which we have spontaneously done the same thing in easier ones.

This truth is exemplified by the history of the various branches of knowledge which have successively, in the ascending order of their complication, assumed the character of sciences; and will doubtless receive fresh confirmation from those of which the final scientific constitution is yet to come, and which are still abandoned to the uncertainties of vague and popular discussion. Although several other sciences have emerged from this state at a comparatively recent date, none now remain in it except those which relate to man himself, the most complex and most difficult subject of study on which the human mind can be engaged.

[pg 580]
Concerning the physical nature of man, as an organized being—though there is still much uncertainty and much controversy, which can only be terminated by the general acknowledgment and employment of stricter rules of induction than are commonly recognized—there is, however, a considerable body of truths which all who have attended to the subject

consider to be fully established; nor is there now any radical imperfection in the method observed in the department of science by its most distinguished modern teachers. But the laws of Mind, and, in even a greater degree, those of Society, are so far from having attained a similar state of even partial recognition, that it is still a controversy whether they are capable of becoming subjects of science in the strict sense of the term: and among those who are agreed on this point, there reigns the most irreconcilable diversity on almost every other. Here, therefore, if anywhere, the principles laid down in the preceding Books may be expected to be useful.

If on matters so much the most important with which human intellect can occupy itself a more general agreement is ever to exist among thinkers; if what has been pronounced "the proper study of mankind" is not destined to remain the only subject which Philosophy can not succeed in rescuing from Empiricism; the same process through which the laws of many simpler phenomena have by general acknowledgment been placed beyond dispute, must be consciously and deliberately applied to those more difficult inquiries. If there are some subjects on which the results obtained have finally received the unanimous assent of all who have attended to the proof, and others on which mankind have not yet been equally successful; on which the most sagacious minds have occupied themselves from the earliest date, and have never succeeded in establishing any considerable body of truths, so as to be beyond denial or doubt; it is by generalizing the methods successfully followed in the former inquiries, and adapting them to the latter, that we may hope to remove this blot on the face of science. The remaining chapters are an endeavor to facilitate this most desirable object.

§ 2. In attempting this, I am not unmindful how little can be done toward it in a mere treatise on Logic, or how vague and unsatisfactory all precepts of Method must necessarily appear when not practically exemplified in the establishment of a body of doctrine. Doubtless, the most effectual mode of showing how the sciences of Ethics and Politics may be constructed would be to construct them: a task which, it needs scarcely be said, I am not about to undertake. But even if there were no other examples, the memorable one of Bacon would be sufficient to demonstrate, that it is sometimes both possible and useful to point out the way, though without being one's self prepared to adventure far into it. And if more were to be attempted, this at least is not a proper place for the attempt.

In substance, whatever can be done in a work like this for the Logic of the Moral Sciences, has been or ought to have been accomplished in the five preceding Books; to which the present can be only a kind of supplement or appendix, since the methods of investigation applicable to moral and social science must have been already described, if I have succeeded in enumerating and characterizing those of science in general. It remains, however, to examine which of those methods are more especially suited to the various branches of moral inquiry; under what peculiar facilities or difficulties they are there employed; how far the unsatisfactory state [pg 581] of those inquiries is owing to a wrong choice of methods, how far to want of skill in the application of right ones; and what degree of ultimate success may be attained or hoped for by a better choice or more careful employment of logical processes appropriate to the case. In other words, whether moral sciences exist, or can exist; to what degree of perfection they are susceptible of being carried; and by what selection or adaptation of the methods brought to view in the previous part of this work that degree of perfection is attainable.

At the threshold of this inquiry we are met by an objection, which, if not removed, would be fatal to the attempt to treat human conduct as a subject of science. Are the actions of human beings, like all other natural events, subject to invariable laws? Does that constancy of causation, which is the foundation of every scientific theory of successive phenomena, really obtain among them? This is often denied; and for the sake of systematic completeness, if not from any very urgent practical necessity, the question should receive a deliberate answer in this place. We shall devote to the subject a chapter apart.

Chapter II.

Of Liberty And Necessity.

§ 1. The question, whether the law of causality applies in the same strict sense to human actions as to other phenomena, is the celebrated controversy concerning the freedom of the will; which, from at least as far back as the time of Pelagius, has divided both the philosophical and the religious world. The affirmative opinion is commonly called the doctrine of Necessity, as asserting human volitions and actions to be necessary and inevitable. The negative maintains that the will is not determined, like other phenomena, by antecedents, but determines itself; that our volitions are not, properly speaking, the effects of causes, or at least have no causes which they uniformly and implicitly obey.

I have already made it sufficiently apparent that the former of these opinions is that which I consider the true one; but the misleading terms in which it is often expressed, and the indistinct manner in which it is usually apprehended, have both obstructed its reception, and perverted its influence when received. The metaphysical theory of free-will, as held by philosophers (for the practical feeling of it, common in a greater or less degree to all mankind, is in no way inconsistent with the contrary theory), was invented because the supposed alternative of admitting human actions to be *necessary* was deemed inconsistent with every one's instinctive consciousness, as well as humiliating to the pride and even degrading to the moral nature of man. Nor do I deny that the doctrine, as sometimes held, is open to these imputations; for the misapprehension in which I shall be able to show that they originate, unfortunately is not confined to the opponents of the doctrine, but is participated in by many, perhaps we might say by most, of its supporters.

§ 2. Correctly conceived, the doctrine called Philosophical Necessity is simply this: that, given the motives which are present to an individual's mind, and given likewise the character and disposition of the individual, the manner in which he will act might be unerringly inferred; that if we knew [pg 582] the person thoroughly, and knew all the inducements which are acting upon him, we could foretell his conduct with as much certainty as we can predict any physical event. This proposition I take to be a mere interpretation of universal experience, a statement in words of what every one is internally convinced of. No one who believed that he knew thoroughly the circumstances of any case, and the characters of the different persons concerned, would hesitate to foretell how all of them would act. Whatever degree of doubt he may in fact feel, arises from the uncertainty whether he really knows the circumstances, or the character of some one or other of the persons, with the degree of accuracy required; but by no means from thinking that if he did know these things, there could be any uncertainty what the conduct would be. Nor does this full assurance conflict in the smallest degree with what is called our feeling of freedom. We do not feel ourselves the less free, because those to whom we are intimately known are well assured how we shall will to act in a particular case. We often, on the contrary, regard the doubt what our conduct will be, as a mark of ignorance of our character, and sometimes even resent it as an imputation. The religious metaphysicians who have asserted the freedom of the will, have always maintained it to be consistent with divine foreknowledge of our actions: and if with divine, then with any other foreknowledge. We may be free, and yet another may have reason to be perfectly certain what use we shall make of our freedom. It is not, therefore, the doctrine that our volitions and actions are invariable consequents of our antecedent states of mind, that is either contradicted by our consciousness, or felt to be degrading.

But the doctrine of causation, when considered as obtaining between our volitions and their antecedents, is almost universally conceived as involving more than this. Many do not believe, and very few practically feel, that there is nothing in causation but invariable, certain, and unconditional sequence. There are few to whom mere constancy of succession appears a sufficiently stringent bond of union for so peculiar a relation as that of cause and effect. Even if the reason repudiates, the imagination retains, the feeling of some more intimate connection, of some peculiar tie, or mysterious constraint exercised by the antecedent over the consequent. Now this it is which, considered as applying to the human will, conflicts with our consciousness,

and revolts our feelings. We are certain that, in the case of our volitions, there is not this mysterious constraint. We know that we are not compelled, as by a magical spell, to obey any particular motive. We feel, that if we wished to prove that we have the power of resisting the motive, we could do so (that wish being, it needs scarcely be observed, a *new antecedent*); and it would be humiliating to our pride, and (what is of more importance) paralyzing to our desire of excellence, if we thought otherwise. But neither is any such mysterious compulsion now supposed, by the best philosophical authorities, to be exercised by any other cause over its effect. Those who think that causes draw their effects after them by a mystical tie, are right in believing that the relation between volitions and their antecedents is of another nature. But they should go farther, and admit that this is also true of all other effects and their antecedents. If such a tie is considered to be involved in the word Necessity, the doctrine is not true of human actions; but neither is it then true of inanimate objects. It would be more correct to say that matter is not bound by necessity, than that mind is so.

That the free-will metaphysicians, being mostly of the school which rejects [pg 583] Hume's and Brown's analysis of Cause and Effect, should miss their way for want of the light which that analysis affords, can not surprise us. The wonder is, that the necessitarians, who usually admit that philosophical theory, should in practice equally lose sight of it. The very same misconception of the doctrine called Philosophical Necessity, which prevents the opposite party from recognizing its truth, I believe to exist more or less obscurely in the minds of most necessitarians, however they may in words disavow it. I am much mistaken if they habitually feel that the necessity which they recognize in actions is but uniformity of order, and capability of being predicted. They have a feeling as if there were at bottom a stronger tie between the volitions and their causes; as if, when they asserted that the will is governed by the balance of motives, they meant something more cogent than if they had only said, that whoever knew the motives, and our habitual susceptibilities to them, could predict how we should will to act. They commit, in opposition to their own scientific system, the very same mistake which their adversaries commit in obedience to theirs; and in consequence do really in some instances suffer those depressing consequences which their opponents erroneously impute to the doctrine itself.

§ 3. I am inclined to think that this error is almost wholly an effect of the associations with a word, and that it would be prevented, by forbearing to employ, for the expression of the simple fact of causation, so extremely inappropriate a term as Necessity. That word, in its other acceptations, involves much more than mere uniformity of sequence: it implies irresistibleness. Applied to the will, it only means that, the given cause will be followed by the effect, subject to all possibilities of counteraction by other causes; but in common use it stands for the operation of those causes exclusively which are supposed too powerful to be counteracted at all. When we say that all human actions take place of necessity, we only mean that they will certainly happen if nothing prevents; when we say that dying of want, to those who can not get food, is a necessity, we mean that it will certainly happen whatever may be done to prevent it. The application of the same term to the agencies on which human actions depend, as is used to express those agencies of nature which are really uncontrollable, can not fail, when habitual, to create a feeling of uncontrollableness in the former also. This, however, is a mere illusion. There are physical sequences which we call necessary, as death for want of food or air; there are others which, though as much cases of causation as the former, are not said to be necessary, as death from poison, which an antidote, or the use of the stomach-pump, will sometimes avert. It is apt to be forgotten by people's feelings, even if remembered by their understandings, that human actions are in this last predicament: they are never (except in some cases of mania) ruled by any one motive with such absolute sway that there is no room for the influence of any other. The causes, therefore, on which action depends, are never uncontrollable; and any given effect is only necessary provided that the causes tending to produce it are not controlled. That whatever happens, could not have happened otherwise, unless something had taken place which was capable of preventing it, no one surely needs hesitate to admit. But to call this by the name Necessity is to use the term in a sense so different from its primitive and familiar meaning, from that which it bears in the common occasions of life, as to amount almost to a play upon words. The associations derived from [pg 584] the ordinary sense of the term will adhere to it in spite of all we can do; and though the doctrine of Necessity, as stated by most who hold it, is very remote from fatalism, it is probable that most necessitarians are fatalists, more or less, in their feelings.

A fatalist believes, or half believes (for nobody is a consistent fatalist), not only that whatever is about to happen will be the infallible result of the causes which produce it (which is the true

necessitarian doctrine), but moreover that there is no use in struggling against it; that it will happen, however we may strive to prevent it. Now, a necessitarian, believing that our actions follow from our characters, and that our characters follow from our organization, our education, and our circumstances, is apt to be, with more or less of consciousness on his part, a fatalist as to his own actions, and to believe that his nature is such, or that his education and circumstances have so moulded his character, that nothing can now prevent him from feeling and acting in a particular way, or at least that no effort of his own can hinder it. In the words of the sect which in our own day has most perseveringly inculcated and most perversely misunderstood this great doctrine, his character is formed *for* him, and not *by* him; therefore his wishing that it had been formed differently is of no use; he has no power to alter it. But this is a grand error. He has, to a certain extent, a power to alter his character. Its being, in the ultimate resort, formed for him, is not inconsistent with its being, in part, formed *by* him as one of the intermediate agents. His character is formed by his circumstances (including among these his particular organization); but his own desire to mould it in a particular way, is one of those circumstances, and by no means one of the least influential. We can not, indeed, directly will to be different from what we are. But neither did those who are supposed to have formed our characters directly will that we should be what we are. Their will had no direct power except over their own actions. They made us what they did make us, by willing, not the end, but the requisite means; and we, when our habits are not too inveterate, can, by similarly willing the requisite means, make ourselves different. If they could place us under the influence of certain circumstances, we, in like manner, can place ourselves under the influence of other circumstances. We are exactly as capable of making our own character, *if we will*, as others are of making it for us.

Yes (answers the Owenite), but these words, "if we will," surrender the whole point: since the will to alter our own character is given us, not by any efforts of ours, but by circumstances which we can not help, it comes to us either from external causes, or not at all. Most true: if the Owenite stops here, he is in a position from which nothing can expel him. Our character is formed by us as well as for us; but the wish which induces us to attempt to form it is formed for us; and how? Not, in general, by our organization, nor wholly by our education, but by our experience; experience of the painful consequences of the character we previously had; or by some strong feeling of admiration or aspiration, accidentally aroused. But to think that we have no power of altering our character, and to think that we shall not use our power unless we desire to use it, are very different things, and have a very different effect on the mind. A person who does not wish to alter his character, can not be the person who is supposed to feel discouraged or paralyzed by thinking himself unable to do it. The depressing effect of the fatalist doctrine can only be felt where there *is* a wish to do what that doctrine represents as impossible. It is of no consequence what we think forms our character, when we have no desire of our [pg 585] own about forming it; but it is of great consequence that we should not be prevented from forming such a desire by thinking the attainment impracticable, and that if we have the desire, we should know that the work is not so irrevocably done as to be incapable of being altered.

And indeed, if we examine closely, we shall find that this feeling, of our being able to modify our own character *if we wish*, is itself the feeling of moral freedom which we are conscious of. A person feels morally free who feels that his habits or his temptations are not his masters, but he theirs; who, even in yielding to them, knows that he could resist; that were he desirous of altogether throwing them off, there would not be required for that purpose a stronger desire than he knows himself to be capable of feeling. It is of course necessary, to render our consciousness of freedom complete, that we should have succeeded in making our character all we have hitherto attempted to make it; for if we have wished and not attained, we have, to that extent, not power over our own character; we are not free. Or at least, we must feel that our wish, if not strong enough to alter our character, is strong enough to conquer our character when the two are brought into conflict in any particular case of conduct. And hence it is said with truth, that none but a person of confirmed virtue is completely free.

The application of so improper a term as Necessity to the doctrine of cause and effect in the matter of human character, seems to me one of the most signal instances in philosophy of the abuse of terms, and its practical consequences one of the most striking examples of the power of language over our associations. The subject will never be generally understood until that objectionable term is dropped. The free-will doctrine, by keeping in view precisely that portion of the truth which the word Necessity puts out of sight, namely the power of the mind to co-operate in the formation of its own character, has given to its adherents a practical feeling much

nearer to the truth than has generally (I believe) existed in the minds of necessitarians. The latter may have had a stronger sense of the importance of what human beings can do to shape the characters of one another; but the free-will doctrine has, I believe, fostered in its supporters a much stronger spirit of self-culture.

§ 4. There is still one fact which requires to be noticed (in addition to the existence of a power of self-formation) before the doctrine of the causation of human actions can be freed from the confusion and misapprehensions which surround it in many minds. When the will is said to be determined by motives, a motive does not mean always, or solely, the anticipation of a pleasure or of a pain. I shall not here inquire whether it be true that, in the commencement, all our voluntary actions are mere means consciously employed to obtain some pleasure or avoid some pain. It is at least certain that we gradually, through the influence of association, come to desire the means without thinking of the end; the action itself becomes an object of desire, and is performed without reference to any motive beyond itself. Thus far, it may still be objected that, the action having through association become pleasurable, we are, as much as before, moved to act by the anticipation of a pleasure, namely, the pleasure of the action itself. But granting this, the matter does not end here. As we proceed in the formation of habits, and become accustomed to will a particular act or a particular course of conduct because it is pleasurable, we at last continue to will it without any reference to its being pleasurable. [pg 586] Although, from some change in us or in our circumstances, we have ceased to find any pleasure in the action, or perhaps to anticipate any pleasure as the consequence of it, we still continue to desire the action, and consequently to do it. In this manner it is that habits of hurtful excess continue to be practiced although they have ceased to be pleasurable; and in this manner also it is that the habit of willing to persevere in the course which he has chosen, does not desert the moral hero, even when the reward, however real, which he doubtless receives from the consciousness of well-doing, is any thing but an equivalent for the sufferings he undergoes, or the wishes which he may have to renounce.

A habit of willing is commonly called a purpose; and among the causes of our volitions, and of the actions which flow from them, must be reckoned not only likings and aversions, but also purposes. It is only when our purposes have become independent of the feelings of pain or pleasure from which they originally took their rise, that we are said to have a confirmed character. “A character,” says Novalis, “is a completely fashioned will:” and the will, once so fashioned, may be steady and constant, when the passive susceptibilities of pleasure and pain are greatly weakened or materially changed.

With the corrections and explanations now given, the doctrine of the causation of our volitions by motives, and of motives by the desirable objects offered to us, combined with our particular susceptibilities of desire, may be considered, I hope, as sufficiently established for the purposes of this treatise.[268]

Chapter III.

That There Is, Or May Be, A Science Of Human Nature.

§ 1. It is a common notion, or at least it is implied in many common modes of speech, that the thoughts, feelings, and actions of sentient beings are not a subject of science, in the same strict sense in which this is true of the objects of outward nature. This notion seems to involve some confusion of ideas, which it is necessary to begin by clearing up.

Any facts are fitted, in themselves, to be a subject of science which follow one another according to constant laws, although those laws may not have been discovered, nor even be discoverable by our existing resources. Take, for instance, the most familiar class of meteorological phenomena, those of rain and sunshine. Scientific inquiry has not yet succeeded in ascertaining the order of antecedence and consequence among these phenomena, so as to be

able, at least in our regions of the earth, to predict them with certainty, or even with any high degree of probability. Yet no one doubts that the phenomena depend on laws, and that these must be derivative laws resulting from known ultimate laws, those of heat, electricity, vaporization, and elastic fluids. Nor can it be doubted that if we were acquainted with all the antecedent circumstances, we could, even from those more general laws, predict (saving difficulties of calculation) the state of the weather at any future time. Meteorology, therefore, not only has in itself every natural requisite for being, but actually is, a science; though, from the difficulty of observing the facts on which the phenomena depend (a difficulty [pg 587] inherent in the peculiar nature of those phenomena), the science is extremely imperfect; and were it perfect, might probably be of little avail in practice, since the data requisite for applying its principles to particular instances would rarely be procurable.

A case may be conceived, of an intermediate character, between the perfection of science and this its extreme imperfection. It may happen that the greater causes, those on which the principal part of the phenomena depends, are within the reach of observation and measurement; so that if no other causes intervened, a complete explanation could be given not only of the phenomena in general, but of all the variations and modifications which it admits of. But inasmuch as other, perhaps many other causes, separately insignificant in their effects, co-operate or conflict in many or in all cases with those greater causes, the effect, accordingly, presents more or less of aberration from what would be produced by the greater causes alone. Now if these minor causes are not so constantly accessible, or not accessible at all, to accurate observation, the principal mass of the effect may still, as before, be accounted for, and even predicted; but there will be variations and modifications which we shall not be competent to explain thoroughly, and our predictions will not be fulfilled accurately, but only approximately.

It is thus, for example, with the theory of the tides. No one doubts that Tidology (as Dr. Whewell proposes to call it) is really a science. As much of the phenomena as depends on the attraction of the sun and moon is completely understood, and may, in any, even unknown, part of the earth's surface, be foretold with certainty; and the far greater part of the phenomena depends on those causes. But circumstances of a local or casual nature, such as the configuration of the bottom of the ocean, the degree of confinement from shores, the direction of the wind, etc., influence, in many or in all places, the height and time of the tide; and a portion of these circumstances being either not accurately knowable, not precisely measurable, or not capable of being certainly foreseen, the tide in known places commonly varies from the calculated result of general principles by some difference that we can not explain, and in unknown ones may vary from it by a difference that we are not able to foresee or conjecture. Nevertheless, not only is it certain that these variations depend on causes, and follow their causes by laws of unerring uniformity; not only, therefore, is tidology a science, like meteorology, but it is, what hitherto at least meteorology is not, a science largely available in practice. General laws may be laid down respecting the tides, predictions may be founded on those laws, and the result will in the main, though often not with complete accuracy, correspond to the predictions.

And this is what is or ought to be meant by those who speak of sciences which are not *exact* sciences. Astronomy was once a science, without being an exact science. It could not become exact until not only the general course of the planetary motions, but the perturbations also, were accounted for, and referred to their causes. It has become an exact science, because its phenomena have been brought under laws comprehending the whole of the causes by which the phenomena are influenced, whether in a great or only in a trifling degree, whether in all or only in some cases, and assigning to each of those causes the share of effect which really belongs to it. But in the theory of the tides the only laws as yet accurately ascertained are those of the causes which affect the phenomenon in all cases, and in a considerable degree; while others which affect it in some cases [pg 588] only, or, if in all, only in a slight degree, have not been sufficiently ascertained and studied to enable us to lay down their laws; still less to deduce the completed law of the phenomenon, by compounding the effects of the greater with those of the minor causes. Tidology, therefore, is not yet an exact science; not from any inherent incapacity of being so, but from the difficulty of ascertaining with complete precision the real derivative uniformities. By combining, however, the exact laws of the greater causes, and of such of the minor ones as are sufficiently known, with such empirical laws or such approximate generalizations respecting the miscellaneous variations as can be obtained by specific observation, we can lay down general propositions which will be true in the main, and on which,

with allowance for the degree of their probable inaccuracy, we may safely ground our expectations and our conduct.

§ 2. The science of human nature is of this description. It falls far short of the standard of exactness now realized in Astronomy; but there is no reason that it should not be as much a science as Tidology is, or as Astronomy was when its calculations had only mastered the main phenomena, but not the perturbations.

The phenomena with which this science is conversant being the thoughts, feelings, and actions of human beings, it would have attained the ideal perfection of a science if it enabled us to foretell how an individual would think, feel, or act throughout life, with the same certainty with which astronomy enables us to predict the places and the occultations of the heavenly bodies. It needs scarcely be stated that nothing approaching to this can be done. The actions of individuals could not be predicted with scientific accuracy, were it only because we can not foresee the whole of the circumstances in which those individuals will be placed. But further, even in any given combination of (present) circumstances, no assertion, which is both precise and universally true, can be made respecting the manner in which human beings will think, feel, or act. This is not, however, because every person's modes of thinking, feeling, and acting do not depend on causes; nor can we doubt that if, in the case of any individual, our data could be complete, we even now know enough of the ultimate laws by which mental phenomena are determined, to enable us in many cases to predict, with tolerable certainty, what, in the greater number of supposable combinations of circumstances, his conduct or sentiments would be. But the impressions and actions of human beings are not solely the result of their present circumstances, but the joint result of those circumstances and of the characters of the individuals; and the agencies which determine human character are so numerous and diversified (nothing which has happened to the person throughout life being without its portion of influence), that in the aggregate they are never in any two cases exactly similar. Hence, even if our science of human nature were theoretically perfect, that is, if we could calculate any character as we can calculate the orbit of any planet, *from given data*; still, as the data are never all given, nor ever precisely alike in different cases, we could neither make positive predictions, nor lay down universal propositions.

Inasmuch, however, as many of those effects which it is of most importance to render amenable to human foresight and control are determined, like the tides, in an incomparably greater degree by general causes, than by all partial causes taken together; depending in the main on those circumstances and qualities which are common to all mankind, or at least to large [pg 589] bodies of them, and only in a small degree on the idiosyncrasies of organization or the peculiar history of individuals; it is evidently possible with regard to all such effects, to make predictions which will *almost* always be verified, and general propositions which are almost always true. And whenever it is sufficient to know how the great majority of the human race, or of some nation or class of persons, will think, feel, and act, these propositions are equivalent to universal ones. For the purposes of political and social science this *is* sufficient. As we formerly remarked,[269] an approximate generalization is, in social inquiries, for most practical purposes equivalent to an exact one; that which is only probable when asserted of individual human beings indiscriminately selected, being certain when affirmed of the character and collective conduct of masses.

It is no disparagement, therefore, to the science of Human Nature, that those of its general propositions which descend sufficiently into detail to serve as a foundation for predicting phenomena in the concrete, are for the most part only approximately true. But in order to give a genuinely scientific character to the study, it is indispensable that these approximate generalizations, which in themselves would amount only to the lowest kind of empirical laws, should be connected deductively with the laws of nature from which they result; should be resolved into the properties of the causes on which the phenomena depend. In other words, the science of Human Nature may be said to exist in proportion as the approximate truths, which compose a practical knowledge of mankind, can be exhibited as corollaries from the universal laws of human nature on which they rest; whereby the proper limits of those approximate truths would be shown, and we should be enabled to deduce others for any new state of circumstances, in anticipation of specific experience.

The proposition now stated is the text on which the two succeeding chapters will furnish the comment.

Chapter IV.

Of The Laws Of Mind.

§ 1. What the Mind is, as well as what Matter is, or any other question respecting Things in themselves, as distinguished from their sensible manifestations, it would be foreign to the purposes of this treatise to consider. Here, as throughout our inquiry, we shall keep clear of all speculations respecting the mind's own nature, and shall understand by the laws of mind those of mental Phenomena; of the various feelings or states of consciousness of sentient beings. These, according to the classification we have uniformly followed, consist of Thoughts, Emotions, Volitions, and Sensations; the last being as truly states of Mind as the three former. It is usual, indeed, to speak of sensations as states of body, not of mind. But this is the common confusion, of giving one and the same name to a phenomenon and to the approximate cause or conditions of the phenomenon. The immediate antecedent of a sensation is a state of body, but the sensation itself is a state of mind. If the word Mind means any thing, it means that which feels. Whatever opinion we hold respecting the fundamental identity or diversity of matter and mind, in any case the distinction between [pg 590] mental and physical facts, between the internal and the external world, will always remain, as a matter of classification; and in that classification, sensations, like all other feelings, must be ranked as mental phenomena. The mechanism of their production, both in the body itself and in what is called outward nature, is all that can with any propriety be classed as physical.

The phenomena of mind, then, are the various feelings of our nature, both those improperly called physical and those peculiarly designated as mental; and by the laws of mind, I mean the laws according to which those feelings generate one another.

§ 2. All states of mind are immediately caused either by other states of mind, or by states of body. When a state of mind is produced by a state of mind, I call the law concerned in the case a law of Mind. When a state of mind is produced directly by a state of body, the law is a law of Body, and belongs to physical science.

With regard to those states of mind which are called sensations, all are agreed that these have for their immediate antecedents, states of body. Every sensation has for its proximate cause some affection of the portion of our frame called the nervous system, whether this affection originates in the action of some external object, or in some pathological condition of the nervous organization itself. The laws of this portion of our nature—the varieties of our sensations, and the physical conditions on which they proximately depend—manifestly belong to the province of Physiology.

Whether the remainder of our mental states are similarly dependent on physical conditions, is one of the *vexatæ questiones* in the science of human nature. It is still disputed whether our thoughts, emotions, and volitions are generated through the intervention of material mechanism; whether we have organs of thought and of emotion, in the same sense in which we have organs of sensation. Many eminent physiologists hold the affirmative. These contend that a thought (for example) is as much the result of nervous agency, as a sensation; that some particular state of our nervous system, in particular of that central portion of it called the brain, invariably precedes, and is presupposed by, every state of our consciousness. According to this theory, one state of mind is never really produced by another: all are produced by states of body. When one thought seems to call up another by association, it is not really a thought which recalls a thought; the association did not exist between the two thoughts, but between the two states of the brain or nerves which preceded the thoughts: one of those states recalls the other, each being attended in its passage by the particular state of consciousness which is consequent on it. On this theory the

uniformities of succession among states of mind would be mere derivative uniformities, resulting from the laws of succession of the bodily states which cause them. There would be no original mental laws, no Laws of Mind in the sense in which I use the term, at all; and mental science would be a mere branch, though the highest and most recondite branch, of the science of physiology. M. Comte, accordingly, claims the scientific cognizance of moral and intellectual phenomena exclusively for physiologists; and not only denies to Psychology, or Mental Philosophy properly so called, the character of a science, but places it, in the chimerical nature of its objects and pretensions, almost on a par with astrology.

But, after all has been said which can be said, it remains incontestable that there exist uniformities of succession among states of mind, and that [pg 591] these can be ascertained by observation and experiment. Further, that every mental state has a nervous state for its immediate antecedent and proximate cause, though extremely probable, can not hitherto be said to be proved, in the conclusive manner in which this can be proved of sensations; and even were it certain, yet every one must admit that we are wholly ignorant of the characteristics of these nervous states; we know not, and at present have no means of knowing, in what respect one of them differs from another; and our only mode of studying their successions or co-existences must be by observing the successions and co-existences of the mental states, of which they are supposed to be the generators or causes. The successions, therefore, which obtain among mental phenomena, do not admit of being deduced from the physiological laws of our nervous organization; and all real knowledge of them must continue, for a long time at least, if not always, to be sought in the direct study, by observation and experiment, of the mental successions themselves. Since, therefore, the order of our mental phenomena must be studied in those phenomena, and not inferred from the laws of any phenomena more general, there is a distinct and separate Science of Mind.

The relations, indeed, of that science to the science of physiology must never be overlooked or undervalued. It must by no means be forgotten that the laws of mind may be derivative laws resulting from laws of animal life, and that their truth, therefore, may ultimately depend on physical conditions; and the influence of physiological states or physiological changes in altering or counteracting the mental successions, is one of the most important departments of psychological study. But, on the other hand, to reject the resource of psychological analysis, and construct the theory of the mind solely on such data as physiology at present affords, seems to me as great an error in principle, and an even more serious one in practice. Imperfect as is the science of mind, I do not scruple to affirm that it is in a considerably more advanced state than the portion of physiology which corresponds to it; and to discard the former for the latter appears, to me an infringement of the true canons of inductive philosophy, which must produce, and which does produce, erroneous conclusions in some very important departments of the science of human nature.

§ 3. The subject, then, of Psychology is the uniformities of succession, the laws, whether ultimate or derivative, according to which one mental state succeeds another; is caused by, or at least, is caused to follow, another. Of these laws some are general, others more special. The following are examples of the most general laws:

First. Whenever any state of consciousness has once been excited in us, no matter by what cause, an inferior degree of the same state of consciousness, a state of consciousness resembling the former, but inferior in intensity, is capable of being reproduced in us, without the presence of any such cause as excited it at first. Thus, if we have once seen or touched an object, we can afterward think of the object though it be absent from our sight or from our touch. If we have been joyful or grieved at some event, we can think of or remember our past joy or grief, though no new event of a happy or painful nature has taken place. When a poet has put together a mental picture of an imaginary object, a Castle of Indolence, a Una, or a Hamlet, he can afterward think of the ideal object he has created, without any fresh act of intellectual combination. This law is expressed by saying, in the language of Hume, that every mental *impression* has its *idea*.

[pg 592]
Secondly. These ideas, or secondary mental states, are excited by our impressions, or by other ideas, according to certain laws which are called Laws of Association. Of these laws the first is, that similar ideas tend to excite one another. The second is, that when two impressions have been

frequently experienced (or even thought of) either simultaneously or in immediate succession, then whenever one of these impressions, or the idea of it, recurs, it tends to excite the idea of the other. The third law is, that greater intensity in either or both of the impressions is equivalent, in rendering them excitable by one another, to a greater frequency of conjunction. These are the laws of ideas, on which I shall not enlarge in this place, but refer the reader to works professedly psychological, in particular to Mr. James Mill's *Analysis of the Phenomena of the Human Mind*, where the principal laws of association, along with many of their applications, are copiously exemplified, and with a masterly hand.[270]

These simple or elementary Laws of Mind have been ascertained by the ordinary methods of experimental inquiry; nor could they have been ascertained in any other manner. But a certain number of elementary laws having thus been obtained, it is a fair subject of scientific inquiry how far those laws can be made to go in explaining the actual phenomena. It is obvious that complex laws of thought and feeling not only may, but must, be generated from these simple laws. And it is to be remarked, that the case is not always one of Composition of Causes: the effect of concurring causes is not always precisely the sum of the effects of those causes when separate, nor even always an effect of the same kind with them. Reverting to the distinction which occupies so prominent a place in the theory of induction, the laws of the phenomena of mind are sometimes analogous to mechanical, but sometimes also to chemical laws. When many impressions or ideas are operating in the mind together, there sometimes takes place a process of a similar kind to chemical combination. When impressions have been so often experienced in conjunction, that each of them calls up readily and instantaneously the ideas of the whole group, those ideas sometimes melt and coalesce into one another, and appear not several ideas, but one; in the same manner as, when the seven prismatic colors are presented to the eye in rapid succession, the sensation produced is that of white. But as in this last case it is correct to say that the seven colors when they rapidly follow one another *generate* white, but not that they actually *are* white; so it appears to me that the Complex Idea, formed by the blending together of several simpler ones, should, when it really appears simple (that is, when the separate elements are not consciously distinguishable in it), be said to *result from*, or *be generated by*, the simple ideas, not to *consist* of them. Our idea of an orange really *consists* of the simple ideas of a certain color, a certain form, a certain taste and smell, etc., because we can, by interrogating our consciousness, perceive all these elements in the idea. [pg 593] But we can not perceive, in so apparently simple a feeling as our perception of the shape of an object by the eye, all that multitude of ideas derived from other senses, without which it is well ascertained that no such visual perception would ever have had existence; nor, in our idea of Extension, can we discover those elementary ideas of resistance, derived from our muscular frame, in which it has been conclusively shown that the idea originates. These, therefore, are cases of mental chemistry; in which it is proper to say that the simple ideas generate, rather than that they compose, the complex ones.

With respect to all the other constituents of the mind, its beliefs, its abstruser conceptions, its sentiments, emotions, and volitions, there are some (among whom are Hartley and the author of the *Analysis*) who think that the whole of these are generated from simple ideas of sensation, by a chemistry similar to that which we have just exemplified. These philosophers have made out a great part of their case, but I am not satisfied that they have established the whole of it. They have shown that there is such a thing as mental chemistry; that the heterogeneous nature of a feeling A, considered in relation to B and C, is no conclusive argument against its being generated from B and C. Having proved this, they proceed to show, that where A is found, B and C were, or may have been present, and why, therefore, they ask, should not A have been generated from B and C? But even if this evidence were carried to the highest degree of completeness which it admits of; if it were shown (which hitherto it has not, in all cases, been) that certain groups of associated ideas not only might have been, but actually were, present whenever the more recondite mental feeling was experienced; this would amount only to the Method of Agreement, and could not prove causation until confirmed by the more conclusive evidence of the Method of Difference. If the question be whether Belief is a mere case of close association of ideas, it would be necessary to examine experimentally if it be true that any ideas whatever, provided they are associated with the required degree of closeness, give rise to belief. If the inquiry be into the origin of moral feelings, the feeling for example of moral reprobation, it is necessary to compare all the varieties of actions or states of mind which are ever morally disapproved, and see whether in all these cases it can be shown, or reasonably surmised, that the action or state of mind had become connected by association, in the disapproving mind, with some particular class of hateful or disgusting ideas; and the method employed is, thus far, that of

Agreement. But this is not enough. Supposing this proved, we must try further by the Method of Difference, whether this particular kind of hateful or disgusting ideas, when it becomes associated with an action previously indifferent, will render that action a subject of moral disapproval. If this question can be answered in the affirmative, it is shown to be a law of the human mind, that an association of that particular description is the generating cause of moral reprobation. That all this is the case has been rendered extremely probable, but the experiments have not been tried with the degree of precision necessary for a complete and absolutely conclusive induction.[271]

It is further to be remembered, that even if all which this theory of [pg 594] mental phenomena contends for could be proved, we should not be the more enabled to resolve the laws of the more complex feelings into those of the simpler ones. The generation of one class of mental phenomena from another, whenever it can be made out, is a highly interesting fact in psychological chemistry; but it no more supersedes the necessity of an experimental study of the generated phenomenon, than a knowledge of the properties of oxygen and sulphur enables us to deduce those of sulphuric acid without specific observation and experiment. Whatever, therefore, may be the final issue of the attempt to account for the origin of our judgments, our desires, or our volitions, from simpler mental phenomena, it is not the less imperative to ascertain the sequences of the complex phenomena themselves, by special study in conformity to the canons of Induction. Thus, in respect to Belief, psychologists will always have to inquire what beliefs we have by direct consciousness, and according to what laws one belief produces another; what are the laws in virtue of which one thing is recognized by the mind, either rightly or erroneously, as evidence of another thing. In regard to Desire, they will have to examine what objects we desire naturally, and by what causes we are made to desire things originally indifferent, or even disagreeable to us; and so forth. It may be remarked that the general laws of association prevail among these more intricate states of mind, in the same manner as among the simpler ones. A desire, an emotion, an idea of the higher order of abstraction, even our judgments and volitions, when they have become habitual, are called up by association, according to precisely the same laws as our simple ideas.

§ 4. In the course of these inquiries, it will be natural and necessary to examine how far the production of one state of mind by another is influenced by any assignable state of body. The commonest observation shows that different minds are susceptible in very different degrees to the action of the same psychological causes. The idea, for example, of a given desirable object will excite in different minds very different degrees of intensity of desire. The same subject of meditation, presented to different minds, will excite in them very unequal degrees of intellectual action. These differences of mental susceptibility in different individuals may be, first, original and ultimate facts; or, secondly, they may be consequences of the previous mental history of those individuals; or, thirdly and lastly, they may depend on varieties of physical organization. That the previous mental history of the individuals must have some share in producing or in modifying the whole of their mental character, is an inevitable consequence of the laws of mind; but that differences of bodily structure also co-operate, is the opinion of all physiologists, confirmed by common experience. It is to be regretted that hitherto this experience, being accepted in the gross, without due analysis, has been made the groundwork of empirical generalizations most detrimental to the progress of real knowledge.

It is certain that the natural differences which really exist in the mental predispositions or susceptibilities of different persons are often not unconnected with diversities in their organic constitution. But it does not therefore follow that these organic differences must in all cases influence the mental phenomena directly and immediately. They often affect them through the medium of their psychological causes. For example, the idea of some particular pleasure may excite in different persons, even independently of habit or education, very different strengths of desire, and this may be the effect of their different degrees or kinds of nervous susceptibility; [pg 595] but these organic differences, we must remember, will render the pleasurable sensation itself more intense in one of these persons than in the other; so that the idea of the pleasure will also be an intenser feeling, and will, by the operation of mere mental laws, excite an intenser desire, without its being necessary to suppose that the desire itself is directly influenced by the physical peculiarity. As in this, so in many cases, such differences in the kind or in the intensity of the physical sensations as must necessarily result from differences of bodily organization, will of themselves account for many differences not only in the degree, but even in the kind, of the other mental phenomena. So true is this, that even different *qualities* of mind, different types of

mental character, will naturally be produced by mere differences of intensity in the sensations generally; as is well pointed out in the able essay on Dr. Priestley, by Mr. Martineau, mentioned in a former chapter:

"The sensations which form the elements of all knowledge are received either simultaneously or successively: when several are received simultaneously, as the smell, the taste, the color, the form, etc., of a fruit, their association together constitutes our idea of an *object*; when received successively, their association makes up the idea of an *event*. Any thing, then, which favors the associations of synchronous ideas will tend to produce a knowledge of objects, a perception of qualities; while any thing which favors association in the successive order, will tend to produce a knowledge of events, of the order of occurrences, and of the connection of cause and effect: in other words, in the one case a perceptive mind, with a discriminate feeling of the pleasurable and painful properties of things, a sense of the grand and the beautiful will be the result: in the other, a mind attentive to the movements and phenomena, a ratiocinative and philosophic intellect. Now it is an acknowledged principle, that all sensations experienced during the presence of any vivid impression become strongly associated with it, and with each other; and does it not follow that the synchronous feelings of a sensitive constitution (*i.e.*, the one which has vivid impressions) will be more intimately blended than in a differently formed mind? If this suggestion has any foundation in truth, it leads to an inference not unimportant; that where nature has endowed an individual with great original susceptibility, he will probably be distinguished by fondness for natural history, a relish for the beautiful and great, and moral enthusiasm; where there is but a mediocrity of sensibility, a love of science, of abstract truth, with a deficiency of taste and of fervor, is likely to be the result."

We see from this example, that when the general laws of mind are more accurately known, and, above all, more skillfully applied to the detailed explanation of mental peculiarities, they will account for many more of those peculiarities than is ordinarily supposed. Unfortunately the reaction of the last and present generation against the philosophy of the eighteenth century has produced a very general neglect of this great department of analytical inquiry; of which, consequently, the recent progress has been by no means proportional to its early promise. The majority of those who speculate on human nature prefer dogmatically to assume that the mental differences which they perceive, or think they perceive, among human beings, are ultimate facts, incapable of being either explained or altered, rather than take the trouble of fitting themselves, by the requisite processes of thought, for referring those mental differences to the outward causes by which they are for the most part produced, and on the removal of which [pg 596] they would cease to exist. The German school of metaphysical speculation, which has not yet lost its temporary predominance in European thought, has had this among many other injurious influences; and at the opposite extreme of the psychological scale, no writer, either of early or of recent date, is chargeable in a higher degree with this aberration from the true scientific spirit, than M. Comte.

It is certain that, in human beings at least, differences in education and in outward circumstances are capable of affording an adequate explanation of by far the greatest portion of character; and that the remainder may be in great part accounted for by physical differences in the sensations produced in different individuals by the same external or internal cause. There are, however, some mental facts which do not seem to admit of these modes of explanation. Such, to take the strongest case, are the various instincts of animals, and the portion of human nature which corresponds to those instincts. No mode has been suggested, even by way of hypothesis, in which these can receive any satisfactory, or even plausible, explanation from psychological causes alone; and there is great reason to think that they have as positive, and even as direct and immediate, a connection with physical conditions of the brain and nerves as any of our mere sensations have. A supposition which (it is perhaps not superfluous to add) in no way conflicts with the indisputable fact that these instincts may be modified to any extent, or entirely conquered, in human beings, and to no inconsiderable extent even in some of the domesticated animals, by other mental influences, and by education.

Whether organic causes exercise a direct influence over any other classes of mental phenomena, is hitherto as far from being ascertained as is the precise nature of the organic conditions even in the case of instincts. The physiology, however, of the brain and nervous system is in a state of such rapid advance, and is continually bringing forth such new and interesting results, that if there be really a connection between mental peculiarities and any varieties cognizable by our

senses in the structure of the cerebral and nervous apparatus, the nature of that connection is now in a fair way of being found out. The latest discoveries in cerebral physiology appear to have proved that any such connection which may exist is of a radically different character from that contended for by Gall and his followers, and that, whatever may hereafter be found to be the true theory of the subject, phrenology at least is untenable.

Chapter V.

Of Ethology, Or The Science Of The Formation Of Character.

§ 1. The laws of mind as characterized in the preceding chapter, compose the universal or abstract portion of the philosophy of human nature; and all the truths of common experience, constituting a practical knowledge of mankind, must, to the extent to which they are truths, be results or consequences of these. Such familiar maxims, when collected *a posteriori* from observation of life, occupy among the truths of the science the place of what, in our analysis of Induction, have so often been spoken of under the title of Empirical Laws.

An Empirical Law (it will be remembered) is a uniformity, whether of [pg 597] succession or of co-existence, which holds true in all instances within our limits of observation, but is not of a nature to afford any assurance that it would hold beyond those limits; either because the consequent is not really the effect of the antecedent, but forms part along with it of a chain of effects flowing from prior causes not yet ascertained, or because there is ground to believe that the sequence (though a case of causation) is resolvable into simpler sequences, and, depending therefore on a concurrence of several natural agencies, is exposed to an unknown multitude of possibilities of counteraction. In other words, an empirical law is a generalization, of which, not content with finding it true, we are obliged to ask, why is it true? knowing that its truth is not absolute, but dependent on some more general conditions, and that it can only be relied on in so far as there is ground of assurance that those conditions are realized.

Now, the observations concerning human affairs collected from common experience are precisely of this nature. Even if they were universally and exactly true within the bounds of experience, which they never are, still they are not the ultimate laws of human action; they are not the principles of human nature, but results of those principles under the circumstances in which mankind have happened to be placed. When the Psalmist “said in his haste that all men are liars,” he enunciated what in some ages and countries is borne out by ample experience; but it is not a law of man’s nature to lie; though it is one of the consequences of the laws of human nature, that lying is nearly universal when certain external circumstances exist universally, especially circumstances productive of habitual distrust and fear. When the character of the old is asserted to be cautious, and of the young impetuous, this, again, is but an empirical law; for it is not because of their youth that the young are impetuous, nor because of their age that the old are cautious. It is chiefly, if not wholly, because the old, during their many years of life, have generally had much experience of its various evils, and having suffered or seen others suffer much from incautious exposure to them, have acquired associations favorable to circumspection; while the young, as well from the absence of similar experience as from the greater strength of the inclinations which urge them to enterprise, engage themselves in it more readily. Here, then, is the *explanation* of the empirical law; here are the conditions which ultimately determine whether the law holds good or not. If an old man has not been oftener than most young men in contact with danger and difficulty, he will be equally incautious; if a youth has not stronger inclinations than an old man, he probably will be as little enterprising. The empirical law derives whatever truth it has from the causal laws of which it is a consequence. If we know those laws, we know what are the limits to the derivative law; while, if we have not yet accounted for the empirical law—if it rests only on observation—there is no safety in applying it far beyond the limits of time, place, and circumstance in which the observations were made.

The really scientific truths, then, are not these empirical laws, but the causal laws which explain them. The empirical laws of those phenomena which depend on known causes, and of which a general theory can therefore be constructed, have, whatever may be their value in practice, no other function in science than that of verifying the conclusions of theory. Still more must this be the case when most of the empirical laws amount, even within the limits of observation, only to approximate generalizations.

§ 2. This, however, is not, so much as is sometimes supposed, a peculiarity [pg 598] of the sciences called moral. It is only in the simplest branches of science that empirical laws are ever exactly true; and not always in those. Astronomy, for example, is the simplest of all the sciences which explain, in the concrete, the actual course of natural events. The causes or forces on which astronomical phenomena depend, are fewer in number than those which determine any other of the great phenomena of nature. Accordingly, as each effect results from the conflict of but few causes, a great degree of regularity and uniformity might be expected to exist among the effects; and such is really the case: they have a fixed order, and return in cycles. But propositions which should express, with absolute correctness, all the successive positions of a planet until the cycle is completed, would be of almost unmanageable complexity, and could be obtained from theory alone. The generalizations which can be collected on the subject from direct observation, even such as Kepler's law, are mere approximations; the planets, owing to their perturbations by one another, do not move in exact ellipses. Thus even in astronomy, perfect exactness in the mere empirical laws is not to be looked for; much less, then, in more complex subjects of inquiry.

The same example shows how little can be inferred against the universality or even the simplicity of the ultimate laws, from the impossibility of establishing any but approximate empirical laws of the effects. The laws of causation according to which a class of phenomena are produced may be very few and simple, and yet the effects themselves may be so various and complicated that it shall be impossible to trace any regularity whatever completely through them. For the phenomena in question may be of an eminently modifiable character; insomuch that innumerable circumstances are capable of influencing the effect, although they may all do it according to a very small number of laws. Suppose that all which passes in the mind of man is determined by a few simple laws; still, if those laws be such that there is not one of the facts surrounding a human being, or of the events which happen to him, that does not influence in some mode or degree his subsequent mental history, and if the circumstances of different human beings are extremely different, it will be no wonder if very few propositions can be made respecting the details of their conduct or feelings, which will be true of all mankind.

Now, without deciding whether the ultimate laws of our mental nature are few or many, it is at least certain that they are of the above description. It is certain that our mental states, and our mental capacities and susceptibilities, are modified, either for a time or permanently, by every thing which happens to us in life. Considering, therefore, how much these modifying causes differ in the case of any two individuals, it would be unreasonable to expect that the empirical laws of the human mind, the generalizations which can be made respecting the feelings or actions of mankind without reference to the causes that determine them, should be any thing but approximate generalizations. They are the common wisdom of common life, and as such are invaluable; especially as they are mostly to be applied to cases not very dissimilar to those from which they were collected. But when maxims of this sort, collected from Englishmen, come to be applied to Frenchmen, or when those collected from the present day are applied to past or future generations, they are apt to be very much at fault. Unless we have resolved the empirical law into the laws of the causes on which it depends, and ascertained that those causes extend to the case which we have in view, there can be no reliance placed in our inferences. For every [pg 599] individual is surrounded by circumstances different from those of every other individual; every nation or generation of mankind from every other nation or generation: and none of these differences are without their influence in forming a different type of character. There is, indeed, also a certain general resemblance; but peculiarities of circumstances are continually constituting exceptions even to the propositions which are true in the great majority of cases.

Although, however, there is scarcely any mode of feeling or conduct which is, in the absolute sense, common to all mankind; and though the generalizations which assert that any given variety of conduct or feeling will be found universally (however nearly they may approximate to truth within given limits of observation), will be considered as scientific propositions by no one who is at all familiar with scientific investigation; yet all modes of feeling and conduct met with

among mankind have causes which produce them; and in the propositions which assign those causes will be found the explanation of the empirical laws, and the limiting principle of our reliance on them. Human beings do not all feel and act alike in the same circumstances; but it is possible to determine what makes one person, in a given position, feel or act in one way, another in another; how any given mode of feeling and conduct, compatible with the general laws (physical and mental) of human nature, has been, or may be, formed. In other words, mankind have not one universal character, but there exist universal laws of the Formation of Character. And since it is by these laws, combined with the facts of each particular case, that the whole of the phenomena of human action and feeling are produced, it is on these that every rational attempt to construct the science of human nature in the concrete, and for practical purposes, must proceed.

§ 3. The laws, then, of the formation of character being the principal object of scientific inquiry into human nature, it remains to determine the method of investigation best fitted for ascertaining them. And the logical principles according to which this question is to be decided, must be those which preside over every other attempt to investigate the laws of very complex phenomena. For it is evident that both the character of any human being, and the aggregate of the circumstances by which that character has been formed, are facts of a high order of complexity. Now to such cases we have seen that the Deductive Method, setting out from general laws, and verifying their consequences by specific experience, is alone applicable. The grounds of this great logical doctrine have formerly been stated; and its truth will derive additional support from a brief examination of the specialties of the present case.

There are only two modes in which laws of nature can be ascertained—deductively and experimentally; including under the denomination of experimental inquiry, observation as well as artificial experiment. Are the laws of the formation of character susceptible of a satisfactory investigation by the method of experimentation? Evidently not; because, even if we suppose unlimited power of varying the experiment (which is abstractedly possible, though no one but an Oriental despot has that power, or, if he had, would probably be disposed to exercise it), a still more essential condition is wanting—the power of performing any of the experiments with scientific accuracy.

The instances requisite for the prosecution of a directly experimental inquiry into the formation of character, would be a number of human beings [pg 600] to bring up and educate, from infancy to mature age. And to perform any one of these experiments with scientific propriety, it would be necessary to know and record every sensation or impression received by the young pupil from a period long before it could speak; including its own notions respecting the sources of all those sensations and impressions. It is not only impossible to do this completely, but even to do so much of it as should constitute a tolerable approximation. One apparently trivial circumstance which eluded our vigilance might let in a train of impressions and associations sufficient to vitiate the experiment as an authentic exhibition of the effects flowing from given causes. No one who has sufficiently reflected on education is ignorant of this truth; and whoever has not, will find it most instructively illustrated in the writings of Rousseau and Helvetius on that great subject.

Under this impossibility of studying the laws of the formation of character by experiments purposely contrived to elucidate them, there remains the resource of simple observation. But if it be impossible to ascertain the influencing circumstances with any approach to completeness even when we have the shaping of them ourselves, much more impossible is it when the cases are further removed from our observation, and altogether out of our control. Consider the difficulty of the very first step—of ascertaining what actually is the character of the individual, in each particular case that we examine. There is hardly any person living concerning some essential part of whose character there are not differences of opinion even among his intimate acquaintances; and a single action, or conduct continued only for a short time, goes a very little way toward ascertaining it. We can only make our observations in a rough way and *en masse*; not attempting to ascertain completely in any given instance, what character has been formed, and still less by what causes; but only observing in what state of previous circumstances it is found that certain marked mental qualities or deficiencies *oftenest* exist. These conclusions, besides that they are mere approximate generalizations, deserve no reliance, even as such, unless the instances are sufficiently numerous to eliminate not only chance, but every assignable circumstance in which a number of the cases examined may happen to have resembled one

another. So numerous and various, too, are the circumstances which form individual character, that the consequence of any particular combination is hardly ever some definite and strongly marked character, always found where that combination exists, and not otherwise. What is obtained, even after the most extensive and accurate observation, is merely a comparative result; as, for example, that in a given number of Frenchmen, taken indiscriminately, there will be found more persons of a particular mental tendency, and fewer of the contrary tendency, than among an equal number of Italians or English, similarly taken; or thus: of a hundred Frenchmen and an equal number of Englishmen, fairly selected, and arranged according to the degree in which they possess a particular mental characteristic, each number, 1, 2, 3, etc., of the one series, will be found to possess more of that characteristic than the corresponding number of the other. Since, therefore, the comparison is not one of kinds, but of ratios and degrees; and since, in proportion as the differences are slight, it requires a greater number of instances to eliminate chance, it can not often happen to any one to know a sufficient number of cases with the accuracy requisite for making the sort of comparison last mentioned; less than which, however, would not constitute a real induction. Accordingly, there is hardly one current opinion respecting the [pg 601] characters of nations, classes, or descriptions of persons, which is universally acknowledged as indisputable.[272]

And finally, if we could even obtain by way of experiment a much more satisfactory assurance of these generalizations than is really possible, they would still be only empirical laws. They would show, indeed, that there was some connection between the type of character formed and the circumstances existing in the case; but not what the precise connection was, nor to which of the peculiarities of those circumstances the effect was really owing. They could only, therefore, be received as results of causation, requiring to be resolved into the general laws of the causes: until the determination of which, we could not judge within what limits the derivative laws might serve as presumptions in cases yet unknown, or even be depended on as permanent in the very cases from which they were collected. The French people had, or were supposed to have, a certain national character; but they drive out their royal family and aristocracy, alter their institutions, pass through a series of extraordinary events for the greater part of a century, and at the end of that time their character is found to have undergone important changes. A long list of mental and moral differences are observed, or supposed to exist between men and women; but at some future and, it may be hoped, not distant period, equal freedom and an equally independent social position come to be possessed by both, and their differences of character are either removed or totally altered.

But if the differences which we think we observe between French and English, or between men and women, can be connected with more general laws; if they be such as might be expected to be produced by the differences of government, former customs, and physical peculiarities in the two nations, and by the diversities of education, occupations, personal independence, and social privileges, and whatever original differences there may be in bodily strength and nervous sensibility between the two sexes; then, indeed, the coincidence of the two kinds of evidence justifies us in believing that we have both reasoned rightly and observed rightly. Our observation, though not sufficient as proof, is ample as verification. And having ascertained not only the empirical laws, but the causes, of the peculiarities, we need be under no difficulty in judging how far they may be expected to be permanent, or by what circumstances they would be modified or destroyed.

§ 4. Since then it is impossible to obtain really accurate propositions [pg 602] respecting the formation of character from observation and experiment alone, we are driven perforce to that which, even if it had not been the indispensable, would have been the most perfect, mode of investigation, and which it is one of the principal aims of philosophy to extend; namely, that which tries its experiments not on the complex facts, but on the simple ones of which they are compounded; and after ascertaining the laws of the causes, the composition of which gives rise to the complex phenomena, then considers whether these will not explain and account for the approximate generalizations which have been framed empirically respecting the sequences of those complex phenomena. The laws of the formation of character are, in short, derivative laws, resulting from the general laws of mind, and are to be obtained by deducing them from those general laws by supposing any given set of circumstances, and then considering what, according to the laws of mind, will be the influence of those circumstances on the formation of character.

A science is thus formed, to which I would propose to give the name of Ethology, or the Science of Character, from ἦθος, a word more nearly corresponding to the term "character" as I here use it, than any other word in the same language. The name is perhaps etymologically applicable to the entire science of our mental and moral nature; but if, as is usual and convenient, we employ the name Psychology for the science of the elementary laws of mind, Ethology will serve for the ulterior science which determines the kind of character produced in conformity to those general laws by any set of circumstances, physical and moral. According to this definition, Ethology is the science which corresponds to the art of education in the widest sense of the term, including the formation of national or collective character as well as individual. It would indeed be vain to expect (however completely the laws of the formation of character might be ascertained) that we could know so accurately the circumstances of any given case as to be able positively to predict the character that would be produced in that case. But we must remember that a degree of knowledge far short of the power of actual prediction is often of much practical value. There may be great power of influencing phenomena, with a very imperfect knowledge of the causes by which they are in any given instance determined. It is enough that we know that certain means have a *tendency* to produce a given effect, and that others have a tendency to frustrate it. When the circumstances of an individual or of a nation are in any considerable degree under our control, we may, by our knowledge of tendencies, be enabled to shape those circumstances in a manner much more favorable to the ends we desire, than the shape which they would of themselves assume. This is the limit of our power; but within this limit the power is a most important one.

This science of Ethology may be called the Exact Science of Human Nature; for its truths are not, like the empirical laws which depend on them, approximate generalizations, but real laws. It is, however (as in all cases of complex phenomena), necessary to the exactness of the propositions, that they should be hypothetical only, and affirm tendencies, not facts. They must not assert that something will always, or certainly, happen; but only that such and such will be the effect of a given cause, so far as it operates uncounteracted. It is a scientific proposition, that bodily strength tends to make men courageous; not that it always makes them so: that an interest on one side of a question tends to bias the judgment; not that it invariably does so: that experience tends to give wisdom; not that such is always [pg 603] its effect. These propositions, being assertive only of tendencies, are not the less universally true because the tendencies may be frustrated.

§ 5. While, on the one hand, Psychology is altogether, or principally, a science of observation and experiment, Ethology, as I have conceived it, is, as I have already remarked, altogether deductive. The one ascertains the simple laws of Mind in general, the other traces their operation in complex combinations of circumstances. Ethology stands to Psychology in a relation very similar to that in which the various branches of natural philosophy stand to mechanics. The principles of Ethology are properly the middle principles, the *axiomata media* (as Bacon would have said) of the science of mind: as distinguished, on the one hand, from the empirical laws resulting from simple observation, and, on the other, from the highest generalizations.

And this seems a suitable place for a logical remark, which, though of general application, is of peculiar importance in reference to the present subject. Bacon has judiciously observed that the *axiomata media* of every science principally constitute its value. The lowest generalizations, until explained by and resolved into the middle principles of which they are the consequences, have only the imperfect accuracy of empirical laws; while the most general laws are *too* general, and include too few circumstances, to give sufficient indication of what happens in individual cases, where the circumstances are almost always immensely numerous. In the importance, therefore, which Bacon assigns, in every science, to the middle principles, it is impossible not to agree with him. But I conceive him to have been radically wrong in his doctrine respecting the mode in which these *axiomata media* should be arrived at; though there is no one proposition laid down in his works for which he has been more extravagantly eulogized. He enunciates as a universal rule that induction should proceed from the lowest to the middle principles, and from those to the highest, never reversing that order, and, consequently, leaving no room for the discovery of new principles by way of deduction at all. It is not to be conceived that a man of his sagacity could have fallen into this mistake if there had existed in his time, among the sciences which treat of successive phenomena, one single instance of a deductive science, such as mechanics, astronomy, optics, acoustics, etc., now are. In those sciences it is evident that the higher and middle principles are by no means derived from the lowest, but the reverse. In some

of them the very highest generalizations were those earliest ascertained with any scientific exactness; as, for example (in mechanics), the laws of motion. Those general laws had not, indeed, at first the acknowledged universality which they acquired after having been successfully employed to explain many classes of phenomena to which they were not originally seen to be applicable; as when the laws of motion were employed, in conjunction with other laws, to explain deductively the celestial phenomena. Still, the fact remains, that the propositions which were afterward recognized as the most general truths of the science were, of all its accurate generalizations, those earliest arrived at. Bacon's greatest merit can not therefore consist, as we are so often told that it did, in exploding the vicious method pursued by the ancients of flying to the highest generalizations first, and deducing the middle principles from them; since this is neither a vicious nor an exploded, but the universally accredited method of modern science, and that to which it owes its greatest triumphs. The error of ancient speculation did not consist in making the largest generalizations [pg 604] first, but in making them without the aid or warrant of rigorous inductive methods, and applying them deductively without the needful use of that important part of the Deductive Method termed Verification.

The order in which truths of the various degrees of generality should be ascertained can not, I apprehend, be prescribed by any unbending rule. I know of no maxim which can be laid down on the subject, but to obtain those first in respect to which the conditions of a real induction can be first and most completely realized. Now, wherever our means of investigation can reach causes, without stopping at the empirical laws of the effects, the simplest cases, being those in which fewest causes are simultaneously concerned, will be most amenable to the inductive process; and these are the cases which elicit laws of the greatest comprehensiveness. In every science, therefore, which has reached the stage at which it becomes a science of causes, it will be usual as well as desirable first to obtain the highest generalizations, and then deduce the more special ones from them. Nor can I discover any foundation for the Baconian maxim, so much extolled by subsequent writers, except this: That before we attempt to explain deductively from more general laws any new class of phenomena, it is desirable to have gone as far as is practicable in ascertaining the empirical laws of those phenomena; so as to compare the results of deduction, not with one individual instance after another, but with general propositions expressive of the points of agreement which have been found among many instances. For if Newton had been obliged to verify the theory of gravitation, not by deducing from it Kepler's laws, but by deducing all the observed planetary positions which had served Kepler to establish those laws, the Newtonian theory would probably never have emerged from the state of an hypothesis.[273]

The applicability of these remarks to the special case under consideration can not admit of question. The science of the formation of character is a science of causes. The subject is one to which those among the canons of induction, by which laws of causation are ascertained, can be rigorously applied. It is, therefore, both natural and advisable to ascertain the simplest, which are necessarily the most general, laws of causation first, and to deduce the middle principles from them. In other words, Ethology, the deductive science, is a system of corollaries from Psychology, the experimental science.

§ 6. Of these, the earlier alone has been, as yet, really conceived or studied as a science; the other, Ethology, is still to be created. But its creation has at length become practicable. The empirical laws, destined to verify its deductions, have been formed in abundance by every successive [pg 605] age of humanity; and the premises for the deductions are now sufficiently complete. Excepting the degree of uncertainty which still exists as to the extent of the natural differences of individual minds, and the physical circumstances on which these may be dependent (considerations which are of secondary importance when we are considering mankind in the average, or *en masse*), I believe most competent judges will agree that the general laws of the different constituent elements of human nature are even now sufficiently understood to render it possible for a competent thinker to deduce from those laws, with a considerable approach to certainty, the particular type of character which would be formed in mankind generally by any assumed set of circumstances. A science of Ethology, founded on the laws of Psychology, is therefore possible; though little has yet been done, and that little not at all systematically, toward forming it. The progress of this important but most imperfect science will depend on a double process: first, that of deducing theoretically the ethological consequences of particular circumstances of position, and comparing them with the recognized results of common experience; and, secondly, the reverse operation; increased study of the various types of human

nature that are to be found in the world; conducted by persons not only capable of analyzing and recording the circumstances in which these types severally prevail, but also sufficiently acquainted with psychological laws to be able to explain and account for the characteristics of the type, by the peculiarities of the circumstances: the residuum alone, when there proves to be any, being set down to the account of congenital predispositions.

For the experimental or *a posteriori* part of this process, the materials are continually accumulating by the observation of mankind. So far as thought is concerned, the great problem of Ethology is to deduce the requisite middle principles from the general laws of Psychology. The subject to be studied is, the origin and sources of all those qualities in human beings which are interesting to us, either as facts to be produced, to be avoided, or merely to be understood; and the object is, to determine, from the general laws of mind, combined with the general position of our species in the universe, what actual or possible combinations of circumstances are capable of promoting or of preventing the production of those qualities. A science which possesses middle principles of this kind, arranged in the order, not of causes, but of the effects which it is desirable to produce or to prevent, is duly prepared to be the foundation of the corresponding Art. And when Ethology shall be thus prepared, practical education will be the mere transformation of those principles into a parallel system of precepts, and the adaptation of these to the sum total of the individual circumstances which exist in each particular case.

It is hardly necessary again to repeat that, as in every other deductive science, verification *a posteriori* must proceed *pari passu* with deduction *a priori*. The inference given by theory as to the type of character which would be formed by any given circumstances must be tested by specific experience of those circumstances whenever obtainable; and the conclusions of the science as a whole must undergo a perpetual verification and correction from the general remarks afforded by common experience respecting human nature in our own age, and by history respecting times gone by. The conclusions of theory can not be trusted, unless confirmed by observation; nor those of observation, unless they can be affiliated to theory, by deducing them from the laws of human nature, and from a close analysis of the circumstances of the particular situation. It is the accordance of [pg 606] these two kinds of evidence separately taken —the consilience of *a priori* reasoning and specific experience—which forms the only sufficient ground for the principles of any science so “immersed in matter,” dealing with such complex and concrete phenomena, as Ethology.

Chapter VI.

General Considerations On The Social Science.

§ 1. Next after the science of individual man comes the science of man in society—of the actions of collective masses of mankind, and the various phenomena which constitute social life.

If the formation of individual character is already a complex subject of study, this subject must be, in appearance at least, still more complex; because the number of concurrent causes, all exercising more or less influence on the total effect, is greater, in the proportion in which a nation, or the species at large, exposes a larger surface to the operation of agents, psychological and physical, than any single individual. If it was necessary to prove, in opposition to an existing prejudice, that the simpler of the two is capable of being a subject of science, the prejudice is likely to be yet stronger against the possibility of giving a scientific character to the study of Politics, and of the phenomena of Society. It is, accordingly, but of yesterday that the conception of a political or social science has existed anywhere but in the mind of here and there an insulated thinker, generally very ill prepared for its realization: though the subject itself has of all others engaged the most general attention, and been a theme of interested and earnest discussions, almost from the beginning of recorded time.

The condition, indeed, of politics as a branch of knowledge was, until very lately, and has scarcely even yet ceased to be, that which Bacon animadverted on, as the natural state of the sciences while their cultivation is abandoned to practitioners; not being carried on as a branch of speculative inquiry, but only with a view to the exigencies of daily practice, and the *fructifera experimenta*, therefore, being aimed at, almost to the exclusion of the *lucifera*. Such was medical investigation, before physiology and natural history began to be cultivated as branches of general knowledge. The only questions examined were, what diet is wholesome, or what medicine will cure some given disease; without any previous systematic inquiry into the laws of nutrition, and of the healthy and morbid action of the different organs, on which laws the effect of any diet or medicine must evidently depend. And in politics the questions which engaged general attention were similar: Is such an enactment, or such a form of government, beneficial or the reverse—either universally, or to some particular community? without any previous inquiry into the general conditions by which the operation of legislative measures, or the effects produced by forms of government, are determined. Students in politics thus attempted to study the pathology and therapeutics of the social body, before they had laid the necessary foundation in its physiology; to cure disease without understanding the laws of health. And the result was such as it must always be when persons, even of ability, attempt to deal with the complex questions of a science before its simpler and more elementary truths have been established.

No wonder that, when the phenomena of society have so rarely been [pg 607] contemplated in the point of view characteristic of science, the philosophy of society should have made little progress; should contain few general propositions sufficiently precise and certain for common inquirers to recognize in them a scientific character. The vulgar notion accordingly is, that all pretension to lay down general truths on politics and society is quackery; that no universality and no certainty are attainable in such matters. What partly excuses this common notion is, that it is really not without foundation in one particular sense. A large proportion of those who have laid claim to the character of philosophic politicians have attempted not to ascertain universal sequences, but to frame universal precepts. They have imagined some one form of government, or system of laws, to fit all cases—a pretension well meriting the ridicule with which it is treated by practitioners, and wholly unsupported by the analogy of the art to which, from the nature of its subject, that of politics must be the most nearly allied. No one now supposes it possible that one remedy can cure all diseases, or even the same disease in all constitutions and habits of body.

It is not necessary even to the perfection of a science, that the corresponding art should possess universal, or even general, rules. The phenomena of society might not only be completely dependent on known causes, but the mode of action of all those causes might be reducible to laws of considerable simplicity, and yet no two cases might admit of being treated in precisely the same manner. So great might be the variety of circumstances on which the results in different cases depend, that the art might not have a single general precept to give, except that of watching the circumstances of the particular case, and adapting our measures to the effects which, according to the principles of the science, result from those circumstances. But although, in so complicated a class of subjects, it is impossible to lay down practical maxims of universal application, it does not follow that the phenomena do not conform to universal laws.

§ 2. All phenomena of society are phenomena of human nature, generated by the action of outward circumstances upon masses of human beings; and if, therefore, the phenomena of human thought, feeling, and action are subject to fixed laws, the phenomena of society can not but conform to fixed laws, the consequence of the preceding. There is, indeed, no hope that these laws, though our knowledge of them were as certain and as complete as it is in astronomy, would enable us to predict the history of society, like that of the celestial appearances, for thousands of years to come. But the difference of certainty is not in the laws themselves, it is in the data to which these laws are to be applied. In astronomy the causes influencing the result are few, and change little, and that little according to known laws; we can ascertain what they are now, and thence determine what they will be at any epoch of a distant future. The data, therefore, in astronomy are as certain as the laws themselves. The circumstances, on the contrary, which influence the condition and progress of society are innumerable, and perpetually changing; and though they all change in obedience to causes, and therefore to laws, the multitude of the causes is so great as to defy our limited powers of calculation. Not to say that the impossibility of applying precise numbers to facts of such a description would set an impassable limit to the

possibility of calculating them beforehand, even if the powers of the human intellect were otherwise adequate to the task.

But, as before remarked, an amount of knowledge quite insufficient for [pg 608] prediction, may be most valuable for guidance. The science of society would have attained a very high point of perfection if it enabled us, in any given condition of social affairs, in the condition, for instance, of Europe or any European country at the present time, to understand by what causes it had, in any and every particular, been made what it was; whether it was tending to any, and to what, changes; what effects each feature of its existing state was likely to produce in the future; and by what means any of those effects might be prevented, modified, or accelerated, or a different class of effects superinduced. There is nothing chimerical in the hope that general laws, sufficient to enable us to answer these various questions for any country or time with the individual circumstances of which we are well acquainted, do really admit of being ascertained; and that the other branches of human knowledge, which this undertaking presupposes, are so far advanced that the time is ripe for its commencement. Such is the object of the Social Science.

That the nature of what I consider the true method of the science may be made more palpable, by first showing what that method is not, it will be expedient to characterize briefly two radical misconceptions of the proper mode of philosophizing on society and government, one or other of which is, either explicitly or more often unconsciously, entertained by almost all who have meditated or argued respecting the logic of politics, since the notion of treating it by strict rules, and on Baconian principles, has been current among the more advanced thinkers. These erroneous methods, if the word method can be applied to erroneous tendencies arising from the absence of any sufficiently distinct conception of method, may be termed the Experimental, or Chemical, mode of investigation, and the Abstract, or Geometrical, mode. We shall begin with the former.

Chapter VII.

Of The Chemical, Or Experimental, Method In The Social Science.

§ 1. The laws of the phenomena of society are, and can be, nothing but the laws of the actions and passions of human beings united together in the social state. Men, however, in a state of society are still men; their actions and passions are obedient to the laws of individual human nature. Men are not, when brought together, converted into another kind of substance, with different properties; as hydrogen and oxygen are different from water, or as hydrogen, oxygen, carbon, and azote, are different from nerves, muscles, and tendons. Human beings in society have no properties but those which are derived from, and may be resolved into, the laws of the nature of individual man. In social phenomena the Composition of Causes is the universal law.

Now, the method of philosophizing which may be termed chemical overlooks this fact, and proceeds as if the nature of man as an individual were not concerned at all, or were concerned in a very inferior degree, in the operations of human beings in society. All reasoning in political or social affairs, grounded on principles of human nature, is objected to by reasoners of this sort, under such names as “abstract theory.” For the direction of their opinions and conduct, they profess to demand, in all cases without exception, specific experience.

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This mode of thinking is not only general with practitioners in politics, and with that very numerous class who (on a subject which no one, however ignorant, thinks himself incompetent to discuss) profess to guide themselves by common sense rather than by science; but is often countenanced by persons with greater pretensions to instruction—persons who, having sufficient acquaintance with books and with the current ideas to have heard that Bacon taught mankind to follow experience, and to ground their conclusions on facts instead of metaphysical dogmas, think that, by treating political facts in as directly experimental a method as chemical facts, they

are showing themselves true Baconians, and proving their adversaries to be mere syllogizers and school-men. As, however, the notion of the applicability of experimental methods to political philosophy can not co-exist with any just conception of these methods themselves, the kind of arguments from experience which the chemical theory brings forth as its fruits (and which form the staple, in this country especially, of parliamentary and hustings oratory), are such as, at no time since Bacon, would have been admitted to be valid in chemistry itself, or in any other branch of experimental science. They are such as these: that the prohibition of foreign commodities must conduce to national wealth, because England has flourished under it, or because countries in general which have adopted it have flourished; that our laws, or our internal administration, or our constitution, are excellent for a similar reason; and the eternal arguments from historical examples, from Athens or Rome, from the fires in Smithfield or the French Revolution.

I will not waste time in contending against modes of argumentation which no person with the smallest practice in estimating evidence could possibly be betrayed into; which draw conclusions of general application from a single unanalyzed instance, or arbitrarily refer an effect to some one among its antecedents, without any process of elimination or comparison of instances. It is a rule both of justice and of good sense to grapple not with the absurdest, but with the most reasonable form of a wrong opinion. We shall suppose our inquirer acquainted with the true conditions of experimental investigation, and competent in point of acquirements for realizing them, so far as they can be realized. He shall know as much of the facts of history as mere erudition can teach—as much as can be proved by testimony, without the assistance of any theory; and if those mere facts, properly collated, can fulfill the conditions of a real induction, he shall be qualified for the task.

But that no such attempt can have the smallest chance of success, has been abundantly shown in the tenth chapter of the Third Book.[274] We there examined whether effects which depend on a complication of causes can be made the subject of a true induction by observation and experiment; and concluded, on the most convincing grounds, that they can not. Since, of all effects, none depend on so great a complication of causes as social phenomena, we might leave our case to rest in safety on that previous showing. But a logical principle as yet so little familiar to the ordinary run of thinkers, requires to be insisted on more than once, in order to make the due impression; and the present being the case which of all others exemplifies it the most strongly, there will be advantage in re-stating the grounds of the general maxim, as applied to the specialties of the class of inquiries now under consideration.

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§ 2. The first difficulty which meets us in the attempt to apply experimental methods for ascertaining the laws of social phenomena, is that we are without the means of making artificial experiments. Even if we could contrive experiments at leisure, and try them without limit, we should do so under immense disadvantage; both from the impossibility of ascertaining and taking note of all the facts of each case, and because (those facts being in a perpetual state of change), before sufficient time had elapsed to ascertain the result of the experiment, some material circumstances would always have ceased to be the same. But it is unnecessary to consider the logical objections which would exist to the conclusiveness of our experiments, since we palpably never have the power of trying any. We can only watch those which nature produces, or which are produced for other reasons. We can not adapt our logical means to our wants, by varying the circumstances as the exigencies of elimination may require. If the spontaneous instances, formed by contemporary events and by the successions of phenomena recorded in history, afford a sufficient variation of circumstances, an induction from specific experience is attainable; otherwise not. The question to be resolved is, therefore, whether the requisites for induction respecting the causes of political effects or the properties of political agents, are to be met with in history? including under the term, contemporary history. And in order to give fixity to our conceptions, it will be advisable to suppose this question asked in reference to some special subject of political inquiry or controversy; such as that frequent topic of debate in the present century, the operation of restrictive and prohibitory commercial legislation upon national wealth. Let this, then, be the scientific question to be investigated by specific experience.

§ 3. In order to apply to the case the most perfect of the methods of experimental inquiry, the Method of Difference, we require to find two instances which tally in every particular except the

one which is the subject of inquiry. If two nations can be found which are alike in all natural advantages and disadvantages; whose people resemble each other in every quality, physical and moral, spontaneous and acquired; whose habits, usages, opinions, laws, and institutions are the same in all respects, except that one of them has a more protective tariff, or in other respects interferes more with the freedom of industry; if one of these nations is found to be rich and the other poor, or one richer than the other, this will be an *experimentum crucis*: a real proof by experience, which of the two systems is most favorable to national riches. But the supposition that two such instances can be met with is manifestly absurd. Nor is such a concurrence even abstractedly possible. Two nations which agreed in every thing except their commercial policy would agree also in that. Differences of legislation are not inherent and ultimate diversities; are not properties of Kinds. They are effects of pre-existing causes. If the two nations differ in this portion of their institutions, it is from some difference in their position, and thence in their apparent interests, or in some portion or other of their opinions, habits, and tendencies; which opens a view of further differences without any assignable limit, capable of operating on their industrial prosperity, as well as on every other feature of their condition, in more ways than can be enumerated or imagined. There is thus a demonstrated impossibility of obtaining, in the investigations of the social science, the conditions required for the most conclusive form of inquiry by specific experience.

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In the absence of the direct, we may next try, as in other cases, the supplementary resource, called in a former place the Indirect Method of Difference; which, instead of two instances differing in nothing but the presence or absence of a given circumstance, compares two *classes* of instances respectively agreeing in nothing but the presence of a circumstance on the one side and its absence on the other. To choose the most advantageous case conceivable (a case far too advantageous to be ever obtained), suppose that we compare one nation which has a restrictive policy with two or more nations agreeing in nothing but in permitting free trade. We need not now suppose that either of these nations agrees with the first in all its circumstances; one may agree with it in some of its circumstances, and another in the remainder. And it may be argued, that if these nations remain poorer than the restrictive nation, it can not be for want either of the first or of the second set of circumstances, but it must be for want of the protective system. If (we might say) the restrictive nation had prospered from the one set of causes, the first of the free-trade nations would have prospered equally; if by reason of the other, the second would; but neither has; therefore the prosperity was owing to the restrictions. This will be allowed to be a very favorable specimen of an argument from specific experience in politics, and if this be inconclusive, it would not be easy to find another preferable to it.

Yet, that it is inconclusive, scarcely requires to be pointed out. Why must the prosperous nation have prospered from one cause exclusively? National prosperity is always the collective result of a multitude of favorable circumstances; and of these, the restrictive nation may unite a greater number than either of the others, though it may have all of those circumstances in common with either one or the other of them. Its prosperity may be partly owing to circumstances common to it with one of those nations, and partly with the other, while they, having each of them only half the number of favorable circumstances, have remained inferior. So that the closest imitation which can be made, in the social science, of a legitimate induction from direct experience, gives but a specious semblance of conclusiveness, without any real value.

§ 4. The Method of Difference in either of its forms being thus completely out of the question, there remains the Method of Agreement. But we are already aware of how little value this method is, in cases admitting Plurality of Causes; and social phenomena are those in which the plurality prevails in the utmost possible extent.

Suppose that the observer makes the luckiest hit which could be given by any conceivable combination of chances; that he finds two nations which agree in no circumstance whatever, except in having a restrictive system, and in being prosperous; or a number of nations, all prosperous, which have no antecedent circumstances common to them all but that of having a restrictive policy. It is unnecessary to go into the consideration of the impossibility of ascertaining from history, or even from contemporary observation, that such is really the fact; that the nations agree in no other circumstance capable of influencing the case. Let us suppose this impossibility vanquished, and the fact ascertained that they agree only in a restrictive system as an antecedent, and industrial prosperity as a consequent. What degree of presumption does

this raise that the restrictive system caused the prosperity? One so trifling as to be equivalent to none at all. That some one antecedent is the cause of a given effect, because all other [pg 612] antecedents have been found capable of being eliminated, is a just inference, only if the effect can have but one cause. If it admits of several, nothing is more natural than that each of these should separately admit of being eliminated. Now, in the case of political phenomena, the supposition of unity of cause is not only wide of the truth, but at an immeasurable distance from it. The causes of every social phenomenon which we are particularly interested about, security, wealth, freedom, good government, public virtue, general intelligence, or their opposites, are infinitely numerous, especially the external or remote causes, which alone are, for the most part, accessible to direct observation. No one cause suffices of itself to produce any of these phenomena; while there are countless causes which have some influence over them, and may co-operate either in their production or in their prevention. From the mere fact, therefore, of our having been able to eliminate some circumstance, we can by no means infer that this circumstance was not instrumental to the effect in some of the very instances from which we have eliminated it. We can conclude that the effect is sometimes produced without it; but not that, when present, it does not contribute its share.

Similar objections will be found to apply to the Method of Concomitant Variations. If the causes which act upon the state of any society produced effects differing from one another in kind; if wealth depended on one cause, peace on another, a third made people virtuous, a fourth intelligent; we might, though unable to sever the causes from one another, refer to each of them that property of the effect which waxed as it waxed, and which waned as it waned. But every attribute of the social body is influenced by innumerable causes; and such is the mutual action of the co-existing elements of society, that whatever affects any one of the more important of them, will by that alone, if it does not affect the others directly, affect them indirectly. The effects, therefore, of different agents not being different in quality, while the quantity of each is the mixed result of all the agents, the variations of the aggregate can not bear a uniform proportion to those of any one of its component parts.

§ 5. There remains the Method of Residues; which appears, on the first view, less foreign to this kind of inquiry than the three other methods, because it only requires that we should accurately note the circumstances of some one country, or state of society. Making allowance, thereupon, for the effect of all causes whose tendencies are known, the residue which those causes are inadequate to explain may plausibly be imputed to the remainder of the circumstances which are known to have existed in the case. Something similar to this is the method which Coleridge[275] describes himself as having followed in his political essays in the *Morning Post*. “On every great occurrence I endeavored to discover in past history the event that most nearly resembled it. I procured, whenever it was possible, the contemporary historians, memorialists, and pamphleteers. Then fairly subtracting the points of difference from those of likeness, as the balance favored the former or the latter, I conjectured that the result would be the same or different. As, for instance, in the series of essays entitled ‘A Comparison of France under Napoleon with Rome under the first Cæsars,’ and in those which followed, ‘on the probable final restoration of the Bourbons.’ The same plan I pursued at the commencement of the Spanish Revolution, and with the same success, taking the war of the United Provinces with [pg 613] Philip II. as the groundwork of the comparison.” In this inquiry he no doubt employed the Method of Residues; for, in “subtracting the points of difference from those of likeness,” he doubtless weighed, and did not content himself with numbering, them: he doubtless took those points of agreement only which he presumed from their own nature to be capable of influencing the effect, and, allowing for that influence, concluded that the remainder of the result would be referable to the points of difference.

Whatever may be the efficacy of this method, it is, as we long ago remarked, not a method of pure observation and experiment; it concludes, not from a comparison of instances, but from the comparison of an instance with the result of a previous deduction. Applied to social phenomena, it presupposes that the causes from which part of the effect proceeded are already known; and as we have shown that these can not have been known by specific experience, they must have been learned by deduction from principles of human nature; experience being called in only as a supplementary resource, to determine the causes which produced an unexplained residue. But if the principles of human nature may be had recourse to for the establishment of some political truths, they may for all. If it be admissible to say, England must have prospered by reason of the prohibitory system, because after allowing for all the other tendencies which have been

operating, there is a portion of prosperity still to be accounted for; it must be admissible to go to the same source for the effect of the prohibitory system, and examine what account the laws of human motives and actions will enable us to give of *its* tendencies. Nor, in fact, will the experimental argument amount to any thing, except in verification of a conclusion drawn from those general laws. For we may subtract the effect of one, two, three, or four causes, but we shall never succeed in subtracting the effect of all causes except one; while it would be a curious instance of the dangers of too much caution if, to avoid depending on *a priori* reasoning concerning the effect of a single cause, we should oblige ourselves to depend on as many separate *a priori* reasonings as there are causes operating concurrently with that particular cause in some given instance.

We have now sufficiently characterized the gross misconception of the mode of investigation proper to political phenomena, which I have termed the Chemical Method. So lengthened a discussion would not have been necessary, if the claim to decide authoritatively on political doctrines were confined to persons who had competently studied any one of the higher departments of physical science. But since the generality of those who reason on political subjects, satisfactorily to themselves and to a more or less numerous body of admirers, know nothing whatever of the methods of physical investigation beyond a few precepts which they continue to parrot after Bacon, being entirely unaware that Bacon's conception of scientific inquiry has done its work, and that science has now advanced into a higher stage, there are probably many to whom such remarks as the foregoing may still be useful. In an age in which chemistry itself, when attempting to deal with the more complex chemical sequences—those of the animal or even the vegetable organism—has found it necessary to become, and has succeeded in becoming, a Deductive Science, it is not to be apprehended that any person of scientific habits, who has kept pace with the general progress of the knowledge of nature, can be in danger of applying the methods of elementary chemistry to explore the sequences of the most complex order of phenomena in existence.

Chapter VIII.

Of The Geometrical, Or Abstract, Method.

§ 1. The misconception discussed in the preceding chapter is, as we said, chiefly committed by persons not much accustomed to scientific investigation: practitioners in politics, who rather employ the commonplaces of philosophy to justify their practice than seek to guide their practice by philosophic principles; or imperfectly educated persons, who, in ignorance of the careful selection and elaborate comparison of instances required for the formation of a sound theory, attempt to found one upon a few coincidences which they have casually noticed.

The erroneous method of which we are now to treat is, on the contrary, peculiar to thinking and studious minds. It never could have suggested itself but to persons of some familiarity with the nature of scientific research; who, being aware of the impossibility of establishing, by casual observation or direct experimentation, a true theory of sequences so complex as are those of the social phenomena, have recourse to the simpler laws which are immediately operative in those phenomena, and which are no other than the laws of the nature of the human beings therein concerned, These thinkers perceive (what the partisans of the chemical or experimental theory do not) that the science of society must necessarily be deductive. But, from an insufficient consideration of the specific nature of the subject-matter—and often because (their own scientific education having stopped short in too early a stage) geometry stands in their minds as

the type of all deductive science—it is to geometry, rather than to astronomy and natural philosophy, that they unconsciously assimilate the deductive science of society.

Among the differences between geometry (a science of co-existent facts, altogether independent of the laws of the succession of phenomena), and those physical Sciences of Causation which have been rendered deductive, the following is one of the most conspicuous: That geometry affords no room for what so constantly occurs in mechanics and its applications, the case of conflicting forces; of causes which counteract or modify one another. In mechanics we continually find two or more moving forces producing, not motion, but rest; or motion in a different direction from that which would have been produced by either of the generating forces. It is true that the effect of the joint forces is the same when they act simultaneously, as if they had acted one after another, or by turns; and it is in this that the difference between mechanical and chemical laws consists. But still the effects, whether produced by successive or by simultaneous action, do, wholly or in part, cancel one another: what the one force does, the other, partly, or altogether undoes. There is no similar state of things in geometry. The result which follows from one geometrical principle has nothing that conflicts with the result which follows from another. What is proved true from one geometrical theorem, what would be true if no other geometrical principles existed, can not be altered and made no longer true by reason of some other geometrical principle. What is once proved true is true in all cases, whatever supposition may be made in regard to any other matter.

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Now a conception similar to this last would appear to have been formed of the social science, in the minds of the earlier of those who have attempted to cultivate it by a deductive method. Mechanics would be a science very similar to geometry, if every motion resulted from one force alone, and not from a conflict of forces. In the geometrical theory of society, it seems to be supposed that this is really the case with the social phenomena; that each of them results always from only one force, one single property of human nature.

At the point which we have now reached, it can not be necessary to say any thing either in proof or in illustration of the assertion that such is not the true character of the social phenomena. There is not, among these most complex and (for that reason) most modifiable of all phenomena, any one over which innumerable forces do not exercise influence; which does not depend on a conjunction of very many causes. We have not, therefore, to prove the notion in question to be an error, but to prove that the error has been committed; that so mistaken a conception of the mode in which the phenomena of society are produced has actually been ascertained.

§ 2. One numerous division of the reasoners who have treated social facts according to geometrical methods, not admitting any modification of one law by another, must for the present be left out of consideration, because in them this error is complicated with, and is the effect of, another fundamental misconception, of which we have already taken some notice, and which will be further treated of before we conclude. I speak of those who deduce political conclusions not from laws of nature, not from sequences of phenomena, real or imaginary, but from unbending practical maxims. Such, for example, are all who found their theory of politics on what is called abstract right, that is to say, on universal precepts; a pretension of which we have already noticed the chimerical nature. Such, in like manner, are those who make the assumption of a social contract, or any other kind of original obligation, and apply it to particular cases by mere interpretation. But in this the fundamental error is the attempt to treat an art like a science, and to have a deductive art; the irrationality of which will be shown in a future chapter. It will be proper to take our exemplification of the geometrical theory from those thinkers who have avoided this additional error, and who entertain, so far, a juster idea of the nature of political inquiry.

We may cite, in the first instance, those who assume as the principle of their political philosophy that government is founded on fear; that the dread of each other is the one motive by which human beings were originally brought into a state of society, and are still held in it. Some of the earlier scientific inquirers into politics, in particular Hobbes, assumed this proposition, not by implication, but avowedly, as the foundation of their doctrine, and attempted to build a complete philosophy of politics thereupon. It is true that Hobbes did not find this one maxim sufficient to carry him through the whole of his subject, but was obliged to eke it out by the double sophism of an original contract. I call this a double sophism; first, as passing off a fiction for a fact, and,

secondly, assuming a practical principle, or precept, as the basis of a theory; which is a *petitio principii*, since (as we noticed in treating of that Fallacy) every rule of conduct, even though it be so binding a one as the observance of a promise, must rest its own foundations on the theory of the subject; and the theory, therefore, can not rest upon it.

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§ 3. Passing over less important instances, I shall come at once to the most remarkable example afforded by our own times of the geometrical method in politics; emanating from persons who are well aware of the distinction between science and art; who knew that rules of conduct must follow, not precede, the ascertainment of laws of nature, and that the latter, not the former, is the legitimate field for the application of the deductive method. I allude to the interest-philosophy of the Bentham school.

The profound and original thinkers who are commonly known under this description, founded their general theory of government on one comprehensive premise, namely, that men's actions are always determined by their interests. There is an ambiguity in this last expression; for, as the same philosophers, especially Bentham, gave the name of an interest to any thing which a person likes, the proposition may be understood to mean only this, that men's actions are always determined by their wishes. In this sense, however, it would not bear out any of the consequences which these writers drew from it; and the word, therefore, in their political reasonings, must be understood to mean (which is also the explanation they themselves, on such occasions gave of it) what is commonly termed private, or worldly, interest.

Taking the doctrine, then, in this sense, an objection presents itself *in limine* which might be deemed a fatal one, namely, that so sweeping a proposition is far from being universally true. Human beings are not governed in all their actions by their worldly interests. This, however, is by no means so conclusive an objection as it at first appears; because in politics we are for the most part concerned with the conduct, not of individual persons, but either of a series of persons (as a succession of kings), or a body or mass of persons, as a nation, an aristocracy, or a representative assembly. And whatever is true of a large majority of mankind, may without much error be taken for true of any succession of persons, considered as a whole, or of any collection of persons in which the act of the majority becomes the act of the whole body. Although, therefore, the maxim is sometimes expressed in a manner unnecessarily paradoxical, the consequences drawn from it will hold equally good if the assertion be limited as follows: Any succession of persons, or the majority of any body of persons, will be governed in the bulk of their conduct by their personal interests. We are bound to allow to this school of thinkers the benefit of this more rational statement of their fundamental maxim, which is also in strict conformity to the explanations which, when considered to be called for, have been given by themselves.

The theory goes on to infer, quite correctly, that if the actions of mankind are determined in the main by their selfish interests, the only rulers who will govern according to the interest of the governed, are those whose selfish interests are in accordance with it. And to this is added a third proposition, namely, that no rulers have their selfish interest identical with that of the governed, unless it be rendered so by accountability, that is, by dependence on the will of the governed. In other words (and as the result of the whole), that the desire of retaining or the fear of losing their power, and whatever is thereon consequent, is the sole motive which can be relied on for producing on the part of rulers a course of conduct in accordance with the general interest.

We have thus a fundamental theorem of political science, consisting of three syllogisms, and depending chiefly on two general premises, in each of which a certain effect is considered as determined only by one cause, not [pg 617] by a concurrence of causes. In the one, it is assumed that the actions of average rulers are determined solely by self-interest; in the other, that the sense of identity of interest with the governed, is produced and producible by no other cause than responsibility.

Neither of these propositions is by any means true; the last is extremely wide of the truth.

It is not true that the actions even of average rulers are wholly, or any thing approaching to wholly, determined by their personal interest, or even by their own opinion of their personal interest. I do not speak of the influence of a sense of duty, or feelings of philanthropy, motives never to be mainly relied on, though (except in countries or during periods of great moral

debasement) they influence almost all rulers in some degree, and some rulers in a very great degree. But I insist only on what is true of all rulers, viz., that the character and course of their actions is largely influenced (independently of personal calculation) by the habitual sentiments and feelings, the general modes of thinking and acting, which prevail throughout the community of which they are members; as well as by the feelings, habits, and modes of thought which characterize the particular class in that community to which they themselves belong. And no one will understand or be able to decipher their system of conduct, who does not take all these things into account. They are also much influenced by the maxims and traditions which have descended to them from other rulers, their predecessors; which maxims and traditions have been known to retain an ascendancy during long periods, even in opposition to the private interests of the rulers for the time being. I put aside the influence of other less general causes. Although, therefore, the private interest of the rulers or of the ruling class is a very powerful force, constantly in action, and exercising the most important influence upon their conduct, there is also, in what they do, a large portion which that private interest by no means affords a sufficient explanation of; and even the particulars which constitute the goodness or badness of their government, are in some, and no small degree, influenced by those among the circumstances acting upon them, which can not, with any propriety, be included in the term self-interest.

Turning now to the other proposition, that responsibility to the governed is the only cause capable of producing in the rulers a sense of identity of interest with the community, this is still less admissible as a universal truth, than even the former. I am not speaking of perfect identity of interest, which is an impracticable chimera; which, most assuredly, responsibility to the people does not give. I speak of identity in essentials; and the essentials are different at different places and times. There are a large number of cases in which those things which it is most for the general interest that the rulers should do, are also those which they are prompted to do by their strongest personal interest, the consolidation of their power. The suppression, for instance, of anarchy and resistance to law—the complete establishment of the authority of the central government, in a state of society like that of Europe in the Middle Ages—is one of the strongest interests of the people, and also of the rulers simply because they are the rulers; and responsibility on their part could not strengthen, though in many conceivable ways it might weaken, the motives prompting them to pursue this object. During the greater part, of the reign of Queen Elizabeth, and of many other monarchs who might be named, the sense of identity of interest between the sovereign and the majority of the people was probably stronger than it usually is in responsible governments; every thing that [pg 618] the people had most at heart, the monarch had at heart too. Had Peter the Great, or the rugged savages whom he began to civilize, the truest inclination toward the things which were for the real interest of those savages?

I am not here attempting to establish a theory of government, and am not called upon to determine the proportional weight which ought to be given to the circumstances which this school of geometrical politicians left out of their system, and those which they took into it. I am only concerned to show that their method was unscientific; not to measure the amount of error which may have affected their practical conclusions.

It is but justice to them, however, to remark, that their mistake was not so much one of substance as of form, and consisted in presenting in a systematic shape, and as the scientific treatment of a great philosophical question, what should have passed for that which it really was, the mere polemics of the day. Although the actions of rulers are by no means wholly determined by their selfish interests, it is chiefly as a security against those selfish interests that constitutional checks are required; and for that purpose such checks, in England, and the other nations of modern Europe, can in no manner be dispensed with. It is likewise true, that in these same nations, and in the present age, responsibility to the governed is the only means practically available to create a feeling of identity of interest, in the cases, and on the points, where that feeling does not sufficiently exist. To all this, and to the arguments which may be founded on it in favor of measures for the correction of our representative system, I have nothing to object; but I confess my regret, that the small though highly important portion of the philosophy of government, which was wanted for the immediate purpose of serving the cause of parliamentary reform, should have been held forth by thinkers of such eminence as a complete theory.

It is not to be imagined possible, nor is it true in point of fact, that these philosophers regarded the few premises of their theory as including all that is required for explaining social phenomena, or for determining the choice of forms of government and measures of legislation

and administration. They were too highly instructed, of too comprehensive intellect, and some of them of too sober and practical a character, for such an error. They would have applied, and did apply, their principles with innumerable allowances. But it is not allowances that are wanted. There is little chance of making due amends in the superstructure of a theory for the want of sufficient breadth in its foundations. It is unphilosophical to construct a science out of a few of the agencies by which the phenomena are determined, and leave the rest to the routine of practice or the sagacity of conjecture. We either ought not to pretend to scientific forms, or we ought to study all the determining agencies equally, and endeavor, so far as it can be done, to include all of them within the pale of the science; else we shall infallibly bestow a disproportionate attention upon those which our theory takes into account, while we misestimate the rest, and probably underrate their importance. That the deductions should be from the whole and not from a part only of the laws of nature that are concerned, would be desirable even if those omitted were so insignificant in comparison with the others, that they might, for most purposes and on most occasions, be left out of the account. But this is far indeed from being true in the social science. The phenomena of society do not depend, in essentials, on some one agency or law of human nature, with only inconsiderable [pg 619] modifications from others. The whole of the qualities of human nature influence those phenomena, and there is not one which influences them in a small degree. There is not one, the removal or any great alteration of which would not materially affect the whole aspect of society, and change more or less the sequences of social phenomena generally.

The theory which has been the subject of these remarks is, in this country at least, the principal contemporary example of what I have styled the geometrical method of philosophizing in the social science; and our examination of it has, for this reason, been more detailed than would otherwise have been suitable to a work like the present. Having now sufficiently illustrated the two erroneous methods, we shall pass without further preliminary to the true method; that which proceeds (conformably to the practice of the more complex physical sciences) deductively indeed, but by deduction from many, not from one or a very few, original premises; considering each effect as (what it really is) an aggregate result of many causes, operating sometimes through the same, sometimes through different mental agencies, or laws of human nature.

Chapter IX.

Of The Physical, Or Concrete Deductive, Method.

§ 1. After what has been said to illustrate the nature of the inquiry into social phenomena, the general character of the method proper to that inquiry is sufficiently evident, and needs only to be recapitulated, not proved. However complex the phenomena, all their sequences and co-existences result from the laws of the separate elements. The effect produced, in social phenomena, by any complex set of circumstances, amounts precisely to the sum of the effects of the circumstances taken singly; and the complexity does not arise from the number of the laws themselves, which is not remarkably great, but from the extraordinary number and variety of the data or elements—of the agents which, in obedience to that small number of laws, co-operate toward the effect. The Social Science, therefore (which, by a convenient barbarism, has been termed Sociology), is a deductive science; not, indeed, after the model of geometry, but after that of the more complex physical sciences. It infers the law of each effect from the laws of causation on which that effect depends; not, however, from the law merely of one cause, as in the geometrical method, but by considering all the causes which conjunctly influence the effect, and compounding their laws with one another. Its method, in short, is the Concrete Deductive Method: that of which astronomy furnishes the most perfect, natural philosophy a somewhat less perfect, example, and the employment of which, with the adaptations and precautions required by the subject, is beginning to regenerate physiology.

Nor does it admit of doubt, that similar adaptations and precautions are indispensable in sociology. In applying to that most complex of all studies what is demonstrably the sole method capable of throwing the light of science even upon phenomena of a far inferior degree of complication, we ought to be aware that the same superior complexity which renders the instrument of Deduction more necessary, renders it also more precarious; and we must be prepared to meet, by appropriate contrivances, this increase of difficulty.

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The actions and feelings of human beings in the social state, are, no doubt, entirely governed by psychological and ethological laws: whatever influence any cause exercises upon the social phenomena, it exercises through those laws. Supposing therefore the laws of human actions and feelings to be sufficiently known, there is no extraordinary difficulty in determining from those laws, the nature of the social effects which any given cause tends to produce. But when the question is that of compounding several tendencies together, and computing the aggregate result of many co-existent causes; and especially when, by attempting to predict what will actually occur in a given case, we incur the obligation of estimating and compounding the influences of all the causes which happen to exist in that case, we attempt a task to proceed far in which, surpasses the compass of the human faculties.

If all the resources of science are not sufficient to enable us to calculate, *a priori*, with complete precision, the mutual action of three bodies gravitating toward one another, it may be judged with what prospect of success we should endeavor to calculate the result of the conflicting tendencies which are acting in a thousand different directions and promoting a thousand different changes at a given instant in a given society; although we might and ought to be able, from the laws of human nature, to distinguish correctly enough the tendencies themselves, so far as they depend on causes accessible to our observation; and to determine the direction which each of them, if acting alone, would impress upon society, as well as, in a general way at least, to pronounce that some of these tendencies are more powerful than others.

But, without dissembling the necessary imperfections of the *a priori* method when applied to such a subject, neither ought we, on the other hand; to exaggerate them. The same objections which apply to the Method of Deduction in this its most difficult employment, apply to it, as we formerly showed,[276] in its easiest; and would even there have been insuperable, if there had not existed, as was then fully explained, an appropriate remedy. This remedy consists in the process which, under the name of Verification, we have characterized as the third essential constituent part of the Deductive Method; that of collating the conclusions of the ratiocination either with the concrete phenomena themselves, or, when such are obtainable, with their empirical laws. The ground of confidence in any concrete deductive science is not the *a priori* reasoning itself, but the accordance between its results and those of observation *a posteriori*. Either of these processes, apart from the other, diminishes in value as the subject increases in complication, and this is in so rapid a ratio as soon to become entirely worthless; but the reliance to be placed in the concurrence of the two sorts of evidence, not only does not diminish in any thing like the same proportion, but is not necessarily much diminished at all. Nothing more results than a disturbance in the order of precedency of the two processes, sometimes amounting to its actual inversion: insomuch that instead of deducing our conclusions by reasoning, and verifying them by observation, we in some cases begin by obtaining them provisionally from specific experience, and afterward connect them with the principles of human nature by *a priori* reasonings, which reasonings are thus a real Verification.

The only thinker who, with a competent knowledge of scientific methods [pg 621] in general, has attempted to characterize the Method of Sociology, M. Comte, considers this inverse order as inseparably inherent in the nature of sociological speculation. He looks upon the social science as essentially consisting of generalizations from history, verified, not originally suggested, by deduction from the laws of human nature. Though there is a truth contained in this opinion, of which I shall presently endeavor to show the importance, I can not but think that this truth is enunciated in too unlimited a manner, and that there is considerable scope in sociological inquiry for the direct, as well as for the inverse, Deductive Method.

It will, in fact, be shown in the next chapter, that there is a kind of sociological inquiries to which, from their prodigious complication, the method of direct deduction is altogether inapplicable, while by a happy compensation it is precisely in these cases that we are able to obtain the best empirical laws: to these inquiries, therefore, the Inverse Method is exclusively adapted. But there are also, as will presently appear, other cases in which it is impossible to obtain from direct observation any thing worthy the name of an empirical law; and it fortunately happens that these are the very cases in which the Direct Method is least affected by the objection which undoubtedly must always affect it in a certain degree.

We shall begin, then, by looking at the Social Science as a science of direct Deduction, and considering what can be accomplished in it, and under what limitations, by that mode of investigation. We shall, then, in a separate chapter, examine and endeavor to characterize the inverse process.

§ 2. It is evident, in the first place, that Sociology, considered as a system of deductions *a priori*, can not be a science of positive predictions, but only of tendencies. We may be able to conclude, from the laws of human nature applied to the circumstances of a given state of society, that a particular cause will operate in a certain manner unless counteracted; but we can never be assured to what extent or amount it will so operate, or affirm with certainty that it will not be counteracted; because we can seldom know, even approximately, all the agencies which may co-exist with it, and still less calculate the "collective result" of so many combined elements. The remark, however, must here be once more repeated, that knowledge insufficient for prediction may be most valuable for guidance. It is not necessary for the wise conduct of the affairs of society, no more than of any one's private concerns, that we should be able to foresee infallibly the results of what we do. We must seek our objects by means which may perhaps be defeated, and take precautions against dangers which possibly may never be realized. The aim of practical politics is to surround any given society with the greatest possible number of circumstances of which the tendencies are beneficial, and to remove or counteract, as far as practicable, those of which the tendencies are injurious. A knowledge of the tendencies only, though without the power of accurately predicting their conjunct result, gives us to a considerable extent this power.

It would, however, be an error to suppose that even with respect to tendencies we could arrive in this manner at any great number of propositions which will be true in all societies without exception. Such a supposition would be inconsistent with the eminently modifiable nature of the social phenomena, and the multitude and variety of the circumstances by which they are modified—circumstances never the same, or even nearly the same, in two different societies, or in two different periods of the same society. This would not be so serious an obstacle if, though the causes [pg 622] acting upon society in general are numerous, those which influence any one feature of society were limited in number; for we might then insulate any particular social phenomenon, and investigate its laws without disturbance from the rest. But the truth is the very opposite of this. Whatever affects, in an appreciable degree, any one element of the social state, affects through it all the other elements. The mode of production of all social phenomena is one great case of Intermixture of Laws. We can never either understand in theory or command in practice the condition of a society in any one respect, without taking into consideration its condition in all other respects. There is no social phenomenon which is not more or less influenced by every other part of the condition of the same society, and therefore by every cause which is influencing any other of the contemporaneous social phenomena. There is, in short, what physiologists term a *consensus*, similar to that existing among the various organs and functions of the physical frame of man and the more perfect animals; and constituting one of the many analogies which have rendered universal such expressions as the "body politic" and "body natural." It follows from this *consensus*, that unless two societies could be alike in all the circumstances which surround and influence them (which would imply their being alike in their previous history), no portion whatever of the phenomena will, unless by accident, precisely correspond; no one cause will produce exactly the same effects in both. Every cause, as its effect spreads through society, comes somewhere in contact with different sets of agencies, and thus has its effects on some of the social phenomena differently modified; and these differences, by their reaction, produce a difference even in those of the effects which would otherwise have been the same. We can never, therefore, affirm with certainty that a cause which has a particular tendency in one people or in one age will have exactly the same tendency in another, without referring back to our premises, and performing over again for the second age or nation, that analysis of the whole of its influencing circumstances which we had already performed for the first. The deductive science of society will not lay down a theorem, asserting in a universal manner the effect of any cause; but will rather teach us how to frame the proper theorem for the circumstances of any given case. It will not give the laws of society in general, but the means of determining the phenomena of any given society from the particular elements or data of that society.

All the general propositions which can be framed by the deductive science, are therefore, in the strictest sense of the word, hypothetical. They are grounded on some suppositious set of circumstances, and declare how some given cause would operate in those circumstances, supposing that no others were combined with them. If the set of circumstances supposed have been copied from those of any existing society, the conclusions will be true of that society, provided, and in as far as, the effect of those circumstances shall not be modified by others which have not been taken into the account. If we desire a nearer approach to concrete truth, we can only aim at it by taking, or endeavoring to take, a greater number of individualizing circumstances into the computation.

Considering, however, in how accelerating a ratio the uncertainty of our conclusions increases as we attempt to take the effect of a greater number of concurrent causes into our calculations, the hypothetical combinations of circumstances on which we construct the general theorems of the science, can not be made very complex, without so rapidly accumulating a [pg 623] liability to error as must soon deprive our conclusions of all value. This mode of inquiry, considered as a means of obtaining general propositions, must, therefore, on pain of frivolity, be limited to those classes of social facts which, though influenced like the rest by all sociological agents, are under the *immediate* influence, principally at least, of a few only.

§ 3. Notwithstanding the universal *consensus* of the social phenomena, whereby nothing which takes place in any part of the operations of society is without its share of influence on every other part; and notwithstanding the paramount ascendancy which the general state of civilization and social progress in any given society must hence exercise over all the partial and subordinate phenomena; it is not the less true that different species of social facts are in the main dependent, immediately and in the first resort, on different kinds of causes; and therefore not only may with

advantage, but must, be studied apart: just as in the natural body we study separately the physiology and pathology of each of the principal organs and tissues, though every one is acted upon by the state of all the others; and though the peculiar constitution and general state of health of the organism co-operates with, and often preponderates over, the local causes, in determining the state of any particular organ.

On these considerations is grounded the existence of distinct and separate, though not independent, branches or departments of sociological speculation.

There is, for example, one large class of social phenomena in which the immediately determining causes are principally those which act through the desire of wealth, and in which the psychological law mainly concerned is the familiar one, that a greater gain is preferred to a smaller. I mean, of course, that portion of the phenomena of society which emanate from the industrial, or productive, operations of mankind; and from those of their acts through which the distribution of the products of those industrial operations takes place, in so far as not effected by force, or modified by voluntary gift. By reasoning from that one law of human nature, and from the principal outward circumstances (whether universal or confined to particular states of society) which operate upon the human mind through that law, we may be enabled to explain and predict this portion of the phenomena of society, so far as they depend on that class of circumstances only; overlooking the influence of any other of the circumstances of society; and therefore neither tracing back the circumstances which we do take into account, to their possible origin in some other facts in the social state, nor making allowance for the manner in which any of those other circumstances may interfere with, and counteract or modify, the effect of the former. A department of science may thus be constructed, which has received the name of Political Economy.

The motive which suggests the separation of this portion of the social phenomena from the rest, and the creation of a distinct branch of science relating to them is—that they do *mainly* depend, at least in the first resort, on one class of circumstances only; and that even when other circumstances interfere, the ascertainment of the effect due to the one class of circumstances alone, is a sufficiently intricate and difficult business to make it expedient to perform it once for all, and then allow for the effect of the modifying circumstances; especially as certain fixed combinations of the former are apt to recur often, in conjunction with ever-varying circumstances of the latter class.

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Political Economy, as I have said on another occasion, concerns itself only with “such of the phenomena of the social state as take place in consequence of the pursuit of wealth. It makes entire abstraction of every other human passion or motive; except those which may be regarded as perpetually antagonizing principles to the desire of wealth, namely, aversion to labor, and desire of the present enjoyment of costly indulgences. These it takes, to a certain extent, into its calculations, because these do not merely, like our other desires, occasionally conflict with the pursuit of wealth, but accompany it always as a drag or impediment, and are therefore inseparably mixed up in the consideration of it. Political Economy considers mankind as occupied solely in acquiring and consuming wealth; and aims at showing what is the course of action into which mankind, living in a state of society, would be impelled, if that motive, except in the degree in which it is checked by the two perpetual counter-motives above adverted to, were absolute ruler of all their actions. Under the influence of this desire, it shows mankind accumulating wealth, and employing that wealth in the production of other wealth; sanctioning by mutual agreement the institution of property; establishing laws to prevent individuals from encroaching upon the property of others by force or fraud; adopting various contrivances for increasing the productiveness of their labor; settling the division of the produce by agreement, under the influence of competition (competition itself being governed by certain laws, which laws are therefore the ultimate regulators of the division of the produce); and employing certain expedients (as money, credit, etc.) to facilitate the distribution. All these operations, though many of them are really the result of a plurality of motives, are considered by political economy as flowing solely from the desire of wealth. The science then proceeds to investigate the laws which govern these several operations, under the supposition that man is a being who is determined, by the necessity of his nature, to prefer a greater portion of wealth to a smaller, in all cases, without any other exception than that constituted by the two counter-motives already specified. Not that any political economist was ever so absurd as to suppose that mankind are

really thus constituted, but because this is the mode in which science must necessarily proceed. When an effect depends on a concurrence of causes, these causes must be studied one at a time, and their laws separately investigated, if we wish, through the causes, to obtain the power of either predicting or controlling the effect; since the law of the effect is compounded of the laws of all the causes which determine it. The law of the centripetal and that of the projectile force must have been known, before the motions of the earth and planets could be explained, or many of them predicted. The same is the case with the conduct of man in society. In order to judge how he will act under the variety of desires and aversions which are concurrently operating upon him, we must know how he would act under the exclusive influence of each one in particular. There is, perhaps, no action of a man's life in which he is neither under the immediate nor under the remote influence of any impulse but the mere desire of wealth. With respect to those parts of human conduct of which wealth is not even the principal object, to these political economy does not pretend that its conclusions are applicable. But there are also certain departments of human affairs, in which the acquisition of wealth is the main and acknowledged end. It is only of these that political economy takes notice. The manner in which it necessarily proceeds is that of treating the main and acknowledged end as [pg 625] if it were the sole end; which, of all hypotheses equally simple, is the nearest to the truth. The political economist inquires, what are the actions which would be produced by this desire, if within the departments in question it were unimpeded by any other. In this way a nearer approximation is obtained than would otherwise be practicable to the real order of human affairs in those departments. This approximation has then to be corrected by making proper allowance for the effects of any impulses of a different description, which can be shown to interfere with the result in any particular case. Only in a few of the most striking cases (such as the important one of the principle of population) are these corrections interpolated into the expositions of political economy itself; the strictness of purely scientific arrangement being thereby somewhat departed from, for the sake of practical utility. So far as it is known, or may be presumed, that the conduct of mankind in the pursuit of wealth is under the collateral influence of any other of the properties of our nature than the desire of obtaining the greatest quantity of wealth with the least labor and self-denial, the conclusions of political economy will so far fail of being applicable to the explanation or prediction of real events, until they are modified by a correct allowance for the degree of influence exercised by the other cause."[277]

Extensive and important practical guidance may be derived, in any given state of society, from general propositions such as those above indicated; even though the modifying influence of the miscellaneous causes which the theory does not take into account, as well as the effect of the general social changes in progress, be provisionally overlooked. And though it has been a very common error of political economists to draw conclusions from the elements of one state of society, and apply them to other states in which many of the elements are not the same, it is even then not difficult, by tracing back the demonstrations, and introducing the new premises in their proper places, to make the same general course of argument which served for the one case, serve for the others too.

For example, it has been greatly the custom of English political economists to discuss the laws of the distribution of the produce of industry, on a supposition which is scarcely realized anywhere out of England and Scotland, namely, that the produce is "shared among three classes, altogether distinct from one another, laborers, capitalists, and landlords; and that all these are free agents, permitted in law and in fact to set upon their labor, their capital, and their land, whatever price they are able to get for it. The conclusions of the science, being all adapted to a society thus constituted, require to be revised whenever they are applied to any other. They are inapplicable where the only capitalists are the landlords, and the laborers are their property, as in slave countries. They are inapplicable where the almost universal landlord is the state, as in India. They are inapplicable where the agricultural laborer is generally the owner both of the land itself and of the capital, as frequently in France, or of the capital only, as in Ireland." But though it may often be very justly objected to the existing race of political economists "that they attempt to construct a permanent fabric out of transitory materials; that they take for granted the immutability of arrangements of society, many of which are in their nature fluctuating or progressive, and enunciate with as little qualification as if they were universal and absolute truths, propositions which are perhaps [pg 626] applicable to no state of society except the particular one in which the writer happened to live;" this does not take away the value of the propositions, considered with reference to the state of society from which they were drawn. And even as applicable to other states of society, "it must not be supposed that the science is so

incomplete and unsatisfactory as this might seem to prove. Though many of its conclusions are only locally true, its method of investigation is applicable universally; and as whoever has solved a certain number of algebraic equations, can without difficulty solve all others of the same kind, so whoever knows the political economy of England, or even of Yorkshire, knows that of all nations, actual or possible, provided he have good sense enough not to expect the same conclusion to issue from varying premises." Whoever has mastered with the degree of precision which is attainable the laws which, under free competition, determine the rent, profits, and wages, received by landlords, capitalists, and laborers, in a state of society in which the three classes are completely separate, will have no difficulty in determining the very different laws which regulate the distribution of the produce among the classes interested in it in any of the states of cultivation and landed property set forth in the foregoing extract.[278]

§ 4. I would not here undertake to decide what other hypothetical or abstract sciences similar to Political Economy, may admit of being carved out of the general body of the social science; what other portions of the social phenomena are in a sufficiently close and complete dependence, in the first resort, on a peculiar class of causes, to make it convenient to create a preliminary science of those causes; postponing the consideration of the causes which act through them, or in concurrence with them, to a later period of the inquiry. There is, however, among these separate departments one which can not be passed over in silence, being of a more comprehensive and commanding character than any of the other branches into which the social science may admit of being divided. Like them, it is directly conversant with the causes of only one class of social facts, but a class which exercises, immediately or remotely, a paramount influence over the test. I allude to what may be termed Political Ethology, or the theory of the causes which determine the type of character belonging to a people or to an age. Of all the subordinate branches of the social science, this is the most completely in its infancy. The causes of national character are scarcely at all understood, and the effect of institutions or social arrangements upon the character of the people is generally that portion of their effects which is least attended to, and least comprehended. Nor is this wonderful, when we consider the infant state of the science of Ethology itself, from whence the laws must be drawn, of which the truths of political ethology can be but results and exemplifications.

Yet, to whoever well considers the matter, it must appear that the laws of national (or collective) character are by far the most important class of sociological laws. In the first place, the character which is formed by any state of social circumstances is in itself the most interesting phenomenon which that state of society can possibly present. Secondly, it is also a fact which enters largely into the production of all the other phenomena. And above all, the character, that is, the opinions, feelings, and habits, of the people, though greatly the results of the state of society which precedes [pg 627] them, are also greatly the causes of the state of society which follows them; and are the power by which all those of the circumstances of society which are artificial, laws and customs for instance, are altogether moulded: customs evidently, laws no less really, either by the direct influence of public sentiment upon the ruling powers, or by the effect which the state of national opinion and feeling has in determining the form of government and shaping the character of the governors.

As might be expected, the most imperfect part of those branches of social inquiry which have been cultivated as separate sciences, is the theory of the manner in which their conclusions are affected by ethological considerations. The omission is no defect in them as abstract or hypothetical sciences, but it vitiates them in their practical application as branches of a comprehensive social science. In political economy, for instance, empirical laws of human nature are tacitly assumed by English thinkers, which are calculated only for Great Britain and the United States. Among other things, an intensity of competition is constantly supposed, which, as a general mercantile fact, exists in no country in the world except those two. An English political economist, like his countrymen in general, has seldom learned that it is possible that men, in conducting the business of selling their goods over a counter, should care more about their ease or their vanity than about their pecuniary gain. Yet those who know the habits of the continent of Europe are aware how apparently small a motive often outweighs the desire of money getting, even in the operations which have money getting for their direct object. The more highly the science of ethology is cultivated, and the better the diversities of individual and national character are understood, the smaller, probably, will the number of propositions become, which it will be considered safe to build on as universal principles of human nature.

These considerations show that the process of dividing off the social science into compartments, in order that each may be studied separately, and its conclusions afterward corrected for practice by the modifications supplied by the others, must be subject to at least one important limitation. Those portions alone of the social phenomena can with advantage be made the subjects, even provisionally, of distinct branches of science, into which the diversities of character between different nations or different times enter as influencing causes only in a secondary degree. Those phenomena, on the contrary, with which the influences of the ethological state of the people are mixed up at every step (so that the connection of effects and causes can not be even rudely marked out without taking those influences into consideration) could not with any advantage, nor without great disadvantage, be treated independently of political ethology, nor, therefore, of all the circumstances by which the qualities of a people are influenced. For this reason (as well as for others which will hereafter appear) there can be no separate Science of Government; that being the fact which, of all others, is most mixed up, both as cause and effect, with the qualities of the particular people or of the particular age. All questions respecting the tendencies of forms of government must stand part of the general science of society, not of any separate branch of it.

This general Science of Society, as distinguished from the separate departments of the science (each of which asserts its conclusions only conditionally, subject to the paramount control of the laws of the general science) now remains to be characterized. And as will be shown presently, nothing of a really scientific character is here possible, except by the inverse [pg 628] deductive method. But before we quit the subject of those sociological speculations which proceed by way of direct deduction, we must examine in what relation they stand to that indispensable element in all deductive sciences, Verification by Specific Experience—comparison between the conclusions of reasoning and the results of observation.

§ 5. We have seen that, in most deductive sciences, and among the rest in Ethology itself, which is the immediate foundation of the Social Science, a preliminary work of preparation is performed on the observed facts, to fit them for being rapidly and accurately collated (sometimes even for being collated at all) with the conclusions of theory. This preparatory treatment consists in finding general propositions which express concisely what is common to large classes of observed facts; and these are called the empirical laws of the phenomena. We have, therefore, to inquire, whether any similar preparatory process can be performed on the facts of the social science; whether there are any empirical laws in history or statistics.

In statistics, it is evident that empirical laws may sometimes be traced; and the tracing them forms an important part of that system of indirect observation on which we must often rely for the data of the Deductive Science. The process of the science consists in inferring effects from their causes; but we have often no means of observing the causes, except through the medium of their effects. In such cases the deductive science is unable to predict the effects, for want of the necessary data; it can determine what causes are capable of producing any given effect, but not with what frequency and in what quantities those causes exist. An instance in point is afforded by a newspaper now lying before me. A statement was furnished by one of the official assignees in bankruptcy showing among the various bankruptcies which it had been his duty to investigate, in how many cases the losses had been caused by misconduct of different kinds, and in how many by unavoidable misfortunes. The result was, that the number of failures caused by misconduct greatly preponderated over those arising from all other causes whatever. Nothing but specific experience could have given sufficient ground for a conclusion to this purport. To collect, therefore, such empirical laws (which are never more than approximate generalizations) from direct observation, is an important part of the process of sociological inquiry.

The experimental process is not here to be regarded as a distinct road to the truth, but as a means (happening accidentally to be the only, or the best, available) for obtaining the necessary data for the deductive science. When the immediate causes of social facts are not open to direct observation, the empirical law of the effects gives us the empirical law (which in that case is all that we can obtain) of the causes likewise. But those immediate causes depend on remote causes; and the empirical law, obtained by this indirect mode of observation, can only be relied on as applicable to unobserved cases, so long as there is reason to think that no change has taken place in any of the remote causes on which the immediate causes depend. In making use, therefore, of even the best statistical generalizations for the purpose of inferring (though it be only conjecturally) that the same empirical laws will hold in any new case, it is necessary that we be well acquainted with the remoter causes, in order that we may avoid applying the empirical law

to cases which differ in any of the circumstances on which the truth of the law ultimately depends. And thus, even where conclusions derived from specific observation are available for practical inferences [pg 629] in new cases, it is necessary that the deductive science should stand sentinel over the whole process; that it should be constantly referred to, and its sanction obtained to every inference.

The same thing holds true of all generalizations which can be grounded on history. Not only there are such generalizations, but it will presently be shown that the general science of society, which inquires into the laws of succession and co-existence of the great facts constituting the state of society and civilization at any time, can proceed in no other manner than by making such generalizations—afterward to be confirmed by connecting them with the psychological and ethological laws on which they must really depend.

§ 6. But (reserving this question for its proper place) in those more special inquiries which form the subject of the separate branches of the social science, this twofold logical process and reciprocal verification is not possible; specific experience affords nothing amounting to empirical laws. This is particularly the case where the object is to determine the effect of any one social cause among a great number acting simultaneously; the effect, for example, of corn laws, or of a prohibitive commercial system generally. Though it may be perfectly certain, from theory, what *kind* of effects corn laws must produce, and in what general direction their influence must tell upon industrial prosperity, their effect is yet of necessity so much disguised by the similar or contrary effects of other influencing agents, that specific experience can at most only show that on the average of some great number of instances, the cases where there were corn laws exhibited the effect in a greater degree than those where there were not. Now the number of instances necessary to exhaust the whole round of combinations of the various influential circumstances, and thus afford a fair average, never can be obtained. Not only we can never learn with sufficient authenticity the facts of so many instances, but the world itself does not afford them in sufficient numbers, within the limits of the given state of society and civilization which such inquiries always presuppose. Having thus no previous empirical generalizations with which to collate the conclusions of theory, the only mode of direct verification which remains is to compare those conclusions with the result of an individual experiment or instance. But here the difficulty is equally great. For in order to verify a theory by an experiment, the circumstances of the experiment must be exactly the same with those contemplated in the theory. But in social phenomena the circumstances of no two cases are exactly alike. A trial of corn laws in another country, or in a former generation, would go a very little way toward verifying a conclusion drawn respecting their effect in this generation and in this country. It thus happens, in most cases, that the only individual instance really fitted to verify the predictions of theory is the very instance for which the predictions were made; and the verification comes too late to be of any avail for practical guidance.

Although, however, direct verification is impossible, there is an indirect verification, which is scarcely of less value, and which is always practicable. The conclusion drawn as to the individual case can only be directly verified in that case; but it is verified indirectly, by the verification of other conclusions, drawn in other individual cases from the same laws. The experience which comes too late to verify the particular proposition to which it refers, is not too late to help toward verifying the general sufficiency of the theory. The test of the degree in which the science affords safe [pg 630] ground for predicting (and consequently for practically dealing with) what has not yet happened, is the degree in which it would have enabled us to predict what has actually occurred. Before our theory of the influence of a particular cause, in a given state of circumstances, can be entirely trusted, we must be able to explain and account for the existing state of all that portion of the social phenomena which that cause has a tendency to influence. If, for instance, we would apply our speculations in political economy to the prediction or guidance of the phenomena of any country, we must be able to explain all the mercantile or industrial facts of a general character, appertaining to the present state of that country; to point out causes sufficient to account for all of them, and prove, or show good ground for supposing, that these causes have really existed. If we can not do this, it is a proof either that the facts which ought to be taken into account are not yet completely known to us, or that although we know the facts, we are not masters of a sufficiently perfect theory to enable us to assign their consequences. In either case we are not, in the present state of our knowledge, fully competent to draw conclusions, speculative or practical, for that country. In like manner, if we would attempt to judge of the effect which any political institution would have, supposing

that it could be introduced into any given country, we must be able to show that the existing state of the practical government of that country, and of whatever else depends thereon, together with the particular character and tendencies of the people, and their state in respect to the various elements of social well-being, are such as the institutions they have lived under, in conjunction with the other circumstances of their nature or of their position, were calculated to produce.

To prove, in short, that our science, and our knowledge of the particular case, render us competent to predict the future, we must show that they would have enabled us to predict the present and the past. If there be any thing which we could not have predicted, this constitutes a residual phenomenon, requiring further study for the purpose of explanation; and we must either search among the circumstances of the particular case until we find one which, on the principles of our existing theory, accounts for the unexplained phenomenon, or we must turn back, and seek the explanation by an extension and improvement of the theory itself.

Chapter X.

Of The Inverse Deductive, Or Historical, Method.

§ 1. There are two kinds of sociological inquiry. In the first kind, the question proposed is, what effect will follow from a given cause, a certain general condition of social circumstances being presupposed. As, for example, what would be the effect of imposing or of repealing corn laws, of abolishing monarchy or introducing universal suffrage, in the present condition of society and civilization in any European country, or under any other given supposition with regard to the circumstances of society in general, without reference to the changes which might take place, or which may already be in progress, in those circumstances. But there is also a second inquiry, namely, what are the laws which determine those general circumstances themselves. In this last the question is, not what will be the effect of a given cause in a certain state of society, but what are the [pg 631] causes which produce, and the phenomena which characterize, states of society generally. In the solution of this question consists the general Science of Society; by which the conclusions of the other and more special kind of inquiry must be limited and controlled.

§ 2. In order to conceive correctly the scope of this general science, and distinguish it from the subordinate departments of sociological speculation, it is necessary to fix the ideas attached to the phrase, “A State of Society.” What is called a state of society, is the simultaneous state of all the greater social facts or phenomena. Such are: the degree of knowledge, and of intellectual and moral culture, existing in the community, and in every class of it; the state of industry, of wealth and its distribution; the habitual occupations of the community; their division into classes, and the relations of those classes to one another; the common beliefs which they entertain on all the subjects most important to mankind, and the degree of assurance with which those beliefs are held; their tastes, and the character and degree of their æsthetic development; their form of government, and the more important of their laws and customs. The condition of all these things, and of many more which will readily suggest themselves, constitute the state of society, or the state of civilization, at any given time.

When states of society, and the causes which produce them, are spoken of as a subject of science, it is implied that there exists a natural correlation among these different elements; that not every variety of combination of these general social facts is possible, but only certain combinations; that, in short, there exist Uniformities of Co-existence between the states of the various social phenomena. And such is the truth; as is indeed a necessary consequence of the influence exercised by every one of those phenomena over every other. It is a fact implied in the *consensus* of the various parts of the social body.

States of society are like different constitutions or different ages in the physical frame; they are conditions not of one or a few organs or functions, but of the whole organism. Accordingly, the information which we possess respecting past ages, and respecting the various states of society

now existing in different regions of the earth, does, when duly analyzed, exhibit uniformities. It is found that when one of the features of society is in a particular state, a state of many other features, more or less precisely determinate, always or usually co-exists with it.

But the uniformities of co-existence obtaining among phenomena which are effects of causes, must (as we have so often observed) be corollaries from the laws of causation by which these phenomena are really determined. The mutual correlation between the different elements of each state of society, is, therefore, a derivative law, resulting from the laws which regulate the succession between one state of society and another; for the proximate cause of every state of society is the state of society immediately preceding it. The fundamental problem, therefore, of the social science, is to find the laws according to which any state of society produces the state which succeeds it and takes its place. This opens the great and vexed question of the progressiveness of man and society; an idea involved in every just conception of social phenomena as the subject of a science.

§ 3. It is one of the characters, not absolutely peculiar to the sciences of human nature and society, but belonging to them in a peculiar degree, [pg 632] to be conversant with a subject-matter whose properties are changeable. I do not mean changeable from day to day, but from age to age; so that not only the qualities of individuals vary, but those of the majority are not the same in one age as in another.

The principal cause of this peculiarity is the extensive and constant reaction of the effects upon their causes. The circumstances in which mankind are placed, operating according to their own laws and to the laws of human nature, form the characters of the human beings; but the human beings, in their turn, mould and shape the circumstances for themselves and for those who come after them. From this reciprocal action there must necessarily result either a cycle or a progress. In astronomy also, every fact is at once effect and cause; the successive positions of the various heavenly bodies produce changes both in the direction and in the intensity of the forces by which those positions are determined. But in the case of the solar system, these mutual actions bring around again, after a certain number of changes, the former state of circumstances; which, of course, leads to the perpetual recurrence of the same series in an unvarying order. Those bodies, in short, revolve in orbits: but there are (or, conformably to the laws of astronomy, there might be) others which, instead of an orbit, describe a trajectory—a course not returning into itself. One or other of these must be the type to which human affairs must conform.

One of the thinkers who earliest conceived the succession of historical events as subject to fixed laws, and endeavored to discover these laws by an analytical survey of history, Vico, the celebrated author of the *Scienza Nuova*, adopted the former of these opinions. He conceived the phenomena of human society as revolving in an orbit; as going through periodically the same series of changes. Though there were not wanting circumstances tending to give some plausibility to this view, it would not bear a close scrutiny: and those who have succeeded Vico in this kind of speculations have universally adopted the idea of a trajectory or progress, in lieu of an orbit or cycle.

The words Progress and Progressiveness are not here to be understood as synonymous with improvement and tendency to improvement. It is conceivable that the laws of human nature might determine, and even necessitate, a certain series of changes in man and society, which might not in every case, or which might not on the whole, be improvements. It is my belief, indeed, that the general tendency is, and will continue to be, saving occasional and temporary exceptions, one of improvement; a tendency toward a better and happier state. This, however, is not a question of the method of the social science, but a theorem of the science itself. For our purpose it is sufficient that there is a progressive change both in the character of the human race and in their outward circumstances, so far as moulded by themselves; that in each successive age the principal phenomena of society are different from what they were in the age preceding, and still more different from any previous age: the periods which most distinctly mark these successive changes being intervals of one generation, during which a new set of human beings have been educated, have grown up from childhood, and taken possession of society.

The progressiveness of the human race is the foundation on which a method of philosophizing in the social science has been of late years erected, far superior to either of the two modes which had previously been prevalent, the chemical or experimental, and the geometrical modes. This method, which is now generally adopted by the most advanced thinkers [pg 633] on the

Continent, consists in attempting, by a study and analysis of the general facts of history, to discover (what these philosophers term) the law of progress: which law, once ascertained, must according to them enable us to predict future events, just as after a few terms of an infinite series in algebra we are able to detect the principle, of regularity in their formation, and to predict the rest of the series to any number of terms we please. The principal aim of historical speculation in France, of late years, has been to ascertain this law. But while I gladly acknowledge the great services which have been rendered to historical knowledge by this school, I can not but deem them to be mostly chargeable with a fundamental misconception of the true method of social philosophy. The misconception consists in supposing that the order of succession which we may be able to trace among the different states of society and civilization which history presents to us, even if that order were more rigidly uniform than it has yet been proved to be, could ever amount to a law of nature. It can only be an empirical law. The succession of states of the human mind and of human society can not have an independent law of its own; it must depend on the psychological and ethological laws which govern the action of circumstances on men and of men on circumstances. It is conceivable that those laws might be such, and the general circumstances of the human race such, as to determine the successive transformations of man and society to one given and unvarying order. But even if the case were so, it can not be the ultimate aim of science to discover an empirical law. Until that law could be connected with the psychological and ethological laws on which it must depend, and, by the consilience of deduction *a priori* with historical evidence, could be converted from an empirical law into a scientific one, it could not be relied on for the prediction of future events, beyond, at most, strictly adjacent cases. M. Comte alone, among the new historical school, has seen the necessity of thus connecting all our generalizations from history with the laws of human nature.

§ 4. But, while it is an imperative rule never to introduce any generalization from history into the social science unless sufficient grounds can be pointed out for it in human nature, I do not think any one will contend that it would have been possible, setting out from the principles of human nature and from the general circumstances of the position of our species, to determine *a priori* the order in which human development must take place, and to predict, consequently, the general facts of history up to the present time. After the first few terms of the series, the influence exercised, over each generation by the generations which preceded it, becomes, (as is well observed by the writer last referred to) more and more preponderant over all other influences; until at length what we now are and do, is in a very small degree the result of the universal circumstances of the human race, or even of our own circumstances acting through the original qualities of our species, but mainly of the qualities produced in us by the whole previous history of humanity. So long a series of actions and reactions between Circumstances and Man, each successive term being composed of an ever greater number and variety of parts, could not possibly be computed by human faculties from the elementary laws which produce it. The mere length of the series would be a sufficient obstacle, since a slight error in any one of the terms would augment in rapid progression at every subsequent step.

If, therefore, the series of the effects themselves did not, when examined [pg 634] as a whole, manifest any regularity, we should in vain attempt to construct a general science of society. We must in that case have contented ourselves with that subordinate order of sociological speculation formerly noticed, namely, with endeavoring to ascertain what would be the effect of the introduction of any new cause, in a state of society supposed to be fixed—a knowledge sufficient for the more common exigencies of daily political practice, but liable to fail in all cases in which the progressive movement of society is one of the influencing elements; and therefore more precarious in proportion as the case is more important. But since both the natural varieties of mankind, and the original diversities of local circumstances, are much less considerable than the points of agreement, there will naturally be a certain degree of uniformity in the progressive development of the species and of its works. And this uniformity tends to become greater, not less, as society advances; since the evolution of each people, which is at first determined exclusively by the nature and circumstances of that people, is gradually brought under the influence (which becomes stronger as civilization advances) of the other nations of the earth, and of the circumstances by which they have been influenced. History accordingly does, when judiciously examined, afford Empirical Laws of Society. And the problem of general sociology is to ascertain these, and connect them with the laws of human nature, by deductions showing that such were the derivative laws naturally to be expected as the consequences of those ultimate ones.

It is, indeed, hardly ever possible, even after history has suggested the derivative law, to demonstrate *a priori* that such was the only order of succession or of co-existence in which the effects could, consistently with the laws of human nature, have been produced. We can at most make out that there were strong *a priori* reasons for expecting it, and that no other order of succession or co-existence would have been so likely to result from the nature of man and the general circumstances of his position. Often we can not do even this; we can not even show that what did take place was probable *a priori*, but only that it was possible. This, however—which, in the Inverse Deductive Method that we are now characterizing, is a real process of verification—is as indispensable, as verification by specific experience has been shown to be, where the conclusion is originally obtained by the direct way of deduction. The empirical laws must be the result of but a few instances, since few nations have ever attained at all, and still fewer by their own independent development, a high stage of social progress. If, therefore, even one or two of these few instances be insufficiently known, or imperfectly analyzed into their elements, and therefore not adequately compared with other instances, nothing is more probable than that a wrong empirical law will emerge instead of the right one. Accordingly, the most erroneous generalizations are continually made from the course of history; not only in this country, where history can not yet be said to be at all cultivated as a science, but in other countries where it is so cultivated, and by persons well versed in it. The only check or corrective is, constant verification by psychological and ethological laws. We may add to this, that no one but a person competently skilled in those laws is capable of preparing the materials for historical generalization, by analyzing the facts of history, or even by observing the social phenomena of his own time. No other will be aware of the comparative importance of different facts, nor consequently know what facts to look for, or to observe; still less will he be capable of estimating the evidence of facts which, as is [pg 635] the case with most, can not be ascertained by direct observation or learned from testimony, but must be inferred from marks.

§ 5. The Empirical Laws of Society are of two kinds; some are uniformities of co-existence, some of succession. According as the science is occupied in ascertaining and verifying the former sort of uniformities or the latter, M. Comte gives it the title of Social Statics, or of Social Dynamics; conformably to the distinction in mechanics between the conditions of equilibrium and those of movement; or in biology, between the laws of organization and those of life. The first branch of the science ascertains the conditions of stability in the social union; the second, the laws of progress. Social Dynamics is the theory of Society considered in a state of progressive movement; while Social Statics is the theory of the *consensus* already spoken of as existing among the different parts of the social organism; in other words, the theory of the mutual actions and reactions of contemporaneous social phenomena; making[279] provisionally, as far as possible, abstraction, for scientific purposes, of the fundamental movement which is at all times gradually modifying the whole of them.

"In this first point of view, the provisions of sociology will enable us to infer one from another (subject to ulterior verification by direct observation) the various characteristic marks of each distinct mode of social existence, in a manner essentially analogous to what is now habitually practiced in the anatomy of the physical body. This preliminary aspect, therefore, of political science, of necessity supposes that (contrary to the existing habits of philosophers) each of the numerous elements of the social state, ceasing to be looked at independently and absolutely, shall be always and exclusively considered relatively to all the other elements, with the whole of which it is united by mutual interdependence. It would be superfluous to insist here upon the great and constant utility of this branch of sociological speculation. It is, in the first place, the indispensable basis of the theory of social progress. It may, moreover, be employed, immediately, and of itself, to supply the place, provisionally at least, of direct observation, which in many cases is not always practicable for some of the elements of society, the real condition of which may, however, be sufficiently judged of by means of the relations which connect them with others previously known. The history of the sciences may give us some notion of the habitual importance of this auxiliary resource, by reminding us, for example, how the vulgar errors of mere erudition concerning the pretended acquirements of the ancient Egyptians in the higher astronomy were irrevocably dissipated (even before sentence had been passed on them by a sounder erudition) from the single consideration of the inevitable connection between the general state of astronomy and that of abstract geometry, then evidently in its infancy. It would be easy to cite a multitude of analogous cases, the character of which could admit of no dispute. In order to avoid exaggeration, however, it should be remarked, that these necessary relations among the different aspects of society can not, from their very nature, be so simple and precise

that the results observed could only have arisen from some one mode of mutual co-ordination. Such a notion, already too narrow in the science of life, would be completely at variance with the still more complex nature of sociological speculations. But the exact estimation of these limits of variation, both in the healthy [pg 636] and in the morbid state, constitutes, at least as much as in the anatomy of the natural body, an indispensable complement to every theory of Sociological Statics; without which the indirect exploration above spoken of would often lead into error.

"This is not the place for methodically demonstrating the existence of a necessary relation among all the possible aspects of the same social organism; a point on which, in principle at least, there is now little difference of opinion among sound thinkers. From whichever of the social elements we choose to set out, we may easily recognize that it has always a connection, more or less immediate, with all the other elements, even with those which at first sight appear the most independent of it. The dynamical consideration of the progressive development of civilized humanity, affords, no doubt, a still more efficacious means of effecting this interesting verification of the *consensus* of the social phenomena, by displaying the manner in which every change in any one part, operates immediately, or very speedily, upon all the rest. But this indication may be preceded, or at all events followed, by a confirmation of a purely statical kind; for, in politics as in mechanics, the communication of motion from one object to another proves a connection between them. Without descending to the minute interdependence of the different branches of any one science or art, is it not evident that among the different sciences, as well as among most of the arts, there exists such a connection, that if the state of any one well-marked division of them is sufficiently known to us, we can with real scientific assurance infer, from their necessary correlation, the contemporaneous state of every one of the others? By a further extension of this consideration, we may conceive the necessary relation which exists between the condition of the sciences in general and that of the arts in general, except that the mutual dependence is less intense in proportion as it is more indirect. The same is the case, when, instead of considering the aggregate of the social phenomena in some one people, we examine it simultaneously in different contemporaneous nations; between which the perpetual reciprocity of influence, especially in modern times, can not be contested, though the *consensus* must in this case be ordinarily of a less decided character, and must decrease gradually with the affinity of the cases and the multiplicity of the points of contact, so as at last, in some cases, to disappear almost entirely; as for, example, between Western Europe and Eastern Asia, of which the various general states of society appear to have been hitherto almost independent of one another.

These remarks are followed by illustrations of one of the most important, and until lately, most neglected, of the general principles which, in this division of the social science, may be considered as established; namely, the necessary correlation between the form of government existing in any society and the contemporaneous state of civilization: a natural law which stamps the endless discussions and innumerable theories respecting forms of government in the abstract, as fruitless and worthless, for any other purpose than as a preparatory treatment of materials to be afterward used for the construction of a better philosophy.

As already remarked, one of the main results of the science of social statics would be to ascertain the requisites of stable political union. There are some circumstances which, being found in all societies without exception, and in the greatest degree where the social union is most complete, may be considered (when psychological and ethological laws confirm the indication) as conditions of the existence of the complex phenomena called [pg 637] a State. For example, no numerous society has ever been held together without laws, or usages equivalent to them; without tribunals, and an organized force of some sort to execute their decisions. There have always been public authorities whom, with more or less strictness and in cases more or less accurately defined, the rest of the community obeyed, or according to general opinion were bound to obey. By following out this course of inquiry we shall find a number of requisites, which have been present in every society that has maintained a collective existence, and on the cessation of which it has either merged in some other society, or reconstructed itself on some new basis, in which the conditions were conformed to. Although these results, obtained by comparing different forms and states of society, amount in themselves only to empirical laws; some of them, when once suggested, are found to follow with so much probability from general laws of human nature, that the consilience of the two processes raises the evidence to proof, and the generalizations to the rank of scientific truths.

This seems to be affirmable (for instance) of the conclusions arrived at in the following passage, extracted, with some alterations, from a criticism on the negative philosophy of the eighteenth century,[280] and which I quote, though (as in some former instances) from myself, because I have no better way of illustrating the conception I have formed of the kind of theorems of which sociological statics would consist.

"The very first element of the social union, obedience to a government of some sort, has not been found so easy a thing to establish in the world. Among a timid and spiritless race like the inhabitants of the vast plains of tropical countries, passive obedience may be of natural growth; though even there we doubt whether it has ever been found among any people with whom fatalism, or in other words, submission to the pressure of circumstances as a divine decree, did not prevail as a religious doctrine. But the difficulty of inducing a brave and warlike race to submit their individual *arbitrium* to any common umpire, has always been felt to be so great, that nothing short of supernatural power has been deemed adequate to overcome it; and such tribes have always assigned to the first institution of civil society a divine origin. So differently did those judge who knew savage men by actual experience, from those who had no acquaintance with them except in the civilized state. In modern Europe itself, after the fall of the Roman empire, to subdue the feudal anarchy and bring the whole people of any European nation into subjection to government (though Christianity in the most concentrated form of its influence was co-operating in the work) required thrice as many centuries as have elapsed since that time.

"Now if these philosophers had known human nature under any other type than that of their own age, and of the particular classes of society among whom they lived, it would have occurred to them, that wherever this habitual submission to law and government has been firmly and durably established, and yet the vigor and manliness of character which resisted its establishment have been in any degree preserved, certain requisites have existed, certain conditions have been fulfilled, of which the following may be regarded as the principal.

"First: there has existed, for all who were accounted citizens—for all who were not slaves, kept down by brute force—a system of *education*, [pg 638] beginning with infancy and continued through life, of which whatever else it might include, one main and incessant ingredient was *restraining discipline*. To train the human being in the habit, and thence the power, of subordinating his personal impulses and aims to what were considered the ends of society; of adhering, against all temptation, to the course of conduct which those ends prescribed; of controlling in himself all feelings which were liable to militate against those ends, and encouraging all such as tended toward them; this was the purpose, to which every outward motive that the authority directing the system could command, and every inward power or principle which its knowledge of human nature enabled it to evoke, were endeavored to be rendered instrumental. The entire civil and military policy of the ancient commonwealths was such a system of training; in modern nations its place has been attempted to be supplied, principally, by religious teaching. And whenever and in proportion as the strictness of the restraining discipline was relaxed, the natural tendency of mankind to anarchy re-asserted itself; the state became disorganized from within; mutual conflict for selfish ends, neutralized the energies which were required to keep up the contest against natural causes of evil; and the nation, after a longer or briefer interval of progressive decline, became either the slave of a despotism, or the prey of a foreign invader.

"The second condition of permanent political society has been found to be, the existence, in some form or other, of the feeling of allegiance or loyalty. This feeling may vary in its objects, and is not confined to any particular form of government; but whether in a democracy or in a monarchy, its essence is always the same; viz., that there be in the constitution of the state *something* which is settled, something permanent, and not to be called in question; something which, by general agreement, has a right to be where it is, and to be secure against disturbance, whatever else may change. This feeling may attach itself, as among the Jews (and in most of the commonwealths of antiquity), to a common God or gods, the protectors and guardians of their state. Or it may attach itself to certain persons, who are deemed to be, whether by divine appointment, by long prescription, or by the general recognition of their superior capacity and worthiness, the rightful guides and guardians of the rest. Or it may connect itself with laws; with ancient liberties or ordinances. Or, finally, (and this is the only shape in which the feeling is likely to exist hereafter), it may attach itself to the principles of individual freedom and political and social equality, as realized in institutions which as yet exist nowhere, or exist only in a

rudimentary state. But in all political societies which have had a durable existence, there has been some fixed point: something which people agreed in holding sacred; which, wherever freedom of discussion was a recognized principle, it was of course lawful to contest in theory, but which no one could either fear or hope to see shaken in practice; which, in short (except perhaps during some temporary crisis), was in the common estimation placed beyond discussion. And the necessity of this may easily be made evident. A state never is, nor until mankind are vastly improved, can hope to be, for any long time exempt from internal dissension; for there neither is nor has ever been any state of society in which collisions did not occur between the immediate interests and passions of powerful sections of the people. What, then, enables nations to weather these storms, and pass through turbulent times without any permanent weakening of the securities for peaceable existence? Precisely this—that however important the interests about which men fell out, the conflict did not [pg 639] affect the fundamental principle of the system of social union which happened to exist; nor threaten large portions of the community with the subversion of that on which they had built their calculations, and with which their hopes and aims had become identified. But when the questioning of these fundamental principles is (not the occasional disease, or salutary medicine, but) the habitual condition of the body politic, and when all the violent animosities are called forth, which spring naturally from such a situation, the state is virtually in a position of civil war; and can never long remain free from it in act and fact.

"The third essential condition of stability in political society, is a strong and active principle of cohesion among the members of the same community or state. We need scarcely say that we do not mean nationality, in the vulgar sense of the term; a senseless antipathy to foreigners; indifference to the general welfare of the human race, or an unjust preference of the supposed interests of our own country; a cherishing of bad peculiarities because they are national, or a refusal to adopt what has been found good by other countries. We mean a principle of sympathy, not of hostility; of union, not of separation. We mean a feeling of common interest among those who live under the same government, and are contained within the same natural or historical boundaries. We mean, that one part of the community do not consider themselves as foreigners with regard to another part; that they set a value on their connection—feel that they are one people, that their lot is cast together, that evil to any of their fellow-countrymen is evil to themselves, and do not desire selfishly to free themselves from their share of any common inconvenience by severing the connection. How strong this feeling was in those ancient commonwealths which attained any durable greatness, every one knows. How happily Rome, in spite of all her tyranny, succeeded in establishing the feeling of a common country among the provinces of her vast and divided empire, will appear when any one who has given due attention to the subject shall take the trouble to point it out. In modern times the countries which have had that feeling in the strongest degree have been the most powerful countries: England, France, and, in proportion to their territory and resources, Holland and Switzerland; while England in her connection with Ireland is one of the most signal examples of the consequences of its absence. Every Italian knows why Italy is under a foreign yoke; every German knows what maintains despotism in the Austrian empire;[281] the evils of Spain flow as much from the absence of nationality among the Spaniards themselves, as from the presence of it in their relations with foreigners: while the completest illustration of all is afforded by the republics of South America, where the parts of one and the same state adhere so slightly together, that no sooner does any province think itself aggrieved by the general government than it proclaims itself a separate nation."

§ 6. While the derivative laws of social statics are ascertained by analyzing different states of society, and comparing them with one another, without regard to the order of their succession, the consideration of the successive order is, on the contrary, predominant in the study of social dynamics, of which the aim is to observe and explain the sequences of social conditions. This branch of the social science would be as complete as it can be made, if every one of the leading general circumstances of each [pg 640] generation were traced to its causes in the generation immediately preceding. But the *consensus* is so complete (especially in modern history), that in the filiation of one generation and another, it is the whole which produces the whole, rather than any part a part. Little progress, therefore, can be made in establishing the filiation, directly from laws of human nature, without having first ascertained the immediate or derivative laws according to which social states generate one another as society advances; the *axiomata media* of General Sociology.

The empirical laws which are most readily obtained by generalization from history do not amount to this. They are not the "middle principles" themselves, but only evidence toward the establishment of such principles. They consist of certain general tendencies which may be perceived in society; a progressive increase of some social elements, and diminution of others, or a gradual change in the general character of certain elements. It is easily seen, for instance, that as society advances, mental tend more and more to prevail over bodily qualities, and masses over individuals; that the occupation of all that portion of mankind who are not under external restraint is at first chiefly military, but society becomes progressively more and more engrossed with productive pursuits, and the military spirit gradually gives way to the industrial; to which many similar truths might be added. And with generalizations of this description, ordinary inquirers, even of the historical school now predominant on the Continent, are satisfied. But these and all such results are still at too great a distance from the elementary laws of human nature on which they depend—too many links intervene, and the concurrence of causes at each link is far too complicated—to enable these propositions to be presented as direct corollaries from those elementary principles. They have, therefore, in the minds of most inquirers, remained in the state of empirical laws, applicable only within the bounds of actual observation; without any means of determining their real limits, and of judging whether the changes which have hitherto been in progress are destined to continue indefinitely, or to terminate, or even to be reversed.

§ 7. In order to obtain better empirical laws, we must not rest satisfied with noting the progressive changes which manifest themselves in the separate elements of society, and in which nothing is indicated but the relation of fragments of the effect to corresponding fragments of the cause. It is necessary to combine the statical view of social phenomena with the dynamical, considering not only the progressive changes of the different elements, but the contemporaneous condition of each; and thus obtain empirically the law of correspondence not only between the simultaneous states, but between the simultaneous changes, of those elements. This law of correspondence it is, which, duly verified *a priori*, would become the real scientific derivative law of the development of humanity and human affairs.

In the difficult process of observation and comparison which is here required, it would evidently be a great assistance if it should happen to be the fact, that some one element in the complex existence of social man is pre-eminent over all others as the prime agent of the social movement. For we could then take the progress of that one element as the central chain, to each successive link of which, the corresponding links of all the other progressions being appended, the succession of the facts would by this alone be presented in a kind of spontaneous order, far more nearly approaching [pg 641] to the real order of their filiation than could be obtained by any other merely empirical process.

Now, the evidence of history and that of human nature combine, by a striking instance of consilience, to show that there really is one social element which is thus predominant, and almost paramount, among the agents of the social progression. This is, the state of the speculative faculties of mankind; including the nature of the beliefs which by any means they have arrived at, concerning themselves and the world by which they are surrounded.

It would be a great error, and one very little likely to be committed, to assert that speculation, intellectual activity, the pursuit of truth, is among the more powerful propensities of human nature, or holds a predominating place in the lives of any, save decidedly exceptional, individuals. But, notwithstanding the relative weakness of this principle among other sociological agents, its influence is the main determining cause of the social progress; all the other dispositions of our nature which contribute to that progress being dependent on it for the means of accomplishing their share of the work. Thus (to take the most obvious case first), the impelling force to most of the improvements effected in the arts of life, is the desire of increased material comfort; but as we can only act upon external objects in proportion to our knowledge of them, the state of knowledge at any time is the limit of the industrial improvements possible at that time; and the progress of industry must follow, and depend on, the progress of knowledge. The same thing may be shown to be true, though it is not quite so obvious, of the progress of the fine arts. Further, as the strongest propensities of uncultivated or half-cultivated human nature (being the purely selfish ones, and those of a sympathetic character which partake most of the nature of selfishness) evidently tend in themselves to disunite mankind, not to unite them—to make them rivals, not confederates, social existence is only possible by a disciplining of those

more powerful propensities, which consists in subordinating them to a common system of opinions. The degree of this subordination is the measure of the completeness of the social union, and the nature of the common opinions determines its kind. But in order that mankind should conform their actions to any set of opinions, these opinions must exist, must be believed by them. And thus, the state of the speculative faculties, the character of the propositions assented to by the intellect, essentially determines the moral and political state of the community, as we have already seen that it determines the physical.

These conclusions, deduced from the laws of human nature, are in entire accordance with the general facts of history. Every considerable change historically known to us in the condition of any portion of mankind, when not brought about by external force, has been preceded by a change, of proportional extent, in the state of their knowledge, or in their prevalent beliefs. As between any given state of speculation, and the correlative state of every thing else, it was almost always the former which first showed itself; though the effects, no doubt, reacted potently upon the cause. Every considerable advance in material civilization has been preceded by an advance in knowledge: and when any great social change has come to pass, either in the way of gradual development or of sudden conflict, it has had for its precursor a great change in the opinions and modes of thinking of society. Polytheism, Judaism, Christianity, Protestantism, the critical philosophy of modern Europe, and its positive science—each of these has [pg 642] been a primary agent in making society what it was at each successive period, while society was but secondarily instrumental in making *them*, each of them (so far as causes can be assigned for its existence) being mainly an emanation not from the practical life of the period, but from the previous state of belief and thought. The weakness of the speculative propensity in mankind generally has not, therefore, prevented the progress of speculation from governing that of society at large; it has only, and too often, prevented progress altogether, where the intellectual progression has come to an early stand for want of sufficiently favorable circumstances.

From this accumulated evidence, we are justified in concluding, that the order of human progression in all respects will mainly depend on the order of progression in the intellectual convictions of mankind, that is, on the law of the successive transformations of human opinions. The question remains, whether this law can be determined; at first from history as an empirical law, then converted into a scientific theorem by deducing it *a priori* from the principles of human nature. As the progress of knowledge and the changes in the opinions of mankind are very slow, and manifest themselves in a well-defined manner only at long intervals, it can not be expected that the general order of sequence should be discoverable from the examination of less than a very considerable part of the duration of the social progress. It is necessary to take into consideration the whole of past time, from the first recorded condition of the human race, to the memorable phenomena of the last and present generations.

§ 8. The investigation which I have thus endeavored to characterize, has been systematically attempted, up to the present time, by M. Comte alone. His work is hitherto the only known example of the study of social phenomena according to this conception of the Historical Method. Without discussing here the worth of his conclusions, and especially of his predictions and recommendations with respect to the Future of society, which appear to me greatly inferior in value to his appreciation of the Past, I shall confine myself to mentioning one important generalization, which M. Comte regards as the fundamental law of the progress of human knowledge. Speculation he conceives to have, on every subject of human inquiry, three successive stages; in the first of which it tends to explain the phenomena by supernatural agencies, in the second by metaphysical abstractions, and in the third or final state confines itself to ascertaining their laws of succession and similitude. This generalization appears to me to have that high degree of scientific evidence which is derived from the concurrence of the indications of history with the probabilities derived from the constitution of the human mind. Nor could it be easily conceived, from the mere enunciation of such a proposition, what a flood of light it lets in upon the whole course of history, when its consequences are traced, by connecting with each of the three states of human intellect which it distinguishes, and with each successive modification of those three states, the correlative condition of other social phenomena.[282]

[pg 643]
But whatever decision competent judges may pronounce on the results arrived at by any individual inquirer, the method now characterized is that by which the derivative laws of social order and of social progress must be sought. By its aid we may hereafter succeed not only in

looking far forward into the future history of the human race, but in determining what artificial means may be used, and to what extent, to accelerate the natural progress in so far as it is beneficial; to compensate for whatever may be its inherent inconveniences or disadvantages; and to guard against the dangers or accidents to which our species is exposed from the necessary incidents of its progression. Such practical instructions, founded on the highest branch of speculative sociology, will form the noblest and most beneficial portion of the Political Art.

That of this science and art even the foundations are but beginning to be laid, is sufficiently evident. But the superior minds are fairly turning themselves toward that object. It has become the aim of really scientific thinkers to connect by theories the facts of universal history: it is acknowledged to be one of the requisites of a general system of social doctrine, that it should explain, so far as the data exist, the main facts of history; and a Philosophy of History is generally admitted to be at once the verification, and the initial form, of the Philosophy of the Progress of Society.

If the endeavors now making in all the more cultivated nations, and beginning to be made even in England (usually the last to enter into the general movement of the European mind) for the construction of a Philosophy of History, shall be directed and controlled by those views of the nature of sociological evidence which I have (very briefly and imperfectly) attempted to characterize; they can not fail to give birth to a sociological system widely removed from the vague and conjectural character of all former attempts, and worthy to take its place, at last, among the sciences. When this time shall come, no important branch of human affairs will be any longer abandoned to empiricism and unscientific surmise: the circle of human knowledge will be complete, and it can only thereafter receive further enlargement by perpetual expansion from within.

[pg 644]

Chapter XI.

Additional Elucidations Of The Science Of History.

§ 1. The doctrine which the preceding chapters were intended to enforce and elucidate—that the collective series of social phenomena, in other words the course of history, is subject to general laws, which philosophy may possibly detect—has been familiar for generations to the scientific thinkers of the Continent, and has for the last quarter of a century passed out of their peculiar domain, into that of newspapers and ordinary political discussion. In our own country, however, at the time of the first publication of this Treatise, it was almost a novelty, and the prevailing habits of thought on historical subjects were the very reverse of a preparation for it. Since then a great change has taken place, and has been eminently promoted by the important work of Mr. Buckle; who, with characteristic energy, flung down this great principle, together with many striking exemplifications of it, into the arena of popular discussion, to be fought over by a sort of combatants, in the presence of a sort of spectators, who would never even have been aware that there existed such a principle if they had been left to learn its existence from the speculations of pure science. And hence has arisen a considerable amount of controversy, tending not only to make the principle rapidly familiar to the majority of cultivated minds, but also to clear it from the confusions and misunderstandings by which it was but natural that it should for a time be clouded, and which impair the worth of the doctrine to those who accept it, and are the stumbling-block of many who do not.

Among the impediments to the general acknowledgment, by thoughtful minds, of the subjection of historical facts to scientific laws, the most fundamental continues to be that which is grounded

on the doctrine of Free Will, or, in other words, on the denial that the law of invariable Causation holds true of human volitions; for if it does not, the course of history, being the result of human volitions, can not be a subject of scientific laws, since the volitions on which it depends can neither be foreseen, nor reduced to any canon of regularity even after they have occurred. I have discussed this question, as far as seemed suitable to the occasion, in a former chapter; and I only think it necessary to repeat, that the doctrine of the Causation of human actions, improperly called the doctrine of Necessity, affirms no mysterious *nexus*, or overruling fatality: it asserts only that men's actions are the joint result of the general laws and circumstances of human nature, and of their own particular characters; those characters again being the consequence of the natural and artificial circumstances that constituted their education, among which circumstances must be reckoned their own conscious efforts. Any one who is willing to take (if the expression may be permitted) the trouble of thinking himself into the doctrine as thus stated, will find it, I believe, not only a faithful interpretation of the universal experience of human conduct, but a correct representation of the mode in which he himself, in every particular case, spontaneously interprets his own experience of that conduct.

But if this principle is true of individual man, it must be true of collective [pg 645] man. If it is the law of human life, the law must be realized in history. The experience of human affairs when looked at *en masse*, must be in accordance with it if true, or repugnant to it if false. The support which this *a posteriori* verification affords to the law, is the part of the case which has been most clearly and triumphantly brought out by Mr. Buckle.

The facts of statistics, since they have been made a subject of careful recordation and study, have yielded conclusions, some of which have been very startling to persons not accustomed to regard moral actions as subject to uniform laws. The very events which in their own nature appear most capricious and uncertain, and which in any individual case no attainable degree of knowledge would enable us to foresee, occur, when considerable numbers are taken into the account, with a degree of regularity approaching to mathematical. What act is there which all would consider as more completely dependent on individual character, and on the exercise of individual free will, than that of slaying a fellow-creature? Yet in any large country, the number of murders, in proportion to the population, varies (it has been found) very little from one year to another, and in its variations never deviates widely from a certain average. What is still more remarkable, there is a similar approach to constancy in the proportion of these murders annually committed with every particular kind of instrument. There is a like approximation to identity, as between one year and another, in the comparative number of legitimate and of illegitimate births. The same thing is found true of suicides, accidents, and all other social phenomena of which the registration is sufficiently perfect; one of the most curiously illustrative examples being the fact, ascertained by the registers of the London and Paris post-offices, that the number of letters posted which the writers have forgotten to direct, is nearly the same, in proportion to the whole number of letters posted, in one year as in another. "Year after year," says Mr. Buckle, "the same proportion of letter-writers forget this simple act; so that for each successive period we can actually foretell the number of persons whose memory will fail them in regard to this trifling, and as it might appear, accidental occurrence."[283]

This singular degree of regularity *en masse*, combined with the extreme of irregularity in the cases composing the mass, is a felicitous verification *a posteriori* of the law of causation in its application to human conduct. Assuming the truth of that law, every human action, every murder, for instance, is the concurrent result of two sets of causes. On the one part, the general circumstances of the country and its inhabitants; the moral, educational, economical, and other influences operating on the whole people, and constituting what we term the state of civilization. On the other part, the great variety of influences special to the individual: his temperament, and other peculiarities of organization, his parentage, habitual associates, temptations, and so forth. If we now take the whole of the instances which occur within a sufficiently large field to exhaust all the combinations of these special influences, or, in other words, to eliminate chance; and if all these instances have occurred within such narrow limits of time, that no material change can have taken place in the general influences constituting the state of civilization of the country; we may be certain, that if human actions are governed by invariable laws, the aggregate result will be something like a constant quantity. The number of murders committed within that space and time, being the effect partly of general causes which have not varied, [pg 646] and partly of partial causes the whole round of whose variations has been included, will be, practically speaking, invariable.

Literally and mathematically invariable it is not, and could not be expected to be: because the period of a year is too short to include *all* the possible combinations of partial causes, while it is, at the same time, sufficiently long to make it probable that in some years at least, of every series, there will have been introduced new influences of a more or less general character; such as a more vigorous or a more relaxed police; some temporary excitement from political or religious causes; or some incident generally notorious, of a nature to act morbidly on the imagination. That in spite of these unavoidable imperfections in the data, there should be so very trifling a margin of variation in the annual results, is a brilliant continuation of the general theory.

§ 2. The same considerations which thus strikingly corroborate the evidence of the doctrine, that historical facts are the invariable effects of causes, tend equally to clear that doctrine from various misapprehensions, the existence of which has been put in evidence by the recent discussions. Some persons, for instance, seemingly imagine the doctrine to imply, not merely that the total number of murders committed in a given space and time is entirely the effect of the general circumstances of society, but that every particular murder is so too—that the individual murderer is, so to speak, a mere instrument in the hands of general causes that he himself has no option, or, if he has, and chose to exercise it, some one else would be necessitated to take his place; that if any one of the actual murderers had abstained from the crime, some person who would otherwise have remained innocent, would have committed an extra murder to make up the average. Such a corollary would certainly convict any theory which necessarily led to it of absurdity. It is obvious, however, that each particular murder depends, not on the general state of society only, but on that combined with causes special to the case, which are generally much more powerful; and if these special causes, which have greater influence than the general ones in causing every particular murder, have no influence on the number of murders in a given period, it is because the field of observation is so extensive as to include all possible combinations of the special causes—all varieties of individual character and individual temptation compatible with the general state of society. The collective experiment, as it may be termed, exactly separates the effect of the general from that of the special causes, and shows the net result of the former; but it declares nothing at all respecting the amount of influence of the special causes, be it greater or smaller, since the scale of the experiment extends to the number of cases within which the effects of the special causes balance one another, and disappear in that of the general causes.

I will not pretend that all the defenders of the theory have always kept their language free from this same confusion, and have shown no tendency to exalt the influence of general causes at the expense of special. I am of opinion, on the contrary, that they have done so in a very great degree, and by so doing have encumbered their theory with difficulties, and laid it open to objections, which do not necessarily affect it. Some, for example (among whom is Mr. Buckle himself), have inferred, or allowed it to be supposed that they inferred, from the regularity in the recurrence of events which depend on moral qualities, that the moral qualities of mankind are little capable of being improved, or are of little importance in the general [pg 647] progress of society, compared with intellectual or economic causes. But to draw this inference is to forget that the statistical tables, from which the invariable averages are deduced, were compiled from facts occurring within narrow geographical limits and in a small number of successive years; that is, from a field the whole of which was under the operation of the same general causes, and during too short a time to allow of much change therein. All moral causes but those common to the country generally, have been eliminated by the great number of instances taken; and those which are common to the whole country have not varied considerably, in the short space of time comprised in the observations. If we admit the supposition that they have varied; if we compare one age with another, or one country with another, or even one part of a country with another, differing in position and character as to the moral elements, the crimes committed within a year give no longer the same, but a widely different numerical aggregate. And this can not but be the case: for, inasmuch as every single crime committed by an individual mainly depends on his moral qualities, the crimes committed by the entire population of the country must depend in an equal degree on their collective moral qualities. To render this element inoperative upon the large scale, it would be necessary to suppose that the general moral average of mankind does not vary from country to country or from age to age; which is not true, and, even if it were true, could not possibly be proved by any existing statistics. I do not on this account the less agree in the opinion of Mr. Buckle, that the intellectual element in mankind, including in that expression the nature of their beliefs, the amount of their knowledge, and the development of their intelligence, is the predominant circumstance in determining their progress. But I am of this opinion, not because I regard their moral or economical condition either as less powerful or less

variable agencies, but because these are in a great degree the consequences of the intellectual condition, and are, in all cases, limited by it; as was observed in the preceding chapter. The intellectual changes are the most conspicuous agents in history, not from their superior force, considered in themselves, but because practically they work with the united power belonging to all three.[284]

§ 3. There is another distinction often neglected in the discussion of this subject, which it is extremely important to observe. The theory of the [pg 648] subjection of social progress to invariable laws, is often held in conjunction with the doctrine, that social progress can not be materially influenced by the exertions of individual persons, or by the acts of governments. But though these opinions are often held by the same persons, they are two very different opinions, and the confusion between them is the eternally recurring error of confounding Causation with Fatalism. Because whatever happens will be the effect of causes, human volitions among the rest, it does not follow that volitions, even those of peculiar individuals, are not of great efficacy as causes. If any one in a storm at sea, because about the same number of persons in every year perish by shipwreck, should conclude that it was useless for him to attempt to save his own life, we should call him a Fatalist; and should remind him that the efforts of shipwrecked persons to save their lives are so far from being immaterial, that the average amount of those efforts is one of the causes on which the ascertained annual number of deaths by shipwreck depend. However universal the laws of social development may be, they can not be more universal or more rigorous than those of the physical agencies of nature; yet human will can convert these into instruments of its designs, and the extent to which it does so makes the chief difference between savages and the most highly civilized people. Human and social facts, from their more complicated nature, are not less, but more, modifiable than mechanical and chemical facts; human agency, therefore, has still greater power over them. And accordingly, those who maintain that the evolution of society depends exclusively, or almost exclusively, on general causes, always include among these the collective knowledge and intellectual development of the race. But if of the race, why not also of some powerful monarch or thinker, or of the ruling portion of some political society, acting through its government? Though the varieties of character among ordinary individuals neutralize one another on any large scale, exceptional individuals in important positions do not in any given age neutralize one another; there was not another Themistocles, or Luther, or Julius Cæsar, of equal powers and contrary dispositions, who exactly balanced the given Themistocles, Luther, and Cæsar, and prevented them from having any permanent effect. Moreover, for aught that appears, the volitions of exceptional persons, or the opinions and purposes of the individuals who at some particular time compose a government, may be indispensable links in the chain of causation by which even the general causes produce their effects; and I believe this to be the only tenable form of the theory.

Lord Macaulay, in a celebrated passage of one of his early essays (let me add that it was one which he did not himself choose to reprint), gives expression to the doctrine of the absolute inoperativeness of great men, more unqualified, I should think, than has been given to it by any writer of equal abilities. He compares them to persons who merely stand on a loftier height, and thence receive the sun's rays a little earlier, than the rest of the human race. "The sun illuminates the hills while it is still below the horizon, and truth is discovered by the highest minds a little before it becomes manifest to the multitude. This is the extent of their superiority. They are the first to catch and reflect a light which, without their assistance, must in a short time be visible to those who lie far beneath them."[285] If this metaphor is to be carried out, it follows that if there had been no Newton, the world would not only have had the Newtonian [pg 649] system, but would have had it equally soon; as the sun would have risen just as early to spectators in the plain if there had been no mountain at hand to catch still earlier rays. And so it would be, if truths, like the sun, rose by their own proper motion, without human effort; but not otherwise. I believe that if Newton had not lived, the world must have waited for the Newtonian philosophy until there had been another Newton, or his equivalent. No ordinary man, and no succession of ordinary men, could have achieved it. I will not go the length of saying that what Newton did in a single life, might not have been done in successive steps by some of those who followed him, each singly inferior to him in genius. But even the least of those steps required a man of great intellectual superiority. Eminent men do not merely see the coming light from the hill-top, they mount on the hill-top and evoke it; and if no one had ever ascended thither, the light, in many cases, might never have risen upon the plain at all. Philosophy and religion are abundantly amenable to general causes; yet few will doubt that, had there been no Socrates, no Plato, and no Aristotle, there would have been no philosophy for the next two thousand years, nor in all

probability then; and that if there had been no Christ, and no St. Paul, there would have been no Christianity.

The point in which, above all, the influence of remarkable individuals is decisive, is in determining the celerity of the movement. In most states of society it is the existence of great men which decides even whether there shall be any progress. It is conceivable that Greece, or that Christian Europe, might have been progressive in certain periods of their history through general causes only: but if there had been no Mohammed, would Arabia have produced Avicenna or Averroes, or Caliphs of Bagdad or of Cordova? In determining, however, in what manner and order the progress of mankind shall take place if it take place at all, much less depends on the character of individuals. There is a sort of necessity established in this respect by the general laws of human nature—by the constitution of the human mind. Certain truths can not be discovered, nor inventions made, unless certain others have been made first; certain social improvements, from the nature of the case, can only follow, and not precede, others. The order of human progress, therefore, may to a certain extent have definite laws assigned to it: while as to its celerity, or even as to its taking place at all, no generalization, extending to the human species generally, can possibly be made; but only some very precarious approximate generalizations, confined to the small portion of mankind in whom there has been any thing like consecutive progress within the historical period, and deduced from their special position, or collected from their particular history. Even looking to the *manner* of progress, the order of succession of social states, there is need of great flexibility in our generalizations. The limits of variation in the possible development of social, as of animal life, are a subject of which little is yet understood, and are one of the great problems in social science. It is, at all events, a fact, that different portions of mankind, under the influence of different circumstances, have developed themselves in a more or less different manner and into different forms; and among these determining circumstances, the individual character of their great speculative thinkers or practical organizers may well have been one. Who can tell how profoundly the whole subsequent history of China may have been influenced by the individuality of Confucius? and of Sparta (and hence of Greece and the world) by that of Lycurgus?

Concerning the nature and extent of what a great man under favorable [pg 650] circumstances can do for mankind, as well as of what a government can do for a nation, many different opinions are possible; and every shade of opinion on these points is consistent with the fullest recognition that there are invariable laws of historical phenomena. Of course the degree of influence which has to be assigned to these more special agencies, makes a great difference in the precision which can be given to the general laws, and in the confidence with which predictions can be grounded on them. Whatever depends on the peculiarities of individuals, combined with the accident of the positions they hold, is necessarily incapable of being foreseen. Undoubtedly these casual combinations might be eliminated like any others, by taking a sufficiently large cycle: the peculiarities of a great historical character make their influence felt in history sometimes for several thousand years, but it is highly probable that they will make no difference at all at the end of fifty millions. Since, however, we can not obtain an average of the vast length of time necessary to exhaust all the possible combinations of great men and circumstances, as much of the law of evolution of human affairs as depends upon this average, is and remains inaccessible to us; and within the next thousand years, which are of considerably more importance to us than the whole remainder of the fifty millions, the favorable and unfavorable combinations which will occur will be to us purely accidental. We can not foresee the advent of great men. Those who introduce new speculative thoughts or great practical conceptions into the world, can not have their epoch fixed beforehand. What science can do, is this. It can trace through past history the general causes which had brought mankind into that preliminary state which, when the right sort of great man appeared, rendered them accessible to his influence. If this state continues, experience renders it tolerably certain that in a longer or shorter period the great man will be produced; provided that the general circumstances of the country and people are (which very often they are not) compatible with his existence; of which point also, science can in some measure judge. It is in this manner that the results of progress, except as to the celerity of their production, can be, to a certain extent, reduced to regularity and law. And the belief that they can be so, is equally consistent with assigning very great, or very little efficacy, to the influence of exceptional men, or of the acts of governments. And the same may be said of all other accidents and disturbing causes.

§ 4. It would nevertheless be a great error to assign only a trifling importance to the agency of eminent individuals, or of governments. It must not be concluded that the influence of either is small, because they can not bestow what the general circumstances of society, and the course of its previous history, have not prepared it to receive. Neither thinkers nor governments effect all that they intend, but in compensation they often produce important results which they did not in the least foresee. Great men, and great actions, are seldom wasted; they send forth a thousand unseen influences, more effective than those which are seen; and though nine out of every ten things done, with a good purpose, by those who are in advance of their age, produce no material effect, the tenth thing produces effects twenty times as great as any one would have dreamed of predicting from it. Even the men who for want of sufficiently favorable circumstances left no impress at all upon their own age, have often been of the greatest value to posterity. Who could appear to have lived more entirely in vain than some of the early heretics? They were burned or massacred, [pg 651] their writings extirpated, their memory anathematized, and their very names and existence left for seven or eight centuries in the obscurity of musty manuscripts—their history to be gathered, perhaps, only from the sentences by which they were condemned. Yet the memory of these men—men who resisted certain pretensions or certain dogmas of the Church in the very age in which the unanimous assent of Christendom was afterward claimed as having been given to them, and asserted as the ground of their authority—broke the chain of tradition, established a series of precedents for resistance, inspired later Reformers with the courage, and armed them with the weapons, which they needed when mankind were better prepared to follow their impulse. To this example from men, let us add another from governments. The comparatively enlightened rule of which Spain had the benefit during a considerable part of the eighteenth century, did not correct the fundamental defects of the Spanish people; and in consequence, though it did great temporary good, so much of that good perished with it, that it may plausibly be affirmed to have had no permanent effect. The case has been cited as a proof how little governments can do in opposition to the causes which have determined the general character of the nation. It does show how much there is which they can not do; but not that they can do nothing. Compare what Spain was at the beginning of that half-century of liberal government, with what she had become at its close. That period fairly let in the light of European thought upon the more educated classes; and it never afterward ceased to go on spreading. Previous to that time the change was in an inverse direction; culture, light, intellectual and even material activity, were becoming extinguished. Was it nothing to arrest this downward and convert it into an upward course? How much that Charles the Third and Aranda could not do, has been the ultimate consequence of what they did! To that half-century Spain owes that she has got rid of the Inquisition, that she has got rid of the monks, that she now has parliaments and (save in exceptional intervals) a free press, and the feelings of freedom and citizenship, and is acquiring railroads and all the other constituents of material and economical progress. In the Spain which preceded that era, there was not a single element at work which could have led to these results in any length of time, if the country had continued to be governed as it was by the last princes of the Austrian dynasty, or if the Bourbon rulers had been from the first what, both in Spain and in Naples, they afterward became.

And if a government can do much, even when it seems to have done little, in causing positive improvement, still greater are the issues dependent on it in the way of warding off evils, both internal and external, which else would stop improvement altogether. A good or a bad counselor, in a single city at a particular crisis, has affected the whole subsequent fate of the world. It is as certain as any contingent judgment respecting historical events can be, that if there had been no Themistocles there would have been no victory of Salamis; and had there not, where would have been all our civilization? How different, again, would have been the issue if Epaminondas, or Timoleon, or even Iphicrates, instead of Chares and Lysicles, had commanded at Chæroneia. As is well said in the second of two Essays on the Study of History,[286] in my judgment the soundest and most philosophical productions which the recent controversies on this subject [pg 652] have called forth, historical science authorizes not absolute, but only conditional predictions. General causes count for much, but individuals also “produce great changes in history, and color its whole complexion long after their death.... No one can doubt that the Roman republic would have subsided into a military despotism if Julius Cæsar had never lived” (thus much was rendered practically certain by general causes); “but is it at all clear that in that case Gaul would ever have formed a province of the empire? Might not Varus have lost his three legions on the banks of the Rhone? and might not that river have become the frontier instead of the Rhine? This might well have happened if Cæsar and Crassus had changed provinces; and it is surely impossible to say that in such an event the venue (as lawyers say) of European civilization might

not have been changed. The Norman Conquest in the same way was as much the act of a single man, as the writing of a newspaper article; and knowing as we do the history of that man and his family, we can retrospectively predict with all but infallible certainty, that no other person" (no other in that age, I presume, is meant) "could have accomplished the enterprise. If it had not been accomplished, is there any ground to suppose that either our history or our national character would have been what they are?"

As is most truly remarked by the same writer, the whole stream of Grecian history, as cleared up by Mr. Grote, is one series of examples how often events on which the whole destiny of subsequent civilization turned, were dependent on the personal character for good or evil of some one individual. It must be said, however, that Greece furnishes the most extreme example of this nature to be found in history, and is a very exaggerated specimen of the general tendency. It has happened only that once, and will probably never happen again, that the fortunes of mankind depended upon keeping a certain order of things in existence in a single town, or a country scarcely larger than Yorkshire; capable of being ruined or saved by a hundred causes, of very slight magnitude in comparison with the general tendencies of human affairs. Neither ordinary accidents, nor the characters of individuals, can ever again be so vitally important as they then were. The longer our species lasts, and the more civilized it becomes, the more, as Comte remarks, does the influence of past generations over the present, and of mankind *en masse* over every individual in it, predominate over other forces; and though the course of affairs never ceases to be susceptible of alteration both by accidents and by personal qualities, the increasing preponderance of the collective agency of the species over all minor causes, is constantly bringing the general evolution of the race into something which deviates less from a certain and preappointed track. Historical science, therefore, is always becoming more possible; not solely because it is better studied, but because, in every generation, it becomes better adapted for study.

Chapter XII.

Of The Logic Of Practice, Or Art; Including Morality And Policy.

§ 1. In the preceding chapters we have endeavored to characterize the present state of those among the branches of knowledge called Moral, which are sciences in the only proper sense of the term, that is, inquiries into the course of nature. It is customary, however, to include under the term [pg 653] moral knowledge, and even (though improperly) under that of moral science, an inquiry the results of which do not express themselves in the indicative, but in the imperative mood, or in periphrases equivalent to it; what is called the knowledge of duties; practical ethics, or morality.

Now, the imperative mood is the characteristic of art, as distinguished from science. Whatever speaks in rules, or precepts, not in assertions respecting matters of fact, is art; and ethics, or morality, is properly a portion of the art corresponding to the sciences of human nature and society.[287]

The Method, therefore, of Ethics, can be no other than that of Art, or Practice, in general; and the portion yet uncompleted of the task which we proposed to ourselves in the concluding Book, is to characterize the general Method of Art, as distinguished from Science.

§ 2. In all branches of practical business there are cases in which individuals are bound to conform their practice to a pre-established rule, while there are others in which it is part of their task to find or construct the rule by which they are to govern their conduct. The first, for example, is the case of a judge, under a definite written code. The judge is not called upon to determine what course would be intrinsically the most advisable in the particular case in hand, but only within what rule of law it falls; what the legislature has ordained to be done in the kind of case, and must therefore be presumed to have intended in the individual case. The method

must here be wholly and exclusively one of ratiocination, or syllogism; and the process is obviously, what in our analysis of the syllogism we showed that all ratiocination is, namely the interpretation of a formula.

In order that our illustration of the opposite case may be taken from the same class of subjects as the former, we will suppose, in contrast with the situation of the judge, the position of the legislator. As the judge has laws for his guidance, so the legislator has rules, and maxims of policy; but it would be a manifest error to suppose that the legislator is bound by these maxims in the same manner as the judge is bound by the laws, and that all he has to do is to argue down from them to the particular case, as the judge does from the laws. The legislator is bound to take into consideration the reasons or grounds of the maxim; the judge has nothing to do with those of the law, except so far as a consideration of them may throw light upon the intention of the law-maker, where his words have left it doubtful. To the judge, the rule, once positively ascertained, is final; but the legislator, or other practitioner, who goes by rules rather than by their reasons, like the old-fashioned German tacticians who were vanquished by Napoleon, or the physician who preferred that his patients should die by rule rather than recover contrary to it, is rightly judged to be a mere pedant, and the slave of his formulas.

Now, the reasons of a maxim of policy, or of any other rule of art, can be no other than the theorems of the corresponding science.

The relation in which rules of art stand to doctrines of science may be thus characterized. The art proposes to itself an end to be attained, defines the end, and hands it over to the science. The science receives it, considers it as a phenomenon or effect to be studied, and having investigated its causes and conditions, sends it back to art with a theorem of the combination [pg 654] of circumstances by which it could be produced. Art then examines these combinations of circumstances, and according as any of them are or are not in human power, pronounces the end attainable or not. The only one of the premises, therefore, which Art supplies, is the original major premise, which asserts that the attainment of the given end is desirable. Science then lends to Art the proposition (obtained by a series of inductions or of deductions) that the performance of certain actions will attain the end. From these premises Art concludes that the performance of these actions is desirable, and finding it also practicable, converts the theorem into a rule or precept.

§ 3. It deserves particular notice, that the theorem or speculative truth is not ripe for being turned into a precept, until the whole, and not a part merely, of the operation which belongs to science, has been performed. Suppose that we have completed the scientific process only up to a certain point; have discovered that a particular cause will produce the desired effect, but have not ascertained all the negative conditions which are necessary, that is, all the circumstances which, if present, would prevent its production. If, in this imperfect state of the scientific theory, we attempt to frame a rule of art, we perform that operation prematurely. Whenever any counteracting cause, overlooked by the theorem, takes place, the rule will be at fault; we shall employ the means and the end will not follow. No arguing from or about the rule itself will then help us through the difficulty; there is nothing for it but to turn back and finish the scientific process which should have preceded the formation of the rule. We must re-open the investigation to inquire into the remainder of the conditions on which the effect depends; and only after we have ascertained the whole of these are we prepared to transform the completed law of the effect into a precept, in which those circumstances or combinations of circumstances which the science exhibits as conditions are prescribed as means.

It is true that, for the sake of convenience, rules must be formed from something less than this ideally perfect theory: in the first place, because the theory can seldom be made ideally perfect; and next, because, if all the counteracting contingencies, whether of frequent or of rare occurrence, were included, the rules would be too cumbrous to be apprehended and remembered by ordinary capacities, on the common occasions of life. The rules of art do not attempt to comprise more conditions than require to be attended to in ordinary cases; and are therefore always imperfect. In the manual arts, where the requisite conditions are not numerous, and where those which the rules do not specify are generally either plain to common observation or speedily learned from practice, rules may often be safely acted on by persons who know nothing more than the rule. But in the complicated affairs of life, and still more in those of states and societies, rules can not be relied on, without constantly referring back to the scientific laws on

which they are founded. To know what are the practical contingencies which require a modification of the rule, or which are altogether exceptions to it, is to know what combinations of circumstances would interfere with, or entirely counteract, the consequences of those laws; and this can only be learned by a reference to the theoretic grounds of the rule.

By a wise practitioner, therefore, rules of conduct will only be considered as provisional. Being made for the most numerous cases, or for those of most ordinary occurrence, they point out the manner in which it will be least perilous to act, where time or means do not exist for analyzing the [pg 655] actual circumstances of the case, or where we can not trust our judgment in estimating them. But they do not at all supersede the propriety of going through, when circumstances permit, the scientific process requisite for framing a rule from the data of the particular case before us. At the same time, the common rule may very properly serve as an admonition that a certain mode of action has been found by ourselves and others to be well adapted to the cases of most common occurrence; so that if it be unsuitable to the case in hand, the reason of its being so will be likely to arise from some unusual circumstance.

§ 4. The error is therefore apparent of those who would deduce the line of conduct proper to particular cases from supposed universal practical maxims, overlooking the necessity of constantly referring back to the principles of the speculative science, in order to be sure of attaining even the specific end which the rules have in view. How much greater still, then, must the error be, of setting up such unbending principles, not merely as universal rules for attaining a given end, but as rules of conduct generally, without regard to the possibility, not only that some modifying cause may prevent the attainment of the given end by the means which the rule prescribes, but that success itself may conflict with some other end, which may possibly chance to be more desirable.

This is the habitual error of many of the political speculators whom I have characterized as the geometrical school; especially in France, where ratiocination from rules of practice forms the staple commodity of journalism and political oratory—a misapprehension of the functions of Deduction which has brought much discredit, in the estimation of other countries, upon the spirit of generalization so honorably characteristic of the French mind. The commonplaces of politics in France are large and sweeping practical maxims, from which, as ultimate premises, men reason downward to particular applications; and this they call being logical and consistent. For instance, they are perpetually arguing that such and such a measure ought to be adopted, because it is a consequence of the principle on which the form of government is founded; of the principle of legitimacy, or the principle of the sovereignty of the people. To which it may be answered, that if these be really practical principles, they must rest on speculative grounds; the sovereignty of the people, for example, must be a right foundation for government, because a government thus constituted tends to produce certain beneficial effects. Inasmuch, however, as no government produces all possible beneficial effects, but all are attended with more or fewer inconveniences, and since these can not usually be combated by means drawn from the very causes which produce them, it would be often a much stronger recommendation of some practical arrangement, that it does not follow from what is called the general principle of the government, than that it does. Under a government of legitimacy, the presumption is far rather in favor of institutions of popular origin; and in a democracy, in favor of arrangements tending to check the impetus of popular will. The line of augmentation so commonly mistaken in France for political philosophy, tends to the practical conclusion that we should exert our utmost efforts to aggravate, instead of alleviating, whatever are the characteristic imperfections of the system of institutions which we prefer, or under which we happen to live.

§ 5. The grounds, then, of every rule of art, are to be found in the theorems [pg 656] of science. An art, or a body of art, consists of the rules, together with as much of the speculative propositions as comprises the justification of those rules. The complete art of any matter includes a selection of such a portion from the science as is necessary to show on what conditions the effects, which the art aims at producing, depend. And Art in general, consists of the truths of Science, arranged in the most convenient order for practice, instead of the order which is the most convenient for thought. Science groups and arranges its truths, so as to enable us to take in at one view as much as possible of the general order of the universe. Art, though it must assume the same general laws, follows them only into such of their detailed consequences as have led to the formation of rules of conduct; and brings together from parts of the field of science most remote from one another, the truths relating to the production of the different and

heterogeneous conditions necessary to each effect which the exigencies of practical life require to be produced.[288]

Science, therefore, following one cause to its various effects, while art traces one effect to its multiplied and diversified causes and conditions, there is need of a set of intermediate scientific truths, derived from the higher generalities of science, and destined to serve as the generalia or first principles of the various arts. The scientific operation of framing these intermediate principles, M. Comte characterizes as one of those results of philosophy which are reserved for futurity. The only complete example which he points out as actually realized, and which can be held up as a type to be imitated in more important matters, is the general theory of the art of Descriptive Geometry, as conceived by M. Monge. It is not, however, difficult to understand what the nature of these intermediate principles must generally be. After framing the most comprehensive possible conception of the end to be aimed at, that is, of the effect to be produced, and determining in the same comprehensive manner the set of conditions on which that effect depends, there remains to be taken, a general survey of the resources which can be commanded for realizing this set of conditions; and when the result of this survey has been embodied in the fewest and most extensive propositions possible, those propositions will express the general relation between the available means and the end, and will constitute the general scientific theory of the art, from which its practical methods will follow as corollaries.

§ 6. But though the reasonings which connect the end or purpose of every art with its means belong to the domain of Science, the definition of the end itself belongs exclusively to Art, and forms its peculiar province. Every art has one first principle, or general major premise, not borrowed from science; that which enunciates the object aimed at, and affirms it to be a desirable object. The builder's art assumes that it is desirable to have buildings; architecture, as one of the fine arts, that it is desirable to have them beautiful or imposing. The hygienic and medical arts assume, the one that the preservation of health, the other that the cure of disease, are fitting and desirable ends. These are not propositions of science. Propositions of science assert a matter of fact: an existence, a co-existence, a succession, or a resemblance. The propositions now spoken of do not assert that any thing is, but enjoin or recommend that something should be. They are a class by themselves. A proposition of which the [pg 657] predicate is expressed by the words *ought* or *should be*, is generically different from one which is expressed by *is*, or *will be*. It is true, that in the largest sense of the words, even these propositions assert something as a matter of fact. The fact affirmed in them is, that the conduct recommended excites in the speaker's mind the feeling of approbation. This, however, does not go to the bottom of the matter; for the speaker's approbation is no sufficient reason why other people should approve; nor ought it to be a conclusive reason even with himself. For the purposes of practice, every one must be required to justify his approbation; and for this there is need of general premises, determining what are the proper objects of approbation, and what the proper order of precedence among those objects.

These general premises, together with the principal conclusions which may be deduced from them, form (or rather might form) a body of doctrine, which is properly the Art of Life, in its three departments, Morality, Prudence or Policy, and Æsthetics; the Right, the Expedient, and the Beautiful or Noble, in human conduct and works. To this art (which, in the main, is unfortunately still to be created), all other arts are subordinate; since its principles are those which must determine whether the special aim of any particular art is worthy and desirable, and what is its place in the scale of desirable things. Every art is thus a joint result of laws of nature disclosed by science, and of the general principles of what has been called Teleology, or the Doctrine of Ends;[289] which, borrowing the language of the German metaphysicians, may also be termed, not improperly, the principles of Practical Reason.

A scientific observer or reasoner, merely as such, is not an adviser for practice. His part is only to show that certain consequences follow from certain causes, and that to obtain certain ends, certain means are the most effectual. Whether the ends themselves are such as ought to be pursued, and if so, in what cases and to how great a length, it is no part of his business as a cultivator of science to decide, and science alone will never qualify him for the decision. In purely physical science, there is not much temptation to assume this ulterior office; but those who treat of human nature and society invariably claim it: they always undertake to say, not merely what is, but what ought to be. To entitle them to do this, a complete doctrine of Teleology is indispensable. A scientific theory, however perfect, of the subject-matter, considered merely as

part of the order of nature, can in no degree serve as a substitute. In this respect the various subordinate arts afford a misleading analogy. In them there is seldom any visible necessity for justifying the end, since in general its desirableness is denied by nobody, and it is only when the question of precedence is to be decided between that end and some other, that the general principles of Teleology have to be called in; but a writer on Morals and Politics requires those principles at every step. The most elaborate and well-digested exposition of the laws of succession and co-existence among mental or social phenomena, and of their relation to one another as causes and effects, will be of no avail toward the art of Life or of Society, if the ends to be aimed at by that art are left to the vague suggestions of the *intellectus sibi permissus*, or are taken for granted without analysis or questioning.

§ 7. There is, then, a *philosophia prima* peculiar to Art, as there is one which belongs to Science. There are not only first principles of Knowledge, [pg 658] but first principles of Conduct. There must be some standard by which to determine the goodness or badness, absolute and comparative, of ends, or objects of desire. And whatever that standard is, there can be but one; for if there were several ultimate principles of conduct, the same conduct might be approved by one of those principles and condemned by another; and there would be needed some more general principle, as umpire between them.

Accordingly, writers on Moral Philosophy have mostly felt the necessity not only of referring all rules of conduct, and all judgments of praise and blame, to principles, but of referring them to some one principle; some rule, or standard, with which all other rules of conduct were required to be consistent, and from which by ultimate consequence they could all be deduced. Those who have dispensed with the assumption of such a universal standard, have only been enabled to do so by supposing that a moral sense, or instinct, inherent in our constitution, informs us, both what principles of conduct we are bound to observe, and also in what order these should be subordinated to one another.

The theory of the foundations of morality is a subject which it would be out of place, in a work like this, to discuss at large, and which could not to any useful purpose be treated incidentally. I shall content myself, therefore, with saying, that the doctrine of intuitive moral principles, even if true, would provide only for that portion of the field of conduct which is properly called moral. For the remainder of the practice of life some general principle, or standard, must still be sought; and if that principle be rightly chosen, it will be found, I apprehend, to serve quite as well for the ultimate principle of Morality, as for that of Prudence, Policy, or Taste.

Without attempting in this place to justify my opinion, or even to define the kind of justification which it admits of, I merely declare my conviction, that the general principle to which all rules of practice ought to conform, and the test by which they should be tried, is that of conduciveness to the happiness of mankind, or rather, of all sentient beings; in other words, that the promotion of happiness is the ultimate principle of Teleology.[290]

I do not mean to assert that the promotion of happiness should be itself the end of all actions, or even of all rules of action. It is the justification, and ought to be the controller, of all ends, but it is not itself the sole end. There are many virtuous actions, and even virtuous modes of action (though the cases are, I think, less frequent than is often supposed), by which happiness in the particular instance is sacrificed, more pain being produced than pleasure. But conduct of which this can be truly asserted, admits of justification only because it can be shown that, on the whole, more happiness will exist in the world, if feelings are cultivated which will make people, in certain cases, regardless of happiness. I fully admit that this is true; that the cultivation of an ideal nobleness of will and conduct should be to individual human beings an end, to which the specific pursuit either of their own happiness or of that of others (except so far as included in that idea) should, in any case of conflict, give way. But I hold that the very question, what constitutes this elevation of character, is itself to be decided by a reference to happiness as the standard. The character itself should be, to the individual, a paramount end, simply because the existence of this ideal nobleness of character, or of a near approach to it, in any abundance, would go farther than all things else toward making human life happy, [pg 659] both in the comparatively humble sense of pleasure and freedom from pain, and in the higher meaning, of rendering life, not what it now is almost universally, puerile and insignificant, but such as human beings with highly developed faculties can care to have.

§ 8. With these remarks we must close this summary view of the application of the general logic of scientific inquiry to the moral and social departments of science. Notwithstanding the extreme generality of the principles of method which I have laid down (a generality which, I trust, is not, in this instance, synonymous with vagueness), I have indulged the hope that to some of those on whom the task will devolve of bringing those most important of all sciences into a more satisfactory state, these observations may be useful, both in removing erroneous, and in clearing up the true, conceptions of the means by which, on subjects of so high a degree of complication, truth can be attained. Should this hope be realized, what is probably destined to be the great intellectual achievement of the next two or three generations of European thinkers will have been in some degree forwarded.

THE END.

Footnotes

1. In the later editions of Archbishop Whately's "Logic," he states his meaning to be, not that "rules" for the ascertainment of truths by inductive investigation can not be laid down, or that they may not be "of eminent service," but that they "must always be comparatively vague and general, and incapable of being built up into a regular demonstrative theory like that of the Syllogism." (Book iv., ch. iv., § 3.) And he observes, that to devise a system for this purpose, capable of being "brought into a scientific form," would be an achievement which "he must be more sanguine than scientific who expects." (Book iv., ch. ii., § 4.) To effect this, however, being the express object of the portion of the present work which treats of Induction, the words in the text are no overstatement of the difference of opinion between Archbishop Whately and me on the subject.
2. Now forming a chapter in his volume on "The Philosophy of Discovery."
3. Archbishop Whately.
4. I use these terms indiscriminately, because, for the purpose in view, there is no need for making any distinction between them. But metaphysicians usually restrict the name Intuition to the direct knowledge we are supposed to have of things external to our minds, and Consciousness to our knowledge of our own mental phenomena.
5. This important theory has of late been called in question by a writer of deserved reputation, Mr. Samuel Bailey; but I do not conceive that the grounds on which it has been admitted as an established doctrine for a century past, have been at all shaken by that gentleman's objections. I have elsewhere said what appeared to me necessary in reply to his arguments. (*Westminster Review* for October, 1842; reprinted in "Dissertations and Discussions," vol. ii.)
6. The view taken in the text, of the definition and purpose of Logic, stands in marked opposition to that of the school of philosophy which, in this country, is represented by the writings of Sir William Hamilton and of his numerous pupils. Logic, as this school conceives it, is "the Science of the Formal Laws of Thought;" a definition framed for the express purpose of excluding, as irrelevant to Logic, whatever relates to Belief and Disbelief, or to the pursuit of truth as such, and restricting the science to that very limited portion of its total province, which has reference to the conditions, not of Truth, but of Consistency. What I have thought it useful to say in opposition to this limitation of the field of Logic, has been said at some length in a separate work, first published in 1865, and entitled "An Examination of Sir William Hamilton's Philosophy, and of the Principal Philosophical Questions discussed in his Writings." For the purposes of the present Treatise, I am content that the justification of the larger extension which I give to the domain of the science, should rest on the sequel of the Treatise itself. Some remarks on the relation which the Logic of Consistency bears to the Logic of Truth, and on the place which that particular part occupies in the whole to which it belongs, will be found in the present volume (Book II., chap. iii., § 9).
7. *Computation or Logic*, chap. ii.
8. In the original "had, *or had not*." These last words, as involving a subtlety foreign to our present purpose, I have forborne to quote.
9. Vide infra, note at the end of § 3, book ii., chap. ii.
10. *Notare*, to mark; *con*notare, to mark *along with*; to mark one thing *with* or *in addition to* another.
11. Archbishop Whately, who, in the later editions of his *Elements of Logic*, aided in reviving the important distinction treated of in the text, proposes the term "Attributive" as a substitute for "Connotative" (p. 22, 9th edit.). The expression is, in itself, appropriate; but as it has not the advantage of being connected with any verb, of so

markedly distinctive a character as "to connote," it is not, I think, fitted to supply the place of the word Connotative in scientific use.

12. A writer who entitles his book *Philosophy; or, the Science of Truth*, charges me in his very first page (referring at the foot of it to this passage) with asserting that *general* names have properly no signification. And he repeats this statement many times in the course of his volume, with comments, not at all flattering, thereon. It is well to be now and then reminded to how great a length perverse misquotation (for, strange as it appears, I do not believe that the writer is dishonest) can sometimes go. It is a warning to readers when they see an author accused, with volume and page referred to, and the apparent guarantee of inverted commas, of maintaining something more than commonly absurd, not to give implicit credence to the assertion without verifying the reference.

13. "Take the familiar term Stone. It is applied to mineral and rocky materials, to the kernels of fruit, to the accumulations in the gall-bladder and in the kidney; while it is refused to polished minerals (called gems), to rocks that have the cleavage suited for roofing (slates), and to baked clay (bricks). It occurs in the designation of the magnetic oxide of iron (loadstone), and not in speaking of other metallic ores. Such a term is wholly unfit for accurate reasoning, unless hedged round on every occasion by other phrases; as building stone, precious stone, gall-stone, etc. Moreover, the methods of definition are baffled for want of sufficient community to ground upon. There is no quality uniformly present in the cases where it is applied, and uniformly absent where it is not applied; hence the definer would have to employ largely the license of striking off existing applications, and taking in new ones."—Bain, *Logic*, ii., 172.

14. Before quitting the subject of connotative names, it is proper to observe, that the first writer who, in our times, has adopted from the schoolmen the word *to connote*, Mr. James Mill, in his *Analysis of the Phenomena of the Human Mind*, employs it in a signification different from that in which it is here used. He uses the word in a sense co-extensive with its etymology, applying it to every case in which a name, while pointing directly to one thing (which is consequently termed its signification), includes also a tacit reference to some other thing. In the case considered in the text, that of concrete general names, his language and mine are the converse of one another. Considering (very justly) the signification of the name to lie in the attribute, he speaks of the word as *noting* the attribute, and *connoting* the things possessing the attribute. And he describes abstract names as being properly concrete names with their connotation dropped; whereas, in my view, it is the *de*notation which would be said to be dropped, what was previously connoted becoming the whole signification.

In adopting a phraseology at variance with that which so high an authority, and one which I am less likely than any other person to undervalue, has deliberately sanctioned, I have been influenced by the urgent necessity for a term exclusively appropriated to express the manner in which a concrete general name serves to mark the attributes which are involved in its signification. This necessity can scarcely be felt in its full force by any one who has not found by experience how vain is the attempt to communicate clear ideas on the philosophy of language without such a word. It is hardly an exaggeration to say, that some of the most prevalent of the errors with which logic has been infected, and a large part of the cloudiness and confusion of ideas which have enveloped it, would, in all probability, have been avoided, if a term had been in common use to express exactly what I have signified by the term to connote. And the schoolmen, to whom we are indebted for the greater part of our logical language, gave us this also, and in this very sense. For though some of their general expressions countenance the use of the word in the more extensive and vague acceptation in which it is taken by Mr. Mill, yet when they had to define it specifically as a technical term, and to fix its meaning as such, with that admirable precision which always characterizes their definitions, they clearly explained that nothing was said to be connoted except *forms*, which word may generally, in their writings, be understood as synonymous with *attributes*.

Now, if the word *to connote*, so well suited to the purpose to which they applied it, be diverted from that purpose by being taken to fulfill another, for which it does not seem to me to be at all required; I am unable to find any expression to replace it, but such as

are commonly employed in a sense so much more general, that it would be useless attempting to associate them peculiarly with this precise idea. Such are the words, to involve, to imply, etc. By employing these, I should fail of attaining the object for which alone the name is needed, namely, to distinguish this particular kind of involving and implying from all other kinds, and to assure to it the degree of habitual attention which its importance demands.

15. Professor Bain (*Logic*, i., 56) thinks that negative names are not names of all things whatever except those denoted by the correlative positive name, but only for all things of some particular class: *not-white*, for instance, he deems not to be a name for every thing in nature except white things, but only for every *colored* thing other than white. In this case, however, as in all others, the test of what a name denotes is what it can be predicated of: and we can certainly predicate of a sound, or a smell, that it is not white. The affirmation and the negation of the same attribute can not but divide the whole field of predication between them.

16. Or rather, all objects except itself and the percipient mind; for, as we shall see hereafter, to ascribe any attribute to an object, necessarily implies a mind to perceive it.

    The simple and clear explanation given in the text, of relation and relative names, a subject so long the opprobrium of metaphysics, was given (as far as I know) for the first time, by Mr. James Mill, in his Analysis of the Phenomena of the Human Mind.

17. On the preceding passage Professor Bain remarks (Logic, i., 265): "The Categories do not seem to have been intended as a classification of Namable Things, in the sense of 'an enumeration of all kinds of Things which are capable of being made predicates, or of having any thing predicated of them.' They seem to have been rather intended as a generalization of predicates; an analysis of the final import of predication. Viewed in this light, they are not open to the objections offered by Mr. Mill. The proper question to ask is not—In what Category are we to place sensations or other feelings or states of mind? but, Under what Categories can we predicate regarding states of mind? Take, for example, Hope. When we say that it is a state of mind, we predicate Substance: we may also describe how great it is (Quantity), what is the quality of it, pleasurable or painful (Quality), what it has reference to (Relation). Aristotle seems to have framed the Categories on the plan—Here is an individual; what is the final analysis of all that we can predicate about him?"

    This is doubtless a true statement of the leading idea in the classification. The Category Οὐσία was certainly understood by Aristotle to be a general name for all possible answers to the question Quid sit? when asked respecting a concrete individual; as the other Categories are names comprehending all possible answers to the questions Quantum sit? Quale sit? etc. In Aristotle's conception, therefore, the Categories may not have been a classification of Things; but they were soon converted into one by his Scholastic followers, who certainly regarded and treated them as a classification of Things, and carried them out as such, dividing down the Category Substance as a naturalist might do, into the different classes of physical or metaphysical objects as distinguished from attributes, and the other Categories into the principal varieties of quantity, quality, relation, etc. It is, therefore, a just subject of complaint against them, that they had no Category of Feeling. Feeling is assuredly predicable as a summum genus, of every particular kind of feeling, for instance, as in Mr. Bain's example, of Hope: but it can not be brought within any of the Categories as interpreted either by Aristotle or by his followers.

18. *Philosophy of the Inductive Sciences*, vol. i., p. 40.

19. *Discussions on Philosophy*, etc. Appendix I., pp. 643, 644.

20. It is to be regretted that Sir William Hamilton, though he often strenuously insists on this doctrine, and though, in the passage quoted, he states it with a comprehensiveness and force which leave nothing to be desired, did not consistently adhere to his own doctrine, but maintained along with it opinions with which it is utterly irreconcilable. See the third and other chapters of *An Examination of Sir William Hamilton's Philosophy*.

21. “Nous savons qu’il existe quelque chose hors de nous, parceque nous ne pouvons expliquer nos perceptions sans les rattacher à des causes distinctes de nous mêmes; nous savons de plus que ces causes, dont nous ne connaissons pas d’ailleurs l’essence, produisent les effets les plus variables, les plus divers, et même les plus contraires, selon qu’elles rencontrent telle nature ou telle disposition du sujet. Mais savons-nous quelque chose de plus? et même, vu le caractère indéterminé des causes que nous concevons dans les corps, y a-t-il quelque chose de plus à savoir? Y a-t-il lieu de nous enquérir si nous percevons les choses telles qu’elles sont? Non évidemment.... Je ne dis pas que le problème est insoluble, *je dis qu’il est absurde et enferme une contradiction*. Nous *ne savons pas ce que ces causes sont en elles-mêmes*, et la raison nous défend de chercher à le connaître: mais il est bien évident *à priori*, qu’*elles ne sont pas en elles-mêmes ce qu’elles sont par rapport à nous*, puisque la présence du sujet modifie nécessairement leur action. Supprimez tout sujet sentant, il est certain que ces causes agiraient encore puisqu’elles continueraient d’exister; mais elles agiraient autrement; elles seraient encore des qualités et des propriétés, mais qui ne ressembleraient à rien de ce que nous connaissons. Le feu ne manifesterait plus aucune des propriétés que nous lui connaissons: que serait-il? C’est ce que nous ne saurons jamais. *C’est d’ailleurs peut-être un problème qui ne répugne pas seulement à la nature de notre esprit, mais à l’essence même des choses.* Quand même en effet on supprimerait par le pensée tous les sujets sentants, il faudrait encore admettre que nul corps ne manifesterait ses propriétés autrement qu’en relation avec un sujet quelconque, et dans ce cas *ses propriétés ne seraient encore que relatives*: en sorte qu’il me paraît fort raisonnable d’admettre que les propriétés déterminées des corps n’existent pas indépendamment d’un sujet quelconque, et que quand on demande si les propriétés de la matiere sont telles que nous les percevons, il faudrait voir auparavant si elles sont en tant que déterminées, et dans quel sens il est vrai de dire qu’elles sont.”—*Cours d’Histoire de la Philosophie Morale au 18me siècle*, 8me leçon.

22. An attempt, indeed, has been made by Reid and others, to establish that although some of the properties we ascribe to objects exist only in our sensations, others exist in the things themselves, being such as can not possibly be copies of any impression upon the senses; and they ask, from what sensations our notions of extension and figure have been derived? The gauntlet thrown down by Reid was taken up by Brown, who, applying greater powers of analysis than had previously been applied to the notions of extension and figure, pointed out that the sensations from which those notions are derived, are sensations of touch, combined with sensations of a class previously too little adverted to by metaphysicians, those which have their seat in our muscular frame. His analysis, which was adopted and followed up by James Mill, has been further and greatly improved upon in Professor Bain’s profound work, *The Senses and the Intellect*, and in the chapters on “Perception” of a work of eminent analytic power, Mr. Herbert Spencer’s *Principles of Psychology*.

    On this point M. Cousin may again be cited in favor of the better doctrine. M. Cousin recognizes, in opposition to Reid, the essential subjectivity of our conceptions of what are called the primary qualities of matter, as extension, solidity, etc., equally with those of color, heat, and the remainder of the so-called secondary qualities.—*Cours*, ut supra, 9me leçon.

23. This doctrine, which is the most complete form of the philosophical theory known as the Relativity of Human Knowledge, has, since the recent revival in this country of an active interest in metaphysical speculation, been the subject of a greatly increased amount of discussion and controversy; and dissentients have manifested themselves in considerably greater number than I had any knowledge of when the passage in the text was written. The doctrine has been attacked from two sides. Some thinkers, among whom are the late Professor Ferrier, in his *Institutes of Metaphysic*, and Professor John Grote, in his *Exploratio Philosophica*, appear to deny altogether the reality of Noumena, or Things in themselves—of an unknowable substratum or support for the sensations which we experience, and which, according to the theory, constitute all our knowledge of an external world. It seems to me, however, that in Professor Grote’s case at least, the denial of Noumena is only apparent, and that he does not essentially differ from the other class of objectors, including Mr. Bailey in his valuable *Letters on the Philosophy of the Human Mind*, and (in spite of the striking passage quoted in the

text) also Sir William Hamilton, who contend for a direct knowledge by the human mind of more than the sensations—of certain attributes or properties as they exist not in us, but in the Things themselves.

With the first of these opinions, that which denies Noumena, I have, as a metaphysician, no quarrel; but, whether it be true or false, it is irrelevant to Logic. And since all the forms of language are in contradiction to it, nothing but confusion could result from its unnecessary introduction into a treatise, every essential doctrine of which could stand equally well with the opposite and accredited opinion. The other and rival doctrine, that of a direct perception or intuitive knowledge of the outward object as it is in itself, considered as distinct from the sensations we receive from it, is of far greater practical moment. But even this question, depending on the nature and laws of Intuitive Knowledge, is not within the province of Logic. For the grounds of my own opinion concerning it, I must content myself with referring to a work already mentioned—*An Examination of Sir William Hamilton's Philosophy*; several chapters of which are devoted to a full discussion of the questions and theories relating to the supposed direct perception of external objects.

24. Professor Bain (*Logic*, i., 49) defines attributes as "points of community among classes." This definition expresses well one point of view, but is liable to the objection that it applies only to the attributes of classes; though an object, unique in its kind, may be said to have attributes. Moreover, the definition is not ultimate, since the points of community themselves admit of, and require, further analysis; and Mr. Bain does analyze them into resemblances in the sensations, or other states of consciousness excited by the object.

25. *Analysis of the Human Mind*, i., 126 et seq.

26. *Logic*, i., 85.

27. Instead of Universal and Particular as applied to propositions, Professor Bain proposes (*Logic*, i., 81) the terms Total and Partial; reserving the former pair of terms for their inductive meaning, "the contrast between a general proposition and the particulars or individuals that we derive it from." This change in nomenclature would be attended with the further advantage, that Singular propositions, which in the Syllogism follow the same rules as Universal, would be included along with them in the same class, that of Total predications. It is not the Subject's denoting many things or only one, that is of importance in reasoning, it is that the assertion is made of the whole or a part only of what the Subject denotes. The words Universal and Particular, however, are so familiar and so well understood in both the senses mentioned by Mr. Bain, that the double meaning does not produce any material inconvenience.

28. It may, however, be considered as equivalent to a universal proposition with a different predicate, viz.: "All wine is good *quâ* wine," or "is good in respect of the qualities which constitute it wine."

29. *Logic*, i., 82.

30. Dr. Whewell (*Philosophy of Discovery*, p. 242) questions this statement, and asks, "Are we to say that a mole can not dig the ground, except he has an idea of the ground, and of the snout and paws with which he digs it?" I do not know what passes in a mole's mind, nor what amount of mental apprehension may or may not accompany his instinctive actions. But a human being does not use a spade by instinct; and he certainly could not use it unless he had knowledge of a spade, and of the earth which he uses it upon.

31. Professor Bain remarks, in qualification of the statement in the text (*Logic*, i., 50), that the word Class has two meanings; "the class definite, and the class indefinite. The class definite is an enumeration of actual individuals, as the Peers of the Realm, the oceans of the globe, the known planets.... The class indefinite is unenumerated. Such classes are stars, planets, gold-bearing rocks, men, poets, virtuous.... In this last acceptation of the word, class name and general name are identical. The class name denotes an indefinite number of individuals, and connotes the points of community or likeness."

The theory controverted in the text, tacitly supposes all classes to be *definite*. I have assumed them to be indefinite; because, for the purposes of Logic, definite classes, as such, are almost useless; though often serviceable as means of abridged expression. (Vide infra, book iii., chap. ii.)

32. "From hence also this may be deduced, that the first truths were arbitrarily made by those that first of all imposed names upon things, or received them from the imposition of others. For it is true (for example) that *man is a living creature*, but it is for this reason, that it pleased men to impose both these names on the same thing."—*Computation or Logic*, chap. iii., sect. 8.

33. "Men are subject to err not only in affirming and denying, but also in perception, and in silent cogitation.... Tacit errors, or the errors of sense and cogitation, are made by passing from one imagination to the imagination of another different thing; or by feigning that to be past, or future, which never was, nor ever shall be; as when by seeing the image of the sun in water, we imagine the sun itself to be there; or by seeing swords, that there has been, or shall be, fighting, because it used to be so for the most part; or when from promises we feign the mind of the promiser to be such and such; or, lastly, when from any sign we vainly imagine something to be signified which is not. And errors of this sort are common to all things that have sense."—*Computation or Logic*, chap. v., sect. 1.

34. Chap. iii., sect 3.

35. To the preceding statement it has been objected, that "we naturally construe the subject of a proposition in its extension, and the predicate (which therefore may be an adjective) in its intension (connotation): and that consequently co-existence of attributes does not, any more than the opposite theory of equation of groups, correspond with the living processes of thought and language." I acknowledge the distinction here drawn, which, indeed, I had myself laid down and exemplified a few pages back (p. 77). But though it is true that we naturally "construe the subject of a proposition in its extension," this extension, or in other words, the extent of the class denoted by the name, is not apprehended or indicated directly. It is both apprehended and indicated solely through the attributes. In the "living processes of thought and language" the extension, though in this case really thought of (which in the case of the predicate it is not), is thought of only through the medium of what my acute and courteous critic terms the "intension."

For further illustrations of this subject, see *Examination of Sir William Hamilton's Philosophy*, chap. xxii.

36. Professor Bain, in his *Logic* (i., 256), excludes Existence from the list, considering it as a mere name. All propositions, he says, which predicate mere existence "are more or less abbreviated, or elliptical: when fully expressed they fall under either co-existence or succession. When we say there *exists* a conspiracy for a particular purpose, we mean that at the present time a body of men have formed themselves into a society for a particular object; which is a complex affirmation, resolvable into propositions of co-existence and succession (as causation). The assertion that the dodo does not exist, points to the fact that this animal, once known in a certain place, has disappeared or become extinct; is no longer associated with the locality: all which may be better stated without the use of the verb 'exist.' There is a debated question—Does an ether exist? but the concrete form would be this—'Are heat and light and other radiant influences propagated by an ethereal medium diffused in space;' which is a proposition of causation. In like manner the question of the Existence of a Deity can not be discussed in that form. It is properly a question as to the First *Cause* of the Universe, and as to the continued exertion of that Cause in providential superintendence." (i., 407.)

Mr. Bain thinks it "fictitious and unmeaning language" to carry up the classification of Nature to one *summum genus*, Being, or that which Exists; since nothing can be perceived or apprehended but by way of contrast with something else (of which important truth, under the name of Law of Relativity, he has been in our time the principal expounder and champion), and we have no other class to oppose to Being, or fact to contrast with Existence.

I accept fully Mr. Bain's Law of Relativity, but I do not understand by it that to enable us to apprehend or be conscious of any fact, it is necessary that we should contrast it with some other positive fact. The antithesis necessary to consciousness need not, I conceive, be an antithesis between two positives; it may be between one positive and its negative. Hobbes was undoubtedly right when he said that a single sensation indefinitely prolonged would cease to be felt at all; but simple intermission, without other change, would restore it to consciousness. In order to be conscious of heat, it is not necessary that we should pass to it from cold; it suffices that we should pass to it from a state of no sensation, or from a sensation of some other kind. The relative opposite of Being, considered as a summum genus, is Nonentity, or Nothing; and we have, now and then, occasion to consider and discuss things merely in contrast with Nonentity.

I grant that the *decision* of questions of Existence usually if not always depends on a previous question of either Causation or Co-existence. But Existence is nevertheless a different thing from Causation or Co-existence, and can be predicated apart from them. The meaning of the abstract name Existence, and the connotation of the concrete name Being, consist, like the meaning of all other names, in sensations or states of consciousness: their peculiarity is that to exist, is to excite, or be capable of exciting, *any* sensations or states of consciousness: no matter what, but it is indispensable that there should be some. It was from overlooking this that Hegel, finding that Being is an abstraction reached by thinking away all particular attributes, arrived at the self-contradictory proposition on which he founded all his philosophy, that Being is the same as Nothing. It is really the name of Something, taken in the most comprehensive sense of the word.

37. Book iv., chap. vii.

38. *Logic*, i., 103-105.

39. The doctrines which prevented the real meaning of Essences from being understood, had not assumed so settled a shape in the time of Aristotle and his immediate followers, as was afterward given to them by the Realists of the Middle Ages. Aristotle himself (in his Treatise on the Categories) expressly denies that the δεύτεραι οὔσιαι, or Substantiæ Secundæ, inhere in a subject. They are only, he says, predicated of it.

40. The always acute and often profound author of *An Outline of Sematology* (Mr. B. H. Smart) justly says, "Locke will be much more intelligible, if, in the majority of places, we substitute 'the knowledge of' for what he calls 'the Idea of' " (p. 10). Among the many criticisms on Locke's use of the word Idea, this is the one which, as it appears to me, most nearly hits the mark; and I quote it for the additional reason that it precisely expresses the point of difference respecting the import of Propositions, between my view and what I have spoken of as the Conceptualist view of them. Where a Conceptualist says that a name or a proposition expresses our Idea of a thing, I should generally say (instead of our Idea) our Knowledge, or Belief, concerning the thing itself.

41. This distinction corresponds to that which is drawn by Kant and other metaphysicians between what they term *analytic* and *synthetic*, judgments; the former being those which can be evolved from the meaning of the terms used.

42. If we allow a differentia to what is not really a species. For the distinction of Kinds, in the sense explained by us, not being in any way applicable to attributes, it of course follows that although attributes may be put into classes, those classes can be admitted to be genera or species only by courtesy.

43. Professor Bain, in his Logic, takes a peculiar view of Definition. He holds (i., 71) with the present work, that "the definition in its full import, is the sum of all the properties connoted by the name; it exhausts the meaning of a word." But he regards the meaning of a general name as including, not indeed all the common properties of the class named, but all of them that are ultimate properties, not resolvable into one another. "The enumeration of the attributes of oxygen, of gold, of man, should be an enumeration of the final (so far as can be made out), the underivable, powers or functions of each," and nothing less than this is a complete Definition (i., 75). An independent property, not derivable from other properties, even if previously

unknown, yet as soon as discovered becomes, according to him, part of the meaning of the term, and should be included in the definition. “When we are told that diamond, which we know to be a transparent, glittering, hard, and high-priced substance, is composed of carbon, and is combustible, we must put these additional properties on the same level as the rest; to us they are henceforth connoted by the name” (i., 73). Consequently the propositions that diamond is composed of carbon, and that it is combustible, are regarded by Mr. Bain as merely verbal propositions. He carries this doctrine so far as to say that unless mortality can be shown to be a consequence of the ultimate laws of animal organization, mortality is connoted by man, and “Man is Mortal” is a merely verbal proposition. And one of the peculiarities (I think a disadvantageous peculiarity) of his able and valuable treatise, is the large number of propositions requiring proof, and learned by experience, which, in conformity with this doctrine, he considers as not real, but verbal, propositions.

The objection I have to this language is that it confounds, or at least confuses, a much more important distinction than that which it draws. The only reason for dividing Propositions into real and verbal, is in order to discriminate propositions which convey information about facts, from those which do not. A proposition which affirms that an object has a given attribute, while designating the object by a name which already signifies the attribute, adds no information to that which was already possessed by all who understood the name. But when this is said, it is implied that, by the signification of a name, is meant the signification attached to it in the common usage of life. I can not think we ought to say that the meaning of a word includes matters of fact which are unknown to every person who uses the word unless he has learned them by special study of a particular department of Nature; or that because a few persons are aware of these matters of fact, the affirmation of them is a proposition conveying no information. I hold that (special scientific connotation apart) a name means, or connotes, only the properties which it is a mark of in the general mind; and that in the case of any additional properties, however uniformly found to accompany these, it remains possible that a thing which did not possess the properties might still be thought entitled to the name. Ruminant, according to Mr. Bain’s use of language, connotes cloven-hoofed, since the two properties are always found together, and no connection has ever been discovered between them: but ruminant does not mean cloven-hoofed; and were an animal to be discovered which chews the cud, but has its feet undivided, I venture to say that it would still be called ruminant.

44. In the fuller discussion which Archbishop Whately has given to this subject in his later editions, he almost ceases to regard the definitions of names and those of things as, in any important sense, distinct. He seems (9th ed., p. 145) to limit the notion of a Real Definition to one which “explains any thing *more* of the nature of the thing than is implied in the name;” (including under the word “implied,” not only what the name connotes, but every thing which can be deduced by reasoning from the attributes connoted). Even this, as he adds, is usually called not a Definition, but a Description; and (as it seems to me) rightly so called. A Description, I conceive, can only be ranked among Definitions, when taken (as in the case of the zoological definition of man) to fulfill the true office of a Definition, by declaring the connotation given to a word in some special use, as a term of science or art: which special connotation of course would not be expressed by the proper definition of the word in its ordinary employment.

Mr. De Morgan, exactly reversing the doctrine of Archbishop Whately, understands by a Real Definition one which contains *less* than the Nominal Definition, provided only that what it contains is sufficient for distinction. “By *real* definition I mean such an explanation of the word, be it the whole of the meaning or only part, as will be sufficient to separate the things contained under that word from all others. Thus the following, I believe, is a complete definition of an elephant: An animal which naturally drinks by drawing the water into its nose, and then spurting it into its mouth.”—*Formal Logic*, p. 36. Mr. De Morgan’s general proposition and his example are at variance; for the peculiar mode of drinking of the elephant certainly forms no part of the meaning of the word elephant. It could not be said, because a person happened to be ignorant of this property, that he did not know what an elephant means.

45. In the only attempt which, so far as I know, has been made to refute the preceding argumentation, it is maintained that in the first form of the syllogism,

A dragon is a thing which breathes flame,
A dragon is a serpent,
Therefore some serpent or serpents breathe flame,

"there is just as much truth in the conclusion as there is in the premises, or rather, no more in the latter than in the former. If the general name serpent includes both real and imaginary serpents, there is no falsity in the conclusion; if not, there is falsity in the minor premise."

Let us, then, try to set out the syllogism on the hypothesis that the name serpent includes imaginary serpents. We shall find that it is now necessary to alter the predicates; for it can not be asserted that an imaginary creature breathes flame; in predicating of it such a fact, we assert by the most positive implication that it is real, and not imaginary. The conclusion must run thus, "Some serpent or serpents either do or are *imagined* to breathe flame." And to prove this conclusion by the instance of dragons, the premises must be, A dragon is *imagined* as breathing flame. A dragon is a (real or imaginary) serpent: from which it undoubtedly follows, that there are serpents which are imagined to breathe flame; but the major premise is not a definition, nor part of a definition; which is all that I am concerned to prove.

Let us now examine the other assertion—that if the word serpent stands for none but real serpents, the minor premise (a dragon is a serpent) is false. This is exactly what I have myself said of the premise, considered as a statement of fact: but it is not false as part of the definition of a dragon; and since the premises, or one of them, must be false (the conclusion being so), the real premise can not be the definition, which is true, but the statement of fact, which is false.

46. "Few people" (I have said in another place) "have reflected how great a knowledge of Things is required to enable a man to affirm that any given argument turns wholly upon words. There is, perhaps, not one of the leading terms of philosophy which is not used in almost innumerable shades of meaning, to express ideas more or less widely different from one another. Between two of these ideas a sagacious and penetrating mind will discern, as it were intuitively, an unobvious link of connection, upon which, though perhaps unable to give a logical account of it, he will found a perfectly valid argument, which his critic, not having so keen an insight into the Things, will mistake for a fallacy turning on the double meaning of a term. And the greater the genius of him who thus safely leaps over the chasm, the greater will probably be the crowing and vainglory of the mere logician, who, hobbling after him, evinces his own superior wisdom by pausing on its brink, and giving up as desperate his proper business of bridging it over."

47. The different cases of Equipollency, or "Equivalent Propositional Forms," are set forth with some fullness in Professor Bain's *Logic*. One of the commonest of these changes of expression, that from affirming a proposition to denying its negative, or *vicè versa*, Mr. Bain designates, very happily, by the name Obversion.

48. As Sir William Hamilton has pointed out, "Some A is not B" may also be converted in the following form: "No B is *some* A." Some men are not negroes; therefore, No negroes are *some* men (*e.g.*, Europeans).

49. Contraries:
All A is B
No A is B

Subtraries:
Some A is B
Some A is not B

Contradictories:
All A is B

Some A is not B

Also contradictories:
No A is B
Some A is B

Respectively subalternate:
All A is B and No A is B
Some A is B and Some A is not B

50. Professor Bain denies the claim of Singular Propositions to be classed, for the purposes of ratiocination, with Universal; though they come within the designation which he himself proposes as an equivalent for Universal, that of Total. He would even, to use his own expression, banish them entirely from the syllogism. He takes as an example,

Socrates is wise,
Socrates is poor, therefore
Some poor men are wise,

or more properly (as he observes) "one poor man is wise." "Now, if wise, poor, and a man, are attributes belonging to the meaning of the word Socrates, there is then no march of reasoning at all. We have given in Socrates, *inter alia*, the facts wise, poor, and a man, and we merely repeat the concurrence which is selected from the whole aggregate of properties making up the whole, Socrates. The case is one under the head 'Greater and Less Connotation' in Equivalent Propositional Forms, or Immediate Inference.

"But the example in this form does not do justice to the syllogism of singulars. We must suppose both propositions to be real, the predicates being in no way involved in the subject. Thus

Socrates was the master of Plato,
Socrates fought at Delium,
The master of Plato fought at Delium.

"It may fairly be doubted whether the transitions, in this instance, are any thing more than equivalent forms. For the proposition 'Socrates was the master of Plato and fought at Delium,' compounded out of the two premises, is obviously nothing more than a grammatical abbreviation. No one can say that there is here any change of meaning, or any thing beyond a verbal modification of the original form. The next step is, 'The master of Plato fought at Delium,' which is the previous statement cut down by the omission of Socrates. It contents itself with reproducing a part of the meaning, or saying less than had been previously said. The full equivalent of the affirmation is, 'The master of Plato fought at Delium, and the master of Plato was Socrates:' the new form omits the last piece of information, and gives only the first. Now, we never consider that we have made a real inference, a step in advance, when we repeat *less* than we are entitled to say, or drop from a complex statement some portion not desired at the moment. Such an operation keeps strictly within the domain of equivalence, or Immediate Inference. In no way, therefore, can a syllogism with two singular premises be viewed as a genuine syllogistic or deductive inference." (*Logic*, i., 159.)

The first argument, as will have been seen, rests upon the supposition that the name Socrates has a meaning; that man, wise, and poor, are parts of this meaning; and that by predicating them of Socrates we convey no information; a view of the signification of names which, for reasons already given (Note to § 4 of the chapter on Definition, *supra*, pp. 110, 111.), I can not admit, and which, as applied to the class of names which Socrates belongs to, is at war with Mr. Bain's own definition of a Proper Name (i., 148), "a single *meaningless* mark or designation appropriated to the thing." Such names, Mr. Bain proceeded to say, do not necessarily indicate even human beings: much less then does the name Socrates include the meaning of wise or poor. Otherwise

it would follow that if Socrates had grown rich, or had lost his mental faculties by illness, he would no longer have been called Socrates.

The second part of Mr. Bain's argument, in which he contends that even when the premises convey real information, the conclusion is merely the premises with a part left out, is applicable, if at all, as much to universal propositions as to singular. In every syllogism the conclusion contains less than is asserted in the two premises taken together. Suppose the syllogism to be

All bees are intelligent,
All bees are insects, therefore
Some insects are intelligent:

one might use the same liberty taken by Mr. Bain, of joining together the two premises as if they were one—"All bees are insects and intelligent"—and might say that in omitting the middle term *bees* we make no real inference, but merely reproduce part of what had been previously said. Mr. Bain's is really an objection to the syllogism itself, or at all events to the third figure: it has no special applicability to singular propositions.

51. His conclusions are, "The first figure is suited to the discovery or proof of the properties of a thing; the second to the discovery or proof of the distinctions between things; the third to the discovery or proof of instances and exceptions; the fourth to the discovery, or exclusion, of the different species of a genus." The reference of syllogisms in the last three figures to the *dictum de omni et nullo* is, in Lambert's opinion, strained and unnatural: to each of the three belongs, according to him, a separate axiom, co-ordinate and of equal authority with that *dictum*, and to which he gives the names of *dictum de diverso* for the second figure, *dictum de exemplo* for the third, and *dictum de reciproco* for the fourth. See part i., or *Dianoiologie*, chap, iv., § 229 *et seqq.* Mr. Bailey (*Theory of Reasoning*, 2d ed., pp. 70-74) takes a similar view of the subject.

52. Since this chapter was written, two treatises have appeared (or rather a treatise and a fragment of a treatise), which aim at a further improvement in the theory of the forms of ratiocination: Mr. De Morgan's "Formal Logic; or, the Calculus of Inference, Necessary and Probable;" and the "New Analytic of Logical Forms," attached as an Appendix to Sir William Hamilton's *Discussions on Philosophy*, and at greater length, to his posthumous *Lectures on Logic*.

In Mr. De Morgan's volume—abounding, in its more popular parts, with valuable observations felicitously expressed—the principal feature of originality is an attempt to bring within strict technical rules the cases in which a conclusion can be drawn from premises of a form usually classed as particular. Mr. De Morgan observes, very justly, that from the premises most Bs are Cs, most Bs are As, it may be concluded with certainty that some As are Cs, since two portions of the class B, each of them comprising more than half, must necessarily in part consist of the same individuals. Following out this line of thought, it is equally evident that if we knew exactly what proportion the "most" in each of the premises bear to the entire class B, we could increase in a corresponding degree the definiteness of the conclusion. Thus if 60 per cent. of B are included in C, and 70 per cent. in A, 30 per cent. at least must be common to both; in other words, the number of As which are Cs, and of Cs which are As, must be at least equal to 30 per cent. of the class B. Proceeding on this conception of "numerically definite propositions," and extending it to such forms as these:—"45 Xs (or more) are each of them one of 70 Ys," or "45 Xs (or more) are no one of them to be found among 70 Ys," and examining what inferences admit of being drawn from the various combinations which may be made of premises of this description, Mr. De Morgan establishes universal formulæ for such inferences; creating for that purpose not only a new technical language, but a formidable array of symbols analogous to those of algebra.

Since it is undeniable that inferences, in the cases examined by Mr. De Morgan, can legitimately be drawn, and that the ordinary theory takes no account of them, I will not say that it was not worth while to show in detail how these also could be reduced to

formulæ as rigorous as those of Aristotle. What Mr. De Morgan has done was worth doing once (perhaps more than once, as a school exercise); but I question if its results are worth studying and mastering for any practical purpose. The practical use of technical forms of reasoning is to bar out fallacies: but the fallacies which require to be guarded against in ratiocination properly so called, arise from the incautious use of the common forms of language; and the logician must track the fallacy into that territory, instead of waiting for it on a territory of his own. While he remains among propositions which have acquired the numerical precision of the Calculus of Probabilities, the enemy is left in possession of the only ground on which he can be formidable. And since the propositions (short of universal) on which a thinker has to depend, either for purposes of speculation or of practice, do not, except in a few peculiar cases, admit of any numerical precision; common reasoning can not be translated into Mr. De Morgan's forms, which therefore can not serve any purpose as a test of it.

Sir William Hamilton's theory of the "quantification of the predicate" may be described as follows:

"Logically" (I quote his words) "we ought to take into account the quantity, always understood in thought, but usually, for manifest reasons, elided in its expression, not only of the subject, but also of the predicate of a judgment." All A is B, is equivalent to all A is *some* B. No A is B, to No A is *any* B. Some A is B, is tantamount to some A is *some* B. Some A is not B, to Some A is *not any* B. As in these forms of assertion the predicate is exactly co-extensive with the subject, they all admit of simple conversion; and by this we obtain two additional forms—Some B is *all* A, and No B is *some* A. We may also make the assertion All A is all B, which will be true if the classes A and B are exactly co-extensive. The last three forms, though conveying real assertions, have no place in the ordinary classification of Propositions. All propositions, then, being supposed to be translated into this language, and written each in that one of the preceding forms which answers to its signification, there emerges a new set of syllogistic rules, materially different from the common ones. A general view of the points of difference may be given in the words of Sir W. Hamilton (*Discussions*, 2d ed., p. 651):

"The revocation of the two terms of a Proposition to their true relation; a proposition being always an *equation* of its subject and its predicate.

"The consequent reduction of the Conversion of Propositions from three species to one —that of Simple Conversion.

"The reduction of all the *General Laws* of Categorical Syllogisms to a single Canon.

"The evolution from that one canon of all the Species and varieties of Syllogisms.

"The abrogation of all the *Special Laws* of Syllogism.

"A demonstration of the exclusive possibility of Three Syllogistic Figures; and (on new grounds) the scientific and final abolition of the Fourth.

"A manifestation that Figure is an unessential variation in syllogistic form; and the consequent absurdity of Reducing the syllogisms of the other figures to the first.

"An enouncement of *one Organic Principle* for each Figure.

"A determination of the true number of the Legitimate Moods; with

"Their amplification in number (thirty-six);

"Their numerical equality under all the figures; and

"Their relative equivalence, or virtual identity, throughout every schematic difference.

"That, in the second and third figures, the extremes holding both the same relation to the middle term, there is not, as in the first, an opposition and subordination between a term major and a term minor, mutually containing and contained, in the counter wholes of Extension and Comprehension.

"Consequently, in the second and third figures, there is no determinate major and minor premises, and there are two indifferent conclusions: whereas in the first the premises are determinate, and there is a single proximate conclusion."

This doctrine, like that of Mr. De Morgan previously noticed, is a real addition to the syllogistic theory; and has moreover this advantage over Mr. De Morgan's "numerically definite Syllogism," that the forms it supplies are really available as a test of the correctness of ratiocination; since propositions in the common form may always have their predicates quantified, and so be made amenable to Sir W. Hamilton's rules. Considered, however, as a contribution to the *Science* of Logic, that is, to the analysis of the mental processes concerned in reasoning, the new doctrine appears to me, I confess, not merely superfluous, but erroneous; since the form in which it clothes propositions does not, like the ordinary form, express what is in the mind of the speaker when he enunciates the proposition. I can not think Sir William Hamilton right in maintaining that the quantity of the predicate is "always understood in thought." It is implied, but is not present to the mind of the person who asserts the proposition. The quantification of the predicate, instead of being a means of bringing out more clearly the meaning of the proposition, actually leads the mind out of the proposition, into another order of ideas. For when we say, All men are mortal, we simply mean to affirm the attribute mortality of all men; without thinking at all of the *class* mortal in the concrete, or troubling ourselves about whether it contains any other beings or not. It is only for some artificial purpose that we ever look at the proposition in the aspect in which the predicate also is thought of as a class-name, either including the subject only, or the subject and something more. (See above, p. 77, 78.)

For a fuller discussion of this subject, see the twenty-second chapter of a work already referred to, "An Examination of Sir William Hamilton's Philosophy."

53. Mr. Herbert Spencer (*Principles of Psychology*, pp. 125-7), though his theory of the syllogism coincides with all that is essential of mine, thinks it a logical fallacy to present the two axioms in the text, as the regulating principles of syllogism. He charges me with falling into the error pointed out by Archbishop Whately and myself, of confounding exact likeness with literal identity; and maintains, that we ought not to say that Socrates possesses *the same* attributes which are connoted by the word Man, but only that he possesses attributes *exactly like* them: according to which phraseology, Socrates, and the attribute mortality, are not two things co-existing with the same thing, as the axiom asserts, but two things coexisting with two different things.

The question between Mr. Spencer and me is merely one of language; for neither of us (if I understand Mr. Spencer's opinions rightly) believes an attribute to be a real thing, possessed of objective existence; we believe it to be a particular mode of naming our sensations, or our expectations of sensation, when looked at in their relation to an external object which excites them. The question raised by Mr. Spencer does not, therefore, concern the properties of any really existing thing, but the comparative appropriateness, for philosophical purposes, of two different modes of using a name. Considered in this point of view, the phraseology I have employed, which is that commonly used by philosophers, seems to me to be the best. Mr. Spencer is of opinion that because Socrates and Alcibiades are not the same man, the attribute which constitutes them men should not be called the same attribute; that because the humanity of one man and that of another express themselves to our senses not by the same individual sensations but by sensations exactly alike, humanity ought to be regarded as a different attribute in every different man. But on this showing, the humanity even of any one man should be considered as different attributes now and half an hour hence; for the sensations by which it will then manifest itself to my organs will not be a continuation of my present sensations, but a repetition of them; fresh sensations, not identical with, but only exactly like the present. If every general conception, instead of being "the One in the Many," were considered to be as many

different conceptions as there are things to which it is applicable, there would be no such thing as general language. A name would have no general meaning if *man* connoted one thing when predicated of John, and another, though closely resembling, thing when predicated of William. Accordingly a recent pamphlet asserts the impossibility of general knowledge on this precise ground.

The meaning of any general name is some outward or inward phenomenon, consisting, in the last resort, of feelings; and these feelings, if their continuity is for an instant broken, are no longer the same feelings, in the sense of individual identity. What, then, is the common something which gives a meaning to the general name? Mr. Spencer can only say, it is the similarity of the feelings; and I rejoin, the attribute is precisely that similarity. The names of attributes are in their ultimate analysis names for the resemblances of our sensations (or other feelings). Every general name, whether abstract or concrete, denotes or connotes one or more of those resemblances. It will not, probably, be denied, that if a hundred sensations are undistinguishably alike, their resemblance ought to be spoken of as one resemblance, and not a hundred resemblances which merely *resemble* one another. The things compared are many, but the something common to all of them must be conceived as one, just as the name is conceived as one, though corresponding to numerically different sensations of sound each time it is pronounced. The general term *man* does not connote the sensations derived once from one man, which, once gone, can no more occur again than the same flash of lightning. It connotes the general type of the sensations derived always from all men, and the power (always thought of as one) of producing sensations of that type. And the axiom might be thus worded: Two *types of sensation* each of which co-exists with a third type, co-exist with another; or Two *powers* each of which co-exists with a third power co-exist with one another.

Mr. Spencer has misunderstood me in another particular. He supposes that the co-existence spoken of in the axiom, of two things with the same third thing, means simultaneousness in time. The co-existence meant is that of being jointly attributes of the same subject. The attribute of being born without teeth, and the attribute of having thirty-two teeth in mature age, are in this sense co-existent, both being attributes of man, though *ex vi termini* never of the same man at the same time.

54. Supra, p. 93.

55. Professor Bain (*Logic*, i., 157) considers the axiom (or rather axioms) here proposed as a substitute for the *dictum de omni*, to possess certain advantages, but to be "unworkable as a basis of the syllogism. The fatal defect consists in this, that it is ill-adapted to bring out the difference between total and partial coincidence of terms, the observation of which is the essential precaution in syllogizing correctly. If all the terms were co-extensive, the axiom would flow on admirably; A carries B, all B and none but B; B carries C in the same manner; at once A carries C, without limitation or reserve. But in point of fact, we know that while A carries B, other things carry B also; whence a process of limitation is required, in transferring A to C through B. A (in common with other things) carries B; B (in common with other things) carries C; whence A (in common with other things) carries C. The axiom provides no means of making this limitation; if we were to follow A literally, we should be led to suppose A and C co-extensive: for such is the only obvious meaning of 'the attribute A coincides with the attribute C.' "

It is certainly possible that a careless learner here and there may suppose that if A carries B, it follows that B carries A. But if any one is so incautious as to commit this mistake, the very earliest lesson in the logic of inference, the Conversion of propositions, will correct it. The first of the two forms in which I have stated the axiom, is in some degree open to Mr. Bain's criticism: when B is said to co-exist with A (it must be by a *lapsus calami* that Mr. Bain uses the word *coincide*), it is possible, in the absence of warning, to suppose the meaning to be that the two things are only found together. But this misinterpretation is excluded by the other, or practical, form of the maxim; *Nota notæ est nota rei ipsius.* No one would be in any danger of inferring that because *a* is a mark of *b, b* can never exist without *a*; that because being in a confirmed consumption is a mark of being about to die, no one dies who is not in a

consumption; that because being coal is a mark of having come out of the earth, nothing can come out of the earth except coal. Ordinary knowledge of English seems a sufficient protection against these mistakes, since in speaking of a mark of any thing we are never understood as implying reciprocity.

A more fundamental objection is stated by Mr. Bain in a subsequent passage (p. 158). "The axiom does not accommodate itself to the type of Deductive Reasoning as contrasted with Induction—the application of a general principle to a special case. Any thing that fails to make prominent this circumstance is not adapted as a foundation for the syllogism." But though it may be proper to limit the term Deduction to the application of a general principle to a special case, it has never been held that Ratiocination or Syllogism is subject to the same limitation; and the adoption of it would exclude a great amount of valid and conclusive syllogistic reasoning. Moreover, if the *dictum de omni* makes prominent the fact of the application of a general principle to a particular case, the axiom I propose makes prominent the condition which alone makes that application a real inference.

I conclude, therefore, that both forms have their value, and their place in Logic. The *dictum de omni* should be retained as the fundamental axiom of the logic of mere consistency, often called Formal Logic; nor have I ever quarreled with the use of it in that character, nor proposed to banish it from treatises on Formal Logic. But the other is the proper axiom for the logic of the pursuit of truth by way of Deduction; and the recognition of it can alone show how it is possible that deductive reasoning can be a road to truth.

56. *Logic*, p. 239 (9th ed.).

57. It is hardly necessary to say, that I am not contending for any such absurdity as that we *actually* "ought to have known" and considered the case of every individual man, past, present, and future, before affirming that all men are mortal: although this interpretation has been, strangely enough, put upon the preceding observations. There is no difference between me and Archbishop Whately, or any other defender of the syllogism, on the practical part of the matter; I am only pointing out an inconsistency in the logical theory of it, as conceived by almost all writers. I do not say that a person who affirmed, before the Duke of Wellington was born, that all men are mortal, *knew* that the Duke of Wellington was mortal; but I do say that he *asserted* it; and I ask for an explanation of the apparent logical fallacy, of adducing in proof of the Duke of Wellington's mortality, a general statement which presupposes it. Finding no sufficient resolution of this difficulty in any of the writers on Logic, I have attempted to supply one.

58. The language of ratiocination would, I think, be brought into closer agreement with the real nature of the process, if the general propositions employed in reasoning, instead of being in the form All men are mortal, or Every man is mortal, were expressed in the form Any man is mortal. This mode of expression, exhibiting as the type of all reasoning from experience "The men A, B, C, etc., are so and so, therefore *any* man is so and so," would much better manifest the true idea—that inductive reasoning is always, at bottom, inference from particulars to particulars, and that the whole function of general propositions in reasoning, is to vouch for the legitimacy of such inferences.

59. Review of Quetelet on Probabilities, *Essays*, p. 367.

60. *Philosophy of Discovery*, p. 289.

61. *Theory of Reasoning*, chap. iv., to which I may refer for an able statement and enforcement of the grounds of the doctrine.

62. On a recent careful reperusal of Berkeley's whole works, I have been unable to find this doctrine in them. Sir John Herschel probably meant that it is implied in Berkeley's argument against abstract ideas. But I can not find that Berkeley saw the implication, or had ever asked himself what bearing his argument had on the theory of the syllogism. Still less can I admit that the doctrine is (as has been affirmed by one of my ablest and most candid critics) "among the standing marks of what is called the empirical philosophy."

63. *Logic*, book iv., chap. i., sect. 1.

64. See the important chapter on Belief, in Professor Bain's great treatise, *The Emotions and the Will*, pp. 581-4.

65. A writer in the "British Quarterly Review" (August, 1846), in a review of this treatise, endeavors to show that there is no *petitio principii* in the syllogism, by denying that the proposition, All men are mortal, asserts or assumes that Socrates is mortal. In support of this denial, he argues that we may, and in fact do, admit the general proposition that all men are mortal, without having particularly examined the case of Socrates, and even without knowing whether the individual so named is a man or something else. But this of course was never denied. That we can and do draw conclusions concerning cases specifically unknown to us, is the datum from which all who discuss this subject must set out. The question is, in what terms the evidence, or ground, on which we draw these conclusions, may best be designated—whether it is most correct to say, that the unknown case is proved by known cases, or that it is proved by a general proposition including both sets of cases, the unknown and the known? I contend for the former mode of expression. I hold it an abuse of language to say, that the proof that Socrates is mortal, is that all men are mortal. Turn it in what way we will, this seems to me to be asserting that a thing is the proof of itself. Whoever pronounces the words, All men are mortal, has affirmed that Socrates is mortal, though he may never have heard of Socrates; for since Socrates, whether known to be so or not, really is a man, he is included in the words, All men, and in every assertion of which they are the subject. If the reviewer does not see that there is a difficulty here, I can only advise him to reconsider the subject until he does: after which he will be a better judge of the success or failure of an attempt to remove the difficulty. That he had reflected very little on the point when he wrote his remarks, is shown by his oversight respecting the *dictum de omni et nullo*. He acknowledges that this maxim as commonly expressed—"Whatever is true of a class, is true of every thing included in the class," is a mere identical proposition, since the class *is* nothing but the things included in it. But he thinks this defect would be cured by wording the maxim thus—"Whatever is true of a class, is true of every thing which *can be shown* to be a member of the class:" as if a thing could "be shown" to be a member of the class without being one. If a class means the sum of all the things included in the class, the things which can "be shown" to be included in it are part of the sum, and the *dictum* is as much an identical proposition with respect to them as to the rest. One would almost imagine that, in the reviewer's opinion, things are not members of a class until they are called up publicly to take their place in it—that so long, in fact, as Socrates is not known to be a man, he *is not* a man, and any assertion which can be made concerning men does not at all regard him, nor is affected as to its truth or falsity by any thing in which he is concerned.

The difference between the reviewer's theory and mine may be thus stated. Both admit that when we say, All men are mortal, we make an assertion reaching beyond the sphere of our knowledge of individual cases; and that when a new individual, Socrates, is brought within the field of our knowledge by means of the minor premise, we learn that we have already made an assertion respecting Socrates without knowing it: our own general formula being, to that extent, for the first time *interpreted* to us. But according to the reviewer's theory, the smaller assertion is proved by the larger: while I contend, that both assertions are proved together, by the same evidence, namely, the grounds of experience on which the general assertion was made, and by which it must be justified.

The reviewer says, that if the major premise included the conclusion, "we should be able to affirm the conclusion without the intervention of the minor premise; but every one sees that that is impossible." A similar argument is urged by Mr. De Morgan (*Formal Logic*, p. 259): "The whole objection tacitly assumes the superfluity of the minor; that is, tacitly assumes we know Socrates (Mr. De Morgan says 'Plato,' but to prevent confusion I have kept to my own *exemplum*.) to be a man as soon as we know him to be Socrates." The objection would be well grounded if the assertion that the major premise includes the conclusion, meant that it individually specifies all it includes. As, however, the only indication it gives is a description by marks, we have

still to compare any new individual with the marks; and to show that this comparison has been made, is the office of the minor. But since, by supposition, the new individual has the marks, whether we have ascertained him to have them or not; if we have affirmed the major premise, we have asserted him to be mortal. Now my position is that this assertion can not be a necessary part of the argument. It can not be a necessary condition of reasoning that we should begin by making an assertion, which is afterward to be employed in proving a part of itself. I can conceive only one way out of this difficulty, viz., that what really forms the proof is *the other* part of the assertion: the portion of it, the truth of which has been ascertained previously: and that the unproved part is bound up in one formula with the proved part in mere anticipation, and as a memorandum of the nature of the conclusions which we are prepared to prove.

With respect to the minor premise in its formal shape, the minor as it stands in the syllogism, predicating of Socrates a definite class name, I readily admit that it is no more a necessary part of reasoning than the major. When there is a major, doing its work by means of a class name, minors are needed to interpret it: but reasoning can be carried on without either the one or the other. They are not the conditions of reasoning, but a precaution against erroneous reasoning. The only minor premise necessary to reasoning in the example under consideration, is, Socrates is *like* A, B, C, and the other individuals who are known to have died. And this is the only universal type of that step in the reasoning process which is represented by the minor. Experience, however, of the uncertainty of this loose mode of inference, teaches the expediency of determining beforehand what *kind* of likeness to the cases observed, is necessary to bring an unobserved case within the same predicate; and the answer to this question is the major. The minor then identifies the precise kind of likeness possessed by Socrates, as being the kind required by the formula. Thus the syllogistic major and the syllogistic minor start into existence together, and are called forth by the same exigency. When we conclude from personal experience without referring to any record —to any general theorems, either written, or traditional, or mentally registered by ourselves as conclusions of our own drawing—we do not use, in our thoughts, either a major or a minor, such as the syllogism puts into words. When, however, we revise this rough inference from particulars to particulars, and substitute a careful one, the revision consists in selecting two syllogistic premises. But this neither alters nor adds to the evidence we had before; it only puts us in a better position for judging whether our inference from particulars to particulars is well grounded.

66. Infra, book iii., chap. ii.

67. Infra, book iii., ch. iv., § 3, and elsewhere.

68. It is justly remarked by Professor Bain (*Logic*, ii., 134) that the word Hypothesis is here used in a somewhat peculiar sense. An hypothesis, in science, usually means a supposition not proved to be true, but surmised to be so, because if true it would account for certain known facts; and the final result of the speculation may be to prove its truth. The hypotheses spoken of in the text are of a different character; they are known not to be literally true, while as much of them as is true is not hypothetical, but certain. The two cases, however, resemble in the circumstance that in both we reason, not from a truth, but from an assumption, and the truth therefore of the conclusions is conditional, not categorical. This suffices to justify, in point of logical propriety, Stewart's use of the term. It is of course needful to bear in mind that the hypothetical element in the definitions of geometry is the assumption that what is very nearly true is exactly so. This unreal exactitude might be called a fiction, as properly as an hypothesis; but that appellation, still more than the other, would fail to point out the close relation which exists between the fictitious point or line and the points and lines of which we have experience.

69. *Mechanical Euclid*, pp. 149 *et seqq*.

70. We might, it is true, insert this property into the definition of parallel lines, framing the definition so as to require, both that when produced indefinitely they shall never meet, and also that any straight line which intersects one of them shall, if prolonged, meet the other. But by doing this we by no means get rid of the assumption; we are still obliged to take for granted the geometrical truth, that all straight lines in the same

plane, which have the former of these properties, have also the latter. For if it were possible that they should not, that is, if any straight lines in the same plane, other than those which are parallel according to the definition, had the property of never meeting although indefinitely produced, the demonstrations of the subsequent portions of the theory of parallels could not be maintained.

71. Some persons find themselves prevented from believing that the axiom, Two straight lines can not inclose a space, could ever become known to us through experience, by a difficulty which may be stated as follows: If the straight lines spoken of are those contemplated in the definition—lines absolutely without breadth and absolutely straight—that such are incapable of inclosing a space is not proved by experience, for lines such as these do not present themselves in our experience. If, on the other hand, the lines meant are such straight lines as we do meet with in experience, lines straight enough for practical purposes, but in reality slightly zigzag, and with some, however trifling, breadth; as applied to these lines the axiom is not true, for two of them may, and sometimes do, inclose a small portion of space. In neither case, therefore, does experience prove the axiom.

Those who employ this argument to show that geometrical axioms can not be proved by induction, show themselves unfamiliar with a common and perfectly valid mode of inductive proof; proof by approximation. Though experience furnishes us with no lines so unimpeachably straight that two of them are incapable of inclosing the smallest space, it presents us with gradations of lines possessing less and less either of breadth or of flexure, of which series the straight line of the definition is the ideal limit. And observation shows that just as much, and as nearly, as the straight lines of experience approximate to having no breadth or flexure, so much and so nearly does the space-inclosing power of any two of them approach to zero. The inference that if they had no breadth or flexure at all, they would inclose no space at all, is a correct inductive inference from these facts, conformable to one of the four Inductive Methods hereinafter characterized, the Method of Concomitant Variations; of which the mathematical Doctrine of Limits presents the extreme case.

72. Whewell's *History of Scientific Ideas*, i., 140.

73. Dr. Whewell (*Philosophy of Discovery*, p. 289) thinks it unreasonable to contend that we know by experience, that our idea of a line exactly resembles a real line. "It does not appear," he says, "how we can compare our ideas with the realities, since we know the realities only by our ideas." We know the realities by our sensations. Dr. Whewell surely does not hold the "doctrine of perception by means of ideas," which Reid gave himself so much trouble to refute. If Dr. Whewell doubts whether we compare our ideas with the corresponding sensations, and assume that they resemble, let me ask on what evidence do we judge that a portrait of a person not present is like the original. Surely because it is like our idea, or mental image of the person, and because our idea is like the man himself.

Dr. Whewell also says, that it does not appear why this resemblance of ideas to the sensations of which they are copies, should be spoken of as if it were a peculiarity of one class of ideas, those of space. My reply is, that I do not so speak of it. The peculiarity I contend for is only one of degree. All our ideas of sensation of course resemble the corresponding sensations, but they do so with very different degrees of exactness and of reliability. No one, I presume, can recall in imagination a color or an odor with the same distinctness and accuracy with which almost every one can mentally reproduce an image of a straight line or a triangle. To the extent, however, of their capabilities of accuracy, our recollections of colors or of odors may serve as subjects of experimentation, as well as those of lines and spaces, and may yield conclusions which will be true of their external prototypes. A person in whom, either from natural gift or from cultivation, the impressions of color were peculiarly vivid and distinct, if asked which of two blue flowers was of the darkest tinge, though he might never have compared the two, or even looked at them together, might be able to give a confident answer on the faith of his distinct recollection of the colors; that is, he might examine his mental pictures, and find there a property of the outward objects. But in hardly any case except that of simple geometrical forms, could this be done by

mankind generally, with a degree of assurance equal to that which is given by a contemplation of the objects themselves. Persons differ most widely in the precision of their recollection, even of forms: one person, when he has looked any one in the face for half a minute, can draw an accurate likeness of him from memory; another may have seen him every day for six months, and hardly know whether his nose is long or short. But every body has a perfectly distinct mental image of a straight line, a circle, or a rectangle. And every one concludes confidently from these mental images to the corresponding outward things. The truth is, that we may, and continually do, study nature in our recollections, when the objects themselves are absent; and in the case of geometrical forms we can perfectly, but in most other cases only imperfectly, trust our recollections.

74. *Logic*, i., 222.

75. Ibid., 226.

76. *History of Scientific Ideas*, i., 65-67.

77. Ibid., i., 60.

78. Ibid., 58, 59.

79. "If all mankind had spoken one language, we can not doubt that there would have been a powerful, perhaps a universal, school of philosophers, who would have believed in the inherent connection between names and things, who would have taken the sound *man* to be the mode of agitating the air which is essentially communicative of the ideas of reason, cookery, bipedality, etc."—De Morgan, *Formal Logic*, p. 246.

80. It would be difficult to name a man more remarkable at once for the greatness and the wide range of his mental accomplishments, than Leibnitz. Yet this eminent man gave as a reason for rejecting Newton's scheme of the solar system, that God *could not* make a body revolve round a distant centre, unless either by some impelling mechanism, or by miracle: "Tout ce qui n'est pas explicable," says he in a letter to the Abbé Conti, "par la nature des créatures, est miraculeux. Il ne suffit pas de dire: Dieu a fait une telle loi de nature; donc la chose est naturelle. Il faut que la loi soit exécutable par les natures des créatures. Si Dien donnait cette loi, par exemple, à un corps libre, de tourner à l'entour d'un certain centre, *il faudrait ou qu'il y joignît d'autres corps qui par leur impulsion l'obligeassent de rester toujours dans son orbite circulaire, ou qu'il mît un ange à ses trousses, ou enfin il faudrait qu'il y concourût extraordinairement*; car naturellement il s'écartera par la tangente."—*Works of Leibnitz*, ed. Dutens, iii., 446.

81. *Novum Organum Renovatum*, pp. 32, 33.

82. *History of Scientific Ideas*, i., 264.

83. Ibid., i., 263.

84. Ibid., 240.

85. *Hist. Scientific Ideas*, ii., 25, 26.

86. *Phil. of Disc.*, p. 339.

87. *Phil. of Disc.*, p. 338.

88. Ibid., p. 463.

89. *Phil. of Disc.*, pp. 472, 473.

90. The *Quarterly Review* for June, 1841, contained an article of great ability on Dr. Whewell's two great works (since acknowledged and reprinted in Sir John Herschel's Essays) which maintains, on the subject of axioms, the doctrine advanced in the text, that they are generalizations from experience, and supports that opinion by a line of argument strikingly coinciding with mine. When I state that the whole of the present chapter (except the last four pages, added in the fifth edition) was written before I had seen the article (the greater part, indeed, before it was published), it is not my object to occupy the reader's attention with a matter so unimportant as the degree of originality which may or may not belong to any portion of my own speculations, but to obtain for an opinion which is opposed to reigning doctrines, the recommendation derived from a striking concurrence of sentiment between two inquirers entirely independent of one

another. I embrace the opportunity of citing from a writer of the extensive acquirements in physical and metaphysical knowledge and the capacity of systematic thought which the article evinces, passages so remarkably in unison with my own views as the following:

"The truths of geometry are summed up and embodied in its definitions and axioms.... Let us turn to the axioms, and what do we find? A string of propositions concerning magnitude in the abstract, which are equally true of space, time, force, number, and every other magnitude susceptible of aggregation and subdivision. Such propositions, where they are not mere definitions, as some of them are, carry their inductive origin on the face of their enunciation.... Those which declare that two straight lines can not inclose a space, and that two straight lines which cut one another can not both be parallel to a third, are in reality the only ones which express characteristic properties of space, and these it will be worth while to consider more nearly. Now the only clear notion we can form of straightness is uniformity of direction, for space in its ultimate analysis is nothing but an assemblage of distances and directions. And (not to dwell on the notion of continued contemplation, *i.e.*, mental experience, as included in the very idea of uniformity; nor on that of transfer of the contemplating being from point to point, and of experience, during such transfer, of the homogeneity of the interval passed over) we can not even propose the proposition in an intelligible form to any one whose experience ever since he was born has not assured him of the fact. The unity of direction, or that we can not march from a given point by more than one path direct to the same object, is matter of practical experience long before it can by possibility become matter of abstract thought. *We can not attempt mentally to exemplify the conditions of the assertion in an imaginary case opposed to it, without violating our habitual recollection of this experience, and defacing our mental picture of space as grounded on it.* What but experience, we may ask, can possibly assure us of the homogeneity of the parts of distance, time, force, and measurable aggregates in general, on which the truth of the other axioms depends? As regards the latter axiom, after what has been said it must be clear that the very same course of remarks equally applies to its case, and that its truth is quite as much forced on the mind as that of the former by daily and hourly experience, ... *including always, be it observed, in our notion of experience, that which is gained by contemplation of the inward picture which the mind forms to itself in any proposed case, or which it arbitrarily selects as an example—such picture, in virtue of the extreme simplicity of these primary relations, being called up by the imagination with as much vividness and clearness as could be done by any external impression, which is the only meaning we can attach to the word intuition, as applied to such relations*."

And again, of the axioms of mechanics: "As we admit no such propositions, other than as truths inductively collected from observation, even in geometry itself, it can hardly be expected that, in a science of obviously contingent relations, we should acquiesce in a contrary view. Let us take one of these axioms and examine its evidence: for instance, that equal forces perpendicularly applied at the opposite ends of equal arms of a straight lever will balance each other. What but experience, we may ask, in the first place, can possibly inform us that a force so applied will have any tendency to turn the lever on its centre at all? or that force can be so transmitted along a rigid line perpendicular to its direction, as to act elsewhere in space than along its own line of action? Surely this is so far from being self-evident that it has even a paradoxical appearance, which is only to be removed by giving our lever thickness, material composition, and molecular powers. Again, we conclude, that the two forces, being equal and applied under precisely similar circumstances, must, if they exert any effort at all to turn the lever, exert equal and opposite efforts: but what *a priori* reasoning can possibly assure us that they *do* act under precisely similar circumstances? that points which differ in place *are* similarly circumstanced as regards the exertion of force? that universal space may not have relations to universal force—or, at all events, that the organization of the material universe may not be such as to place that portion of space occupied by it in such relations to the forces exerted in it, as may invalidate the absolute similarity of circumstances assumed? Or we may argue, what have we to do with the notion of angular movement in the lever at all? The case is one of rest, and of quiescent destruction of force by force. Now how is this destruction effected?

Assuredly by the counter-pressure which supports the fulcrum. But would not this destruction equally arise, and by the same amount of counteracting force, if each force simply pressed its own half of the lever against the fulcrum? And what can assure us that it is not so, except removal of one or other force, and consequent tilting of the lever? The other fundamental axiom of statics, that the pressure on the point of support is the sum of the weights ... is merely a scientific transformation and more refined mode of stating a coarse and obvious result of universal experience, viz., that the weight of a rigid body is the same, handle it or suspend it in what position or by what point we will, and that whatever sustains it sustains its total weight. Assuredly, as Mr. Whewell justly remarks, 'No one probably ever made a trial for the purpose of showing that the pressure on the support is equal to the sum of the weights.' ... But it is precisely because in every action of his life from earliest infancy he has been continually making the trial, and seeing it made by every other living being about him, that he never dreams of staking its result on one additional attempt made with scientific accuracy. This would be as if a man should resolve to decide by experiment whether his eyes were useful for the purpose of seeing, by hermetically sealing himself up for half an hour in a metal case."

On the "paradox of universal propositions obtained by experience," the same writer says: "If there be necessary and universal truths expressible in propositions of axiomatic simplicity and obviousness, and having for their subject-matter the elements of all our experience and all our knowledge, surely these are the truths which, if experience suggest to us any truths at all, it ought to suggest most readily, clearly, and unceasingly. If it were a truth, universal and necessary, that a net is spread over the whole surface of every planetary globe, we should not travel far on our own without getting entangled in its meshes, and making the necessity of some means of extrication an axiom of locomotion.... There is, therefore, nothing paradoxical, but the reverse, in our being led by observation to a recognition of such truths, as *general* propositions, co-extensive at least with all human experience. That they pervade all the objects of experience, must insure their continual suggestion *by* experience; that they are true, must insure that consistency of suggestion, that iteration of uncontradicted assertion, which commands implicit assent, and removes all occasion of exception; that they are simple, and admit of no misunderstanding, must secure their admission by every mind."

"A truth, necessary and universal, relative to any object of our knowledge, must verify itself in every instance where that object is before our contemplation, and if at the same time it be simple and intelligible, its verification must be obvious. *The sentiment of such a truth can not, therefore, but be present to our minds whenever that object is contemplated, and must therefore make a part of the mental picture or idea of that object which we may on any occasion summon before our imagination.... All propositions, therefore, become not only untrue but inconceivable*, if ... axioms be violated in their enunciation."

Another eminent mathematician had previously sanctioned by his authority the doctrine of the origin of geometrical axioms in experience. "Geometry is thus founded likewise on observation; but of a kind so familiar and obvious, that the primary notions which it furnishes might seem intuitive."—*Sir John Leslie*, quoted by Sir William Hamilton, *Discourses*, etc., p. 272.

91. Principles of Psychology.

92. Mr. Spencer is mistaken in supposing me to claim any peculiar "necessity" for this axiom as compared with others. I have corrected the expressions which led him into that misapprehension of my meaning.

93. Mr. Spencer, in recently returning to the subject (Principles of Psychology, new edition, chap. xii.: "The Test of Relative Validity"), makes two answers to the preceding remarks. One is:

"Were an argument formed by repeating the same proposition over and over again, it would be true that any intrinsic fallibility of the postulate would not make the conclusion more untrustworthy than the first step. But an argument consists of unlike

propositions. Now, since Mr. Mill's criticism on the Universal Postulate is that in some cases, which he names, it has proved to be an untrustworthy test; it follows that in any argument consisting of heterogeneous propositions, there is a risk, increasing as the number of propositions increases, that some one of them belongs to this class of cases, and is wrongly accepted because of the inconceivableness of its negation."

No doubt: but this supposes new *premises* to be taken in. The point we are discussing is the fallibility not of the premises, but of the reasoning, as distinguished from the premises. Now the validity of the reasoning depends always upon the same axiom, repeated (in thought) "over and over again," viz., that whatever has a mark, has what it is a mark of. Even, therefore, on the assumption that this axiom rests ultimately on the Universal Postulate, and that, the Postulate not being wholly trustworthy, the axiom may be one of the cases of its failure; all the risk there is of this is incurred at the very first step of the reasoning, and is not added to, however long may be the series of subsequent steps.

I am here arguing, of course, from Mr. Spencer's point of view. From my own the case is still clearer; for, in my view, the truth that whatever has a mark has what it is a mark of, is wholly trustworthy, and derives none of its evidence from so very untrustworthy a test as the inconceivability of the negative.

Mr. Spencer's second answer is valid up to a certain point; it is, that every prolongation of the process involves additional chances of casual error, from carelessness in the reasoning operation. This is an important consideration in the private speculations of an individual reasoner; and even with respect to mankind at large, it must be admitted that, though mere oversights in the syllogistic process, like errors of addition in an account, are special to the individual, and seldom escape detection, confusion of thought produced (for example) by ambiguous terms has led whole nations or ages to accept fallacious reasoning as valid. But this very fact points to causes of error so much more dangerous than the mere length of the process, as quite to vitiate the doctrine that the "test of the relative validities of conflicting conclusions" is the number of times the fundamental postulate is involved. On the contrary, the subjects on which the trains of reasoning are longest, and the assumption, therefore, oftenest repeated, are in general those which are best fortified against the really formidable causes of fallacy; as in the example already given of mathematics.

94. Mr. Spencer makes a distinction between conceiving myself looking into darkness, and conceiving *that I am* then and there looking into darkness. To me it seems that this change of the expression to the form *I am*, just marks the transition from conception to belief, and that the phrase "to conceive that *I am*," or "that any thing *is*," is not consistent with using the word conceive in its rigorous sense.

95. I have myself accepted the contest, and fought it out on this battle-ground, in the eleventh chapter of *An Examination of Sir William Hamilton's Philosophy.*

96. Chap. xi.

97. In one of the three cases, Mr. Spencer, to my no small surprise, thinks that the belief of mankind "can not be rightly said to have undergone" the change I allege. Mr. Spencer himself still thinks we are unable to conceive gravitation acting through empty space. "If an astronomer avowed that he could conceive gravitative force as exercised through space absolutely void, my private opinion would be that he mistook the nature of conception. Conception implies representation. Here the elements of the representation are the two bodies and an agency by which either affects the other. To conceive this agency is to represent it in some terms derived from our experiences—that is, from our sensations. As this agency gives us no sensations, we are obliged (if we try to conceive it) to use symbols idealized from our sensations—imponderable units forming a medium."

If Mr. Spencer means that the action of gravitation gives us no sensations, the assertion is one than which I have not seen, in the writings of philosophers, many more startling. What other sensation do we need than the sensation of one body moving toward another? "The elements of the representation" are not two bodies and an "agency," but two bodies and an effect; viz., the fact of their approaching one another. If we are able

to conceive a vacuum, is there any difficulty in conceiving a body falling to the earth through it?

98. *Discussions*, etc., 2d ed., p. 624.

99. Professor Bain (*Logic*, i., 16) identifies the Principle of Contradiction with his Law of Relativity, viz., that "every thing that can be thought of, every affirmation that can be made, has an opposite or counter notion or affirmation;" a proposition which is one of the general results of the whole body of human experience. For further considerations respecting the axioms of Contradiction and Excluded Middle, see the twenty-first chapter of *An Examination of Sir William Hamilton's Philosophy*.

100. Dr. Whewell thinks it improper to apply the term Induction to any operation not terminating in the establishment of a general truth. Induction, he says (*Philosophy of Discovery*, p. 245), "is not the same thing as experience and observation. Induction is experience or observation *consciously* looked at in a *general* form. This consciousness and generality are necessary parts of that knowledge which is science." And he objects (p. 241) to the mode in which the word Induction is employed in this work, as an undue extension of that term "not only to the cases in which the general induction is consciously applied to a particular instance, but to the cases in which the particular instance is dealt with by means of experience in that rude sense in which experience can be asserted of brutes, and in which of course we can in no way imagine that the law is possessed or understood as a general proposition." This use of the term he deems a "confusion of knowledge with practical tendencies."

I disclaim, as strongly as Dr. Whewell can do, the application of such terms as induction, inference, or reasoning, to operations performed by mere instinct, that is, from an animal impulse, without the exertion of any intelligence. But I perceive no ground for confining the use of those terms to cases in which the inference is drawn in the forms and with the precautions required by scientific propriety. To the idea of Science, an express recognition and distinct apprehension of general laws as such, is essential: but nine-tenths of the conclusions drawn from experience in the course of practical life, are drawn without any such recognition: they are direct inferences from known cases, to a case supposed to be similar. I have endeavored to show that this is not only as legitimate an operation, but substantially the same operation, as that of ascending from known cases to a general proposition; except that the latter process has one great security for correctness which the former does not possess. In science, the inference must necessarily pass through the intermediate stage of a general proposition, because Science wants its conclusions for record, and not for instantaneous use. But the inferences drawn for the guidance of practical affairs, by persons who would often be quite incapable of expressing in unexceptionable terms the corresponding generalizations, may and frequently do exhibit intellectual powers quite equal to any which have ever been displayed in science; and if these inferences are not inductive, what are they? The limitation imposed on the term by Dr. Whewell seems perfectly arbitrary; neither justified by any fundamental distinction between what he includes and what he desires to exclude, nor sanctioned by usage, at least from the time of Reid and Stewart, the principal legislators (as far as the English language is concerned) of modern metaphysical terminology.

101. Supra, p. 145.

102. *Novum Organum Renovatum*, pp. 72, 73.

103. *Novum Organum Renovatum*, p. 32.

104. *Cours de Philosophie Positive*, vol. ii., p. 202.

105. Dr. Whewell, in his reply, contests the distinction here drawn, and maintains, that not only different descriptions, but different explanations of a phenomenon, may all be true. Of the three theories respecting the motions of the heavenly bodies, he says (*Philosophy of Discovery*, p. 231): "Undoubtedly all these explanations may be true and consistent with each other, and would be so if each had been followed out so as to show in what manner it could be made consistent with the facts. And this was, in reality, in a great measure done. The doctrine that the heavenly bodies were moved by vortices was successfully modified, so that it came to coincide in its results with the

doctrine of an inverse-quadratic centripetal force.... When this point was reached, the vortex was merely a machinery, well or ill devised, for producing such a centripetal force, and therefore did not contradict the doctrine of a centripetal force. Newton himself does not appear to have been averse to explaining gravity by impulse. So little is it true that if one theory be true the other must be false. The attempt to explain gravity by the impulse of streams of particles flowing through the universe in all directions, which I have mentioned in the *Philosophy*, is so far from being inconsistent with the Newtonian theory, that it is founded entirely upon it. And even with regard to the doctrine, that the heavenly bodies move by an inherent virtue; if this doctrine had been maintained in any such way that it was brought to agree with the facts, the inherent virtue must have had its laws determined; and then it would have been found that the virtue had a reference to the central body; and so, the 'inherent virtue' must have coincided in its effect with the Newtonian force; and then, the two explanations would agree, except so far as the word 'inherent' was concerned. And if such a part of an earlier theory as this word *inherent* indicates, is found to be untenable, it is of course rejected in the transition to later and more exact theories, in Inductions of this kind, as well as in what Mr. Mill calls Descriptions. There is, therefore, still no validity discoverable in the distinction which Mr. Mill attempts to draw between descriptions like Kepler's law of elliptical orbits, and other examples of induction."

If the doctrine of vortices had meant, not that vortices existed, but only that the planets moved *in the same manner* as if they had been whirled by vortices; if the hypothesis had been merely a mode of representing the facts, not an attempt to account for them; if, in short, it had been only a Description; it would, no doubt, have been reconcilable with the Newtonian theory. The vortices, however, were not a mere aid to conceiving the motions of the planets, but a supposed physical agent, actively impelling them; a material fact, which might be true or not true, but could not be both true and not true. According to Descartes's theory it was true, according to Newton's it was not true. Dr. Whewell probably means that since the phrases, centripetal and projectile force, do not declare the nature but only the direction of the forces, the Newtonian theory does not absolutely contradict any hypothesis which may be framed respecting the mode of their production. The Newtonian theory, regarded as a mere *description* of the planetary motions, does not; but the Newtonian theory as an *explanation* of them does. For in what does the explanation consist? In ascribing those motions to a general law which obtains between all particles of matter, and in identifying this with the law by which bodies fall to the ground. If the planets are kept in their orbits by a force which draws the particles composing them toward every other particle of matter in the solar system, they are not kept in those orbits by the impulsive force of certain streams of matter which whirl them round. The one explanation absolutely excludes the other. Either the planets are not moved by vortices, or they do not move by a law common to all matter. It is impossible that both opinions can be true. As well might it be said that there is no contradiction between the assertions, that a man died because somebody killed him, and that he died a natural death.

So, again, the theory that the planets move by a virtue inherent in their celestial nature, is incompatible with either of the two others: either that of their being moved by vortices, or that which regards them as moving by a property which they have in common with the earth and all terrestrial bodies. Dr. Whewell says that the theory of an inherent virtue agrees with Newton's when the word inherent is left out, which of course it would be (he says) if "found to be untenable." But leave that out, and where is the theory? The word inherent *is* the theory. When that is omitted, there remains nothing except that the heavenly bodies move "by a virtue," *i.e.*, by a power of some sort; or by virtue of their celestial nature, which directly contradicts the doctrine that terrestrial bodies fall by the same law.

If Dr. Whewell is not yet satisfied, any other subject will serve equally well to test his doctrine. He will hardly say that there is no contradiction between the emission theory and the undulatory theory of light; or that there can be both one and two electricities; or that the hypothesis of the production of the higher organic forms by development from the lower, and the supposition of separate and successive acts of creation, are quite reconcilable; or that the theory that volcanoes are fed from a central fire, and the

doctrines which ascribe them to chemical action at a comparatively small depth below the earth's surface, are consistent with one another, and all true as far as they go.

If different explanations of the same fact can not both be true, still less, surely, can different predictions. Dr. Whewell quarrels (on what ground it is not necessary here to consider) with the example I had chosen on this point, and thinks an objection to an illustration a sufficient answer to a theory. Examples not liable to his objection are easily found, if the proposition that conflicting predictions can not both be true, can be made clearer by many examples. Suppose the phenomenon to be a newly-discovered comet, and that one astronomer predicts its return once in every 300 years—another once in every 400: can they both be right? When Columbus predicted that by sailing constantly westward he should in time return to the point from which he set out, while others asserted that he could never do so except by turning back, were both he and his opponents true prophets? Were the predictions which foretold the wonders of railways and steamships, and those which averred that the Atlantic could never be crossed by steam navigation, nor a railway train propelled ten miles an hour, both (in Dr. Whewell's words) "true, and consistent with one another?"

Dr. Whewell sees no distinction between holding contradictory opinions on a question of fact, and merely employing different analogies to facilitate the conception of the same fact. The case of different Inductions belongs to the former class, that of different Descriptions to the latter.

106. *Phil. of Discov.*, p. 256.

107. *Essays on the Pursuit of Truth.*

108. In the first edition a note was appended at this place, containing some criticism on Archbishop Whately's mode of conceiving the relation between Syllogism and Induction. In a subsequent issue of his *Logic*, the Archbishop made a reply to the criticism, which induced me to cancel part of the note, incorporating the remainder in the text. In a still later edition, the Archbishop observes in a tone of something like disapprobation, that the objections, "doubtless from their being fully answered and found untenable, were silently suppressed," and that hence he might appear to some of his readers to be combating a shadow. On this latter point, the Archbishop need give himself no uneasiness. His readers, I make bold to say, will fully credit his mere affirmation that the objections have actually been made.

But as he seems to think that what he terms the suppression of the objections ought not to have been made "silently," I now break that silence, and state exactly what it is that I suppressed, and why. I suppressed that alone which might be regarded as personal criticism on the Archbishop. I had imputed to him the having omitted to ask himself a particular question. I found that he had asked himself the question, and could give it an answer consistent with his own theory. I had also, within the compass of a parenthesis, hazarded some remarks on certain general characteristics of Archbishop Whately as a philosopher. These remarks, though their tone, I hope, was neither disrespectful nor arrogant, I felt, on reconsideration, that I was hardly entitled to make; least of all, when the instance which I had regarded as an illustration of them, failed, as I now saw, to bear them out. The real matter at the bottom of the whole dispute, the different view we take of the function of the major premise, remains exactly where it was; and so far was I from thinking that my opinion had been fully "answered" and was "untenable," that in the same edition in which I canceled the note, I not only enforced the opinion by further arguments, but answered (though without naming him) those of the Archbishop.

For not having made this statement before, I do not think it needful to apologize. It would be attaching very great importance to one's smallest sayings, to think a formal retractation requisite every time that one falls into an error. Nor is Archbishop Whately's well-earned fame of so tender a quality as to require that in withdrawing a slight criticism on him I should have been bound to offer a public *amende* for having made it.

109.

But though it is a condition of the validity of every induction that there be uniformity in the course of nature, it is not a necessary condition that the uniformity should pervade all nature. It is enough that it pervades the particular class of phenomena to which the induction relates. An induction concerning the motions of the planets, or the properties of the magnet, would not be vitiated though we were to suppose that wind and weather are the sport of chance, provided it be assumed that astronomical and magnetic phenomena are under the dominion of general laws. Otherwise the early experience of mankind would have rested on a very weak foundation; for in the infancy of science it could not be known that *all* phenomena are regular in their course.

Neither would it be correct to say that every induction by which we infer any truth, implies the general fact of uniformity *as foreknown*, even in reference to the kind of phenomena concerned. It implies, *either* that this general fact is already known, *or* that we may now know it: as the conclusion, the Duke of Wellington is mortal, drawn from the instances A, B, and C, implies either that we have already concluded all men to be mortal, or that we are now entitled to do so from the same evidence. A vast amount of confusion and paralogism respecting the grounds of Induction would be dispelled by keeping in view these simple considerations.

110. Infra, chap. xxi.

111. Infra, chap. xxi., xxii.

112. In strictness, wherever the present constitution of space exists; which we have ample reason to believe that it does in the region of the fixed stars.

113. Dr. Whewell (*Phil. of Discov.*, p. 246) will not allow these and similar erroneous judgments to be called inductions; inasmuch as such superstitious fancies "were not collected from the facts by seeking a law of their occurrence, but were suggested by an imagination of the anger of superior powers, shown by such deviations from the ordinary course of nature." I conceive the question to be, not in what manner these notions were at first suggested, but by what evidence they have, from time to time, been supposed to be substantiated. If the believers in these erroneous opinions had been put on their defense, they would have referred to experience: to the comet which preceded the assassination of Julius Cæsar, or to oracles and other prophecies known to have been fulfilled. It is by such appeals to facts that all analogous superstitions, even in our day, attempt to justify themselves; the supposed evidence of experience is necessary to their hold on the mind. I quite admit that the influence of such coincidences would not be what it is, if strength were not lent to it by an antecedent presumption; but this is not peculiar to such cases; preconceived notions of probability form part of the explanation of many other cases of belief on insufficient evidence. The *a priori* prejudice does not prevent the erroneous opinion from being sincerely regarded as a legitimate conclusion from experience; though it improperly predisposes the mind to that interpretation of experience.

Thus much in defense of the sort of examples objected to. But it would be easy to produce instances, equally adapted to the purpose, and in which no antecedent prejudice is at all concerned. "For many ages," says Archbishop Whately, "all farmers and gardeners were firmly convinced—and convinced of their knowing it by experience—that the crops would never turn out good unless the seed were sown during the increase of the moon." This was induction, but bad induction; just as a vicious syllogism is reasoning, but bad reasoning.

114. The assertion, that any and every one of the conditions of a phenomenon may be and is, on some occasions and for some purposes, spoken of as the cause, has been disputed by an intelligent reviewer of this work in the *Prospective Review* (the predecessor of the justly esteemed *National Review*), who maintains that "we always apply the word cause rather to that element in the antecedents which exercises *force*, and which would *tend* at all times to produce the same or a similar effect to that which, under certain conditions, it would actually produce." And he says, that "every one would feel" the expression, that the cause of a surprise was the sentinel's being off his post, to be incorrect; but that the "allurement or force which *drew* him off his post,

might be so called, because in doing so it removed a resisting power which would have prevented the surprise." I can not think that it would be wrong to say, that the event took place because the sentinel was absent, and yet right to say that it took place because he was bribed to be absent. Since the only direct effect of the bribe was his absence, the bribe could be called the remote cause of the surprise, only on the supposition that the absence was the proximate cause; nor does it seem to me that any one (who had not a theory to support) would use the one expression and reject the other.

The reviewer observes, that when a person dies of poison, his possession of bodily organs is a necessary condition, but that no one would ever speak of it as the cause. I admit the fact; but I believe the reason to be, that the occasion could never arise for so speaking of it; for when in the inaccuracy of common discourse we are led to speak of some one condition of a phenomenon as its cause, the condition so spoken of is always one which it is at least possible that the hearer may require to be informed of. The possession of bodily organs is a known condition, and to give that as the answer, when asked the cause of a person's death, would not supply the information sought. Once conceive that a doubt could exist as to his having bodily organs, or that he were to be compared with some being who had them not, and cases may be imagined in which it might be said that his possession of them was the cause of his death. If Faust and Mephistopheles together took poison, it might be said that Faust died because he was a human being, and had a body, while Mephistopheles survived because he was a spirit.

It is for the same reason that no one (as the reviewer remarks) "calls the cause of a leap, the muscles or sinews of the body, though they are necessary conditions; nor the cause of a self-sacrifice, the knowledge which was necessary for it; nor the cause of writing a book, that a man has time for it, which is a necessary condition." These conditions (besides that they are antecedent *states*, and not proximate antecedent *events*, and are therefore never the conditions in closest apparent proximity to the effect) are all of them so obviously implied, that it is hardly possible there should exist that necessity for insisting on them, which alone gives occasion for speaking of a single condition as if it were the cause. Wherever this necessity exists in regard to some one condition, and does not exist in regard to any other, I conceive that it is consistent with usage, when scientific accuracy is not aimed at, to apply the name cause to that one condition. If the only condition which can be supposed to be unknown is a negative condition, the negative condition may be spoken of as the cause. It might be said that a person died for want of medical advice: though this would not be likely to be said, unless the person was already understood to be ill, and in order to indicate that this negative circumstance was what made the illness fatal, and not the weakness of his constitution, or the original virulence of the disease. It might be said that a person was drowned because he could not swim; the positive condition, namely, that he fell into the water, being already implied in the word drowned. And here let me remark, that his falling into the water is in this case the only positive condition: all the conditions not expressly or virtually included in this (as that he could not swim, that nobody helped him, and so forth) are negative. Yet, if it were simply said that the cause of a man's death was falling into the water, there would be quite as great a sense of impropriety in the expression, as there would be if it were said that the cause was his inability to swim; because, though the one condition is positive and the other negative, it would be felt that neither of them was sufficient, without the other, to produce death.

With regard to the assertion that nothing is termed the cause, except the element which exerts active force; I waive the question as to the meaning of active force, and accepting the phrase in its popular sense, I revert to a former example, and I ask, would it be more agreeable to custom to say that a man fell because his foot slipped in climbing a ladder, or that he fell because of his weight? for his weight, and not the motion of his foot, was the active force which determined his fall. If a person walking out in a frosty day, stumbled and fell, it might be said that he stumbled because the ground was slippery, or because he was not sufficiently careful: but few people, I suppose, would say, that he stumbled because he walked. Yet the only active force concerned was that which he exerted in walking: the others were mere negative

conditions; but they happened to be the only ones which there could be any necessity to state; for he walked, most likely, in exactly his usual manner, and the negative conditions made all the difference. Again, if a person were asked why the army of Xerxes defeated that of Leonidas, he would probably say, because they were a thousand times the number; but I do not think he would say, it was because they fought, though that was the element of active force. To borrow another example, used by Mr. Grove and by Mr. Baden Powell, the opening of flood-gates is said to be the cause of the flow of water; yet the active force is exerted by the water itself, and opening the flood-gates merely supplies a negative condition. The reviewer adds, "There are some conditions absolutely passive, and yet absolutely necessary to physical phenomena, viz., the relations of space and time; and to these no one ever applies the word cause without being immediately arrested by those who hear him." Even from this statement I am compelled to dissent. Few persons would feel it incongruous to say (for example) that a secret became known because it was spoken of when A. B. was within hearing; which is a condition of space: or that the cause why one of two particular trees is taller than the other, is that it has been longer planted; which is a condition of time.

115. There are a few exceptions; for there are some properties of objects which seem to be purely preventive; as the property of opaque bodies, by which they intercept the passage of light. This, as far as we are able to understand it, appears an instance not of one cause counteracting another by the same law whereby it produces its own effects, but of an agency which manifests itself in no other way than in defeating the effects of another agency. If we knew on what other relations to light, or on what peculiarities of structure, opacity depends, we might find that this is only an apparent, not a real, exception to the general proposition in the text. In any case it needs not affect the practical application. The formula which includes all the negative conditions of an effect in the single one of the absence of counteracting causes, is not violated by such cases as this; though, if all counteracting agencies were of this description, there would be no purpose served by employing the formula.

116. I mean by this expression, the ultimate laws of nature (whatever they may be) as distinguished from the derivative laws and from the collocations. The diurnal revolution of the earth (for example) is not a part of the constitution of things, because nothing can be so called which might possibly be terminated or altered by natural causes.

117. I use the words "straight line" for brevity and simplicity. In reality the line in question is not exactly straight, for, from the effect of refraction, we actually see the sun for a short interval during which the opaque mass of the earth is interposed in a direct line between the sun and our eyes; thus realizing, though but to a limited extent, the coveted desideratum of seeing round a corner.

118. *Second Burnett Prize Essay*, by Principal Tulloch, p. 25.

119. *Letters on the Philosophy of the Human Mind*, First Series, p. 219.

120. *Essays*, pp. 206-208.

121. To the universality which mankind are agreed in ascribing to the Law of Causation, there is one claim of exception, one disputed case, that of the Human Will; the determinations of which, a large class of metaphysicians are not willing to regard as following the causes called motives, according to as strict laws as those which they suppose to exist in the world of mere matter. This controverted point will undergo a special examination when we come to treat particularly of the Logic of the Moral Sciences (Book vi., chap. 2). In the mean time, I may remark that these metaphysicians, who, it must be observed, ground the main part of their objection on the supposed repugnance of the doctrine in question to our consciousness, seem to me to mistake the fact which consciousness testifies against. What is really in contradiction to consciousness, they would, I think, on strict self-examination, find to be, the application to human actions and volitions of the ideas involved in the common use of the term Necessity; which I agree with them in objecting to. But if they would consider that by saying that a person's actions *necessarily* follow from his character, all that is really meant (for no more is meant in any case whatever of causation) is that he invariably *does* act in conformity to his character, and that any one who thoroughly

knew his character could certainly predict how he would act in any supposable case; they probably would not find this doctrine either contrary to their experience or revolting to their feelings. And no more than this is contended for by any one but an Asiatic fatalist.

122. I believe, however, the accredited authorities do suppose that molecular motion, equivalent in amount to that which will be manifested in the combustion of the coal, is actually taking place during the whole of the long interval, if not in the coal, yet in the oxygen which will then combine with it. But how purely hypothetical this supposition is, need hardly be remarked; I venture to say, unnecessarily and extravagantly hypothetical.

123. *Lectures on Metaphysics*, vol. ii., Lect. xxxix., pp. 391-2.

I regret that I can not invoke the authority of Sir William Hamilton in favor of my own opinions on Causation, as I can against the particular theory which I am now combating. But that acute thinker has a theory of Causation peculiar to himself, which has never yet, as far as I know, been analytically examined, but which, I venture to think, admits of as complete refutation as any one of the false or insufficient psychological theories which strew the ground in such numbers under his potent metaphysical scythe. (Since examined and controverted in the sixteenth chapter of *An Examination of Sir William Hamilton's Philosophy*.)

124. Unless we are to consider as such the following statement, by one of the writers quoted in the text: "In the case of mental exertion, the result to be accomplished is *preconsidered* or meditated, and is therefore known *a priori*, or before experience."—(Bowen's *Lowell Lectures on the Application of Metaphysical and Ethical Science to the Evidence of Religion*. Boston, 1849.) This is merely saying that when we will a thing we have an idea of it. But to have an idea of what we wish to happen, does not imply a prophetic knowledge that it will happen. Perhaps it will be said that the *first time* we exerted our will, when we had of course no experience of any of the powers residing in us, we nevertheless must already have known that we possessed them, since we can not will that which we do not believe to be in our power. But the impossibility is perhaps in the words only, and not in the facts; for we may *desire* what we do not know to be in our power; and finding by experience that our bodies move according to our *desire*, we may then, and only then, pass into the more complicated mental state which is termed will.

After all, even if we had an instinctive knowledge that our actions would follow our will, this, as Brown remarks, would prove nothing as to the nature of Causation. Our knowing, previous to experience, that an antecedent will be followed by a certain consequent, would not prove the relation between them to be any thing more than antecedence and consequence.

125. Reid's *Essays on the Active Powers*, Essay iv., chap. 3.

126. *Prospective Review* for February, 1850.

127. Vide supra, p. 178, note.

128. *Westminster Review* for October, 1855.

129. See the whole doctrine in Aristotle *de Ánimâ*, where the θρεπτικὴ ψυχὴ is treated as exactly equivalent to θρεπτικὴ δύναμις.

130. It deserves notice that the parts of nature which Aristotle regards as representing evidence of design, are the Uniformities: the phenomena in so far as reducible to law. Τύχη and τὸ αὐτομάτον satisfy him as explanations of the variable element in phenomena, but their occurring according to a fixed rule can only, to his conceptions, be accounted for by an Intelligent Will. The common, or what may be called the instinctive, religious interpretation of nature, is the reverse of this. The events in which men spontaneously see the hand of a supernatural being, are those which can not, as they think, be reduced to a physical law. What they can distinctly connect with physical causes, and especially what they can predict, though of course ascribed to an Author of Nature, if they already recognize such an author, might be conceived, they think, to arise from a blind fatality, and in any case do not appear to them to bear so

obviously the mark of a divine will. And this distinction has been countenanced by eminent writers on Natural Theology, in particular by Dr. Chalmers, who thinks that though design is present everywhere, the irresistible evidence of it is to be found not in the *laws* of nature but in the collocations, *i.e.*, in the part of nature in which it is impossible to trace any law. A few properties of dead matter might, he thinks, conceivably account for the regular and invariable succession of effects and causes; but that the different kinds of matter have been so placed as to promote beneficent ends, is what he regards as the proof of a Divine Providence. Mr. Baden Powell, in his Essay entitled "Philosophy of Creation," has returned to the point of view of Aristotle and the ancients, and vigorously re-asserts the doctrine that the indication of design in the universe is not special adaptations, but Uniformity and Law, these being the evidences of mind, and not what appears to us to be a provision for our uses. While I decline to express any opinion here on this *vexata quæstio*, I ought not to mention Mr. Powell's volume without the acknowledgment due to the philosophic spirit which pervades generally the three Essays composing it, forming in the case of one of them (the "Unity of Worlds") an honorable contrast with the other dissertations, so far as they have come under my notice, which have appeared on either side of that controversy.

131. In the words of Fontenelle, another celebrated Cartesian, "les philosophes aussi bien que le peuple avaient cru que l'âme et le corps agissaient réellement et physiquement l'un sur l'autre. Descartes vint, qui prouva que leur nature ne permettait point cette sorte de communication véritable, et qu'ils n'en pouvaient avoir qu'une apparente, dont Dieu était le Médiateur."—(*Œuvres de Fontenelle*, ed. 1767, tom. v., p. 534.)

132. I omit, for simplicity, to take into account the effect, in this latter case, of the diminution of pressure, in diminishing the flow of water through the drain; which evidently in no way affects the truth or applicability of the principle, since when the two causes act simultaneously the conditions of that diminution of pressure do not arise.

133. Professor Bain adds several other well-established chemical generalizations: "The laws that simple substances exhibit the strongest affinities; that compounds are more fusible than their elements; that combination tends to a lower state of matter from gas down to solid;" and some general propositions concerning the circumstances which facilitate or resist chemical combination. (Logic, ii., 254.)

134. Professor Bain (Logic, ii., 39) points out a class of cases, other than that spoken of in the text, which he thinks must be regarded as an exception to the Composition of Causes. "Causes that merely make good the collocation for bringing a prime mover into action, or that release a potential force, do not follow any such rule. One man may direct a gun upon a fort as well as three: two sparks are not more effectual than one in exploding a barrel of gunpowder. In medicine there is a certain dose that answers the end; and adding to it does no more good."

I am not sure that these cases are really exceptions. The law of Composition of Causes, I think, is really fulfilled, and the appearance to the contrary is produced by attending to the remote instead of the immediate effect of the causes. In the cases mentioned, the immediate effect of the causes in action is a collocation, and the duplication of the cause does double the quantity of collocation. Two men could raise the gun to the required angle twice as quickly as one, though one is enough. Two sparks put two sets of particles of the gunpowder into the state of intestine motion which makes them explode, though one is sufficient. It is the collocation itself that does not, by being doubled, always double the effect; because in many cases a certain collocation, once obtained, is all that is required for the production of the whole amount of effect which can be produced at all at the given time and place. Doubling the collocation with difference of time and place, as by pointing two guns, or exploding a second barrel after the first, does double the effect. This remark applies still more to Mr. Bain's third example, that of a double dose of medicine; for a double dose of an aperient does purge more violently, and a double dose of laudanum does produce longer and sounder sleep. But a double purging, or a double amount of narcotism, may have remote effects different in kind from the effect of the smaller amount, reducing the case to that of heteropathic laws, discussed in the text.

135. Unless, indeed, the consequent was generated, not by the antecedent, but by the means employed to produce the antecedent. As, however, these means are under our power, there is so far a probability that they are also sufficiently within our knowledge to enable us to judge whether that could be the case or not.

136. *Discourse on the Study of Natural Philosophy*, p. 179.

137. For this speculation, as for many other of my scientific illustrations, I am indebted to Professor Bain, whose subsequent treatise on Logic abounds with apt illustrations of all the inductive methods.

138. This view of the necessary co-existence of opposite excitements involves a great extension of the original doctrine of two electricities. The early theorists assumed that, when amber was rubbed, the amber was made positive and the rubber negative to the same degree; but it never occurred to them to suppose that the existence of the amber charge was dependent on an opposite charge in the bodies with which the amber was contiguous, while the existence of the negative charge on the rubber was equally dependent on a contrary state of the surfaces that might accidentally be confronted with it; that, in fact, in a case of electrical excitement by friction, four charges were the minimum that could exist. But this double electrical action is essentially implied in the explanation now universally adopted in regard to the phenomena of the common electric machine.

139. Pp. 110, 111.

140. Infra, book iv., chap. ii., On Abstraction.

141. I must, however, remark, that this example, which seems to militate against the assertion we made of the comparative inapplicability of the Method of Difference to cases of pure observation, is really one of those exceptions which, according to a proverbial expression, prove the general rule. For in this case, in which Nature, in her experiment, seems to have imitated the type of the experiments made by man, she has only succeeded in producing the likeness of man's most imperfect experiments; namely, those in which, though he succeeds in producing the phenomenon, he does so by employing complex means, which he is unable perfectly to analyze, and can form, therefore, no sufficient judgment what portion of the effects may be due, not to the supposed cause, but to some unknown agency of the means by which that cause was produced. In the natural experiment which we are speaking of, the means used was the clearing off a canopy of clouds; and we certainly do not know sufficiently in what this process consists, or on what it depends, to be certain *a priori* that it might not operate upon the deposition of dew independently of any thermometric effect at the earth's surface. Even, therefore, in a case so favorable as this to Nature's experimental talents, her experiment is of little value except in corroboration of a conclusion already attained through other means.

142. In his subsequent work, *Outlines of Astronomy* (§ 570), Sir John Herschel suggests another possible explanation of the acceleration of the revolution of a comet.

143. Discourse, pp. 156-8, and 171.

144. Outlines of Astronomy, § 856.

145. *Philosophy of Discovery*, pp. 263, 264.

146. See, on this point, the second chapter of the present book.

147. Ante, chap. vii., § 1.

148. It seems hardly necessary to say that the word *impinge*, as a general term to express collision of forces, is here used by a figure of speech, and not as expressive of any theory respecting the nature of force.

149. *Essays on some Unsettled Questions of Political Economy*, Essay V.

150. It is justly remarked by Professor Bain, that though the Methods of Agreement and Difference are not applicable to these cases, they are not wholly inaccessible to the Method of Concomitant Variations. "If a cause happens to vary alone, the effect will also vary alone: a cause and effect may be thus singled out under the greatest complications. Thus, when the appetite for food increases with the cold, we have a strong evidence of connection between these two facts, although other circumstances

may operate in the same direction. The assigning of the respective parts of the sun and moon in the action of the tides may be effected, to a certain degree of exactness, by the variations of the amount according to the positions of the two attractive bodies. By a series of experiments of Concomitant Variations, directed to ascertain the elimination of nitrogen from the human body under varieties of muscular exercise, Dr. Parkes obtained the remarkable conclusion, that a muscle grows during exercise, and loses bulk during the subsequent rest." (*Logic*, ii., 83.)

It is, no doubt, often possible to single out the influencing causes from among a great number of mere concomitants, by noting what are the antecedents, a variation in which is followed by a variation in the effect. But when there are many influencing causes, no one of them greatly predominating over the rest, and especially when some of these are continually changing, it is scarcely ever possible to trace such a relation between the variations of the effect and those of any one cause as would enable us to assign to that cause its real share in the production of the effect.

151. Bain's *Logic*, ii., 360.

152. What is said in the text on the applicability of the experimental methods to resolve particular questions of medical treatment, does not detract from their efficacy in ascertaining the general laws of the animal or human system. The functions, for example, of the different classes of nerves have been discovered, and probably could only have been discovered, by experiments on living animals. Observation and experiment are the ultimate basis of all knowledge: from them we obtain the elementary laws of life, as we obtain all other elementary truths. It is in dealing with the complex combinations that the experimental methods are for the most part illusory, and the deductive mode of investigation must be invoked to disentangle the complexity.

153. Professor Bain, though concurring generally in the views expressed in this chapter, seems to estimate more highly than I do the scope for specific experimental evidence in politics. (*Logic*, ii., 333-337.) There are, it is true, as he remarks (p. 336), some cases "when an agent suddenly introduced is almost instantaneously followed by some other changes, as when the announcement of a diplomatic rupture between two nations is followed the same day by a derangement of the money-market." But this experiment would be quite inconclusive merely as an experiment. It can only serve, as any experiment may, to verify the conclusion of a deduction. Unless we already knew by our knowledge of the motives which act on business men, that the prospect of war *tends* to derange the money-market, we should never have been able to prove a connection between the two facts, unless after having ascertained historically that the one followed the other in too great a number of instances to be consistent with their having been recorded with due precautions. Whoever has carefully examined any of the attempts continually made to prove economic doctrines by such a recital of instances, knows well how futile they are. It always turns out that the circumstances of scarcely any of the cases have been fully stated; and that cases, in equal or greater numbers, have been omitted which would have tended to an opposite conclusion.

154. Vide Memoir by Thomas Graham, F.R.S., Master of the Mint, "On Liquid Diffusion applied to Analysis," in the *Philosophical Transactions* for 1862, reprinted in the *Journal of the Chemical Society*, and also separately as a pamphlet.

155. It was an old generalization in surgery, that tight bandaging had a tendency to prevent or dissipate local inflammation. This sequence, being, in the progress of physiological knowledge, resolved into more general laws, led to the important surgical invention made by Dr. Arnott, the treatment of local inflammation and tumors by means of an equable pressure, produced by a bladder partially filled with air. The pressure, by keeping back the blood from the part, prevents the inflammation, or the tumor, from being nourished: in the case of inflammation, it removes the stimulus, which the organ is unfit to receive; in the case of tumors, by keeping back the nutritive fluid, it causes the absorption of matter to exceed the supply, and the diseased mass is gradually absorbed and disappears.

156. Since acknowledged and reprinted in Mr. Martineau's *Miscellanies*.

157. *Dissertations and Discussions*, vol. i., fourth paper.

158. Written before the rise of the new views respecting the relation of heat to mechanical force; but confirmed rather than contradicted by them.

159. As is well remarked by Professor Bain, in the very valuable chapter of his Logic which treats of this subject (ii., 121), "scientific explanation and inductive generalization being the same thing, the limits of Explanation are the limits of Induction," and "the limits to inductive generalization are the limits to the agreement or community of facts. Induction supposes similarity among phenomena; and when such similarity is discovered, it reduces the phenomena under a common statement. The similarity of terrestrial gravity to celestial attraction enables the two to be expressed as one phenomenon. The similarity between capillary attraction, solution, the operation of cements, etc., leads to their being regarded not as a plurality, but as a unity, a single causative link, the operation of a single agency.... If it be asked whether we can merge gravity itself in some still higher law, the answer must depend upon the facts. Are there any other forces, at present held distinct from gravity, that we may hope to make fraternize with it, so as to join in constituting a higher unity? Gravity is an attractive force; and another great attractive force is cohesion, or the force that binds together the atoms of solid matter. Might we, then, join these two in a still higher unity, expressed under a more comprehensive law? Certainly we might, but not to any advantage. The two kinds of force agree in the one point, attraction, but they agree in no other; indeed, in the manner of the attraction, they differ widely; so widely that we should have to state totally distinct laws for each. Gravity is common to all matter, and equal in amount in equal masses of matter, whatever be the kind; it follows the law of the diffusion of space from a point (the inverse square of the distance); it extends to distances unlimited; it is indestructible and invariable. Cohesion is special for each separate substance; it decreases according to distance much more rapidly than the inverse square, vanishing entirely at very small distances. Two such forces have not sufficient kindred to be generalized into one force; the generalization is only illusory; the statement of the difference would still make two forces; while the consideration of one would not in any way simplify the phenomena of the other, as happened in the generalization of gravity itself."

To the impassable limit of the explanation of laws of nature, set forth in the text, must therefore be added a further limitation. Although, when the phenomena to be explained are not, in their own nature, generically distinct, the attempt to refer them to the same cause is scientifically legitimate; yet to the success of the attempt it is indispensable that the cause should be shown to be capable of producing them according to the same law. Otherwise the unity of cause is a mere guess, and the generalization only a nominal one, which, even if admitted, would not diminish the number of ultimate laws of nature.

160. *Cours de Philosophie Positive*, ii., 656.

161. Vide supra, book iii., chap. xi.

162. *Philosophy of Discovery*, p. 185 et seq.

163. Comte, *Philosophie Positive*, ii., 434-437.

164. As an example of legitimate hypothesis according to the test here laid down, has been justly cited that of Broussais, who, proceeding on the very rational principle that every disease must originate in some definite part or other of the organism, boldly assumed that certain fevers, which not being known to be local were called constitutional, had their origin in the mucous membrane of the alimentary canal. The supposition was, indeed, as is now generally admitted, erroneous; but he was justified in making it, since by deducing the consequences of the supposition, and comparing them with the facts of those maladies, he might be certain of disproving his hypothesis if it was ill founded, and might expect that the comparison would materially aid him in framing another more conformable to the phenomena.

The doctrine now universally received that the earth is a natural magnet, was originally an hypothesis of the celebrated Gilbert.

Another hypothesis, to the legitimacy of which no objection can lie, and which is well calculated to light the path of scientific inquiry, is that suggested by several recent writers, that the brain is a voltaic pile, and that each of its pulsations is a discharge of electricity through the system. It has been remarked that the sensation felt by the hand from the beating of a brain, bears a strong resemblance to a voltaic shock. And the hypothesis, if followed to its consequences, might afford a plausible explanation of many physiological facts, while there is nothing to discourage the hope that we may in time sufficiently understand the conditions of voltaic phenomena to render the truth of the hypothesis amenable to observation and experiment.

The attempt to localize, in different regions of the brain, the physical organs of our different mental faculties and propensities, was, on the part of its original author, a legitimate example of a scientific hypothesis; and we ought not, therefore, to blame him for the extremely slight grounds on which he often proceeded, in an operation which could only be tentative, though we may regret that materials barely sufficient for a first rude hypothesis should have been hastily worked up into the vain semblance of a science. If there be really a connection between the scale of mental endowments and the various degrees of complication in the cerebral system, the nature of that connection was in no other way so likely to be brought to light as by framing, in the first instance, an hypothesis similar to that of Gall. But the verification of any such hypothesis is attended, from the peculiar nature of the phenomena, with difficulties which phrenologists have not shown themselves even competent to appreciate, much less to overcome.

Mr. Darwin's remarkable speculation on the Origin of Species is another unimpeachable example of a legitimate hypothesis. What he terms "natural selection" is not only a *vera causa*, but one proved to be capable of producing effects of the same kind with those which the hypothesis ascribes to it; the question of possibility is entirely one of degree. It is unreasonable to accuse Mr. Darwin (as has been done) of violating the rules of Induction. The rules of Induction are concerned with the conditions of Proof. Mr. Darwin has never pretended that his doctrine was proved. He was not bound by the rules of Induction, but by those of Hypothesis. And these last have seldom been more completely fulfilled. He has opened a path of inquiry full of promise, the results of which none can foresee. And is it not a wonderful feat of scientific knowledge and ingenuity to have rendered so bold a suggestion, which the first impulse of every one was to reject at once, admissible and discussible, even as a conjecture?

165. Whewell's *Phil. of Discovery*, pp. 275, 276.

166. What has most contributed to accredit the hypothesis of a physical medium for the conveyance of light, is the certain fact that light *travels* (which can not be proved of gravitation); that its communication is not instantaneous, but requires time; and that it is intercepted (which gravitation is not) by intervening objects. These are analogies between its phenomena and those of the mechanical motion of a solid or fluid substance. But we are not entitled to assume that mechanical motion is the only power in nature capable of exhibiting those attributes.

167. *Phil. of Discovery*, p. 274.

168. P. 271.

169. P. 251 and the whole of Appendix G.

170. In Dr. Whewell's latest version of his theory (*Philosophy of Discovery*, p. 331) he makes a concession respecting the medium of the transmission of light, which, taken in conjunction with the rest of his doctrine on the subject, is not, I confess, very intelligible to me, but which goes far toward removing, if it does not actually remove, the whole of the difference between us. He is contending, against Sir William Hamilton, that all matter has weight. Sir William, in proof of the contrary, cited the luminiferous ether, and the calorific and electric fluids, "which," he said, "we can neither denude of their character of substance, nor clothe with the attribute of weight." "To which," continues Dr. Whewell, "my reply is, that precisely because I can not clothe these agents with the attribute of Weight, I *do* denude them of the character of Substance. They are not substances, but agencies. These Imponderable Agents are not

properly called Imponderable Fluids. This I conceive that I have proved." Nothing can be more philosophical. But if the luminiferous ether is not matter, and fluid matter, too, what is the meaning of its undulations? Can an agency undulate? Can there be alternate motion forward and backward of the particles of an agency? And does not the whole mathematical theory of the undulations imply them to be material? Is it not a series of deductions from the known properties of elastic fluids? *This* opinion of Dr. Whewell reduces the undulations to a figure of speech, and the undulatory theory to the proposition which all must admit, that the transmission of light takes place according to laws which present a very striking and remarkable agreement with those of undulations. If Dr. Whewell is prepared to stand by this doctrine, I have no difference with him on the subject.

171. Thus water, of which eight-ninths in weight are oxygen, dissolves most bodies which contain a high proportion of oxygen, such as all the nitrates (which have more oxygen than any others of the common salts), most of the sulphates, many of the carbonates, etc. Again, bodies largely composed of combustible elements, like hydrogen and carbon, are soluble in bodies of similar composition; resin, for instance, will dissolve in alcohol, tar in oil of turpentine. This empirical generalization is far from being universally true; no doubt because it is a remote, and therefore easily defeated, result of general laws too deep for us at present to penetrate; but it will probably in time suggest processes of inquiry, leading to the discovery of those laws.

172. Or, according to Laplace's theory, the sun and the sun's rotation.

173. Supra, book iii., chap. v., § 7.

174. Supra, book iii., chap. x., § 2

175. In the preceding discussion, the *mean* is spoken of as if it were exactly the same thing with the *average*. But the mean, for purposes of inductive inquiry, is not the average, or arithmetical mean, though in a familiar illustration of the theory the difference may be disregarded. If the deviations on one side of the average are much more numerous than those on the other (these last being fewer but greater), the effect due to the invariable cause, as distinct from the variable ones, will not coincide with the average, but will be either below or above the average, the deviation being toward the side on which the greatest number of the instances are found. This follows from a truth, ascertained both inductively and deductively, that small deviations from the true central point are greatly more frequent than large ones. The mathematical law is, "that the most probable determination of one or more invariable elements from observation is that in which the *sum of the squares* of the individual aberrations," or deviations, "*shall be the least possible*." See this principle stated, and its grounds popularly explained, by Sir John Herschel, in his review of Quetelet on Probabilities, *Essays*, p. 395 *et seq*.

176. *Essai Philosophique sur les Probabilités*, fifth Paris edition, p. 7.

177. It even appears to me that the calculation of chances, where there are no data grounded either on special experience or on special inference, must, in an immense majority of cases, break down, from sheer impossibility of assigning any principle by which to be guided in setting out the list of possibilities. In the case of the colored balls we have no difficulty in making the enumeration, because we ourselves determine what the possibilities shall be. But suppose a case more analogous to those which occur in nature: instead of three colors, let there be in the box all possible colors, we being supposed ignorant of the comparative frequency with which different colors occur in nature, or in the productions of art. How is the list of cases to be made out? Is every distinct shade to count as a color? If so, is the test to be a common eye, or an educated eye—a painter's, for instance? On the answer to these questions would depend whether the chances against some particular color would be estimated at ten, twenty, or perhaps five hundred to one. While if we knew from experience that the particular color occurs on an average a certain number of times in every hundred or thousand, we should not require to know any thing either of the frequency or of the number of the other possibilities.

178. *Prospective Review* for February, 1850.

179.

"If this be not so, why do we feel so much more probability added by the first instance than by any single subsequent instance? Why, except that the first instance gives us its possibility (a cause *adequate* to it), while every other only gives us the frequency of its conditions? If no reference to a cause be supposed, possibility would have no meaning; yet it is clear that, antecedent to its happening, we might have supposed the event impossible, *i.e.*, have believed that there was no physical energy really existing in the world equal to producing it.... After the first time of happening, which is, then, more important to the whole probability than any other single instance (because proving the possibility), the *number* of times becomes important as an index to the intensity or extent of the cause, and its independence of any particular time. If we took the case of a tremendous leap, for instance, and wished to form an estimate of the probability of its succeeding a certain number of times; the first instance, by showing its possibility (before doubtful) is of the most importance; but every succeeding leap shows the power to be more perfectly under control, greater and more invariable, and so increases the probability; and no one would think of reasoning in this case straight from one instance to the next, without referring to the physical energy which each leap indicated. Is it not, then, clear that we do not ever" (let us rather say, that we do not in an advanced state of our knowledge) "conclude directly from the happening of an event to the probability of its happening again; but that we refer to the cause, regarding the past cases as an index to the cause, and the cause as our guide to the future?"—*Ibid.*

180. The writer last quoted says that the valuation of chances by comparing the number of cases in which the event occurs with the number in which it does not occur, "would generally be wholly erroneous," and "is not the true theory of probability." It is at least that which forms the foundation of insurance, and of all those calculations of chances in the business of life which experience so abundantly verifies. The reason which the reviewer gives for rejecting the theory is, that it "would regard an event as certain which had hitherto never failed; which is exceedingly far from the truth, even for a very large number of constant successes." This is not a defect in a particular theory, but in any theory of chances. No principle of evaluation can provide for such a case as that which the reviewer supposes. If an event has never once failed, in a number of trials sufficient to eliminate chance, it really has all the certainty which can be given by an empirical law; it *is* certain during the continuance of the same collocation of causes which existed during the observations. If it ever fails, it is in consequence of some change in that collocation. Now, no theory of chances will enable us to infer the future probability of an event from the past, if the causes in operation, capable of influencing the event, have intermediately undergone a change.

181. Pp. 18, 19. The theorem is not stated by Laplace in the exact terms in which I have stated it; but the identity of import of the two modes of expression is easily demonstrable.

182. For a fuller treatment of the many interesting questions raised by the theory of probabilities, I may now refer to a recent work by Mr. Venn, Fellow of Caius College, Cambridge, "The Logic of Chance;" one of the most thoughtful and philosophical treatises on any subject connected with Logic and Evidence which have been produced, to my knowledge, for many years. Some criticisms contained in it have been very useful to me in revising the corresponding chapters of the present work. In several of Mr. Venn's opinions, however, I do not agree. What these are will be obvious to any reader of Mr. Venn's work who is also a reader of this.

183. Hartley's *Observations on Man*, vol. i., p. 16. The passage is not in Priestley's curtailed edition.

184. I am happy to be able to quote the following excellent passage from Mr. Baden Powell's *Essay on the Inductive Philosophy*, in confirmation, both in regard to history and to doctrine, of the statement made in the text. Speaking of the "conviction of the universal and permanent uniformity of nature," Mr. Powell says (pp. 98-100):

"We may remark that this idea, in its proper extent, is by no means one of popular acceptance or natural growth. Just so far as the daily experience of every one goes, so far indeed he comes to embrace a certain persuasion of this kind, but merely to this limited extent, that what is going on around him at present, in his own narrow sphere

of observation, will go on in like manner in future. The peasant believes that the sun which rose to-day will rise again to-morrow; that the seed put into the ground will be followed in due time by the harvest this year as it was last year, and the like; but has no notion of such inferences in subjects beyond his immediate observation. And it should be observed that each class of persons, in admitting this belief within the limited range of his own experience, though he doubt or deny it in every thing beyond, is, in fact, bearing unconscious testimony to its universal truth. Nor, again, is it only among the *most* ignorant that this limitation is put upon the truth. There is a very general propensity to believe that every thing beyond common experience, or especially ascertained laws of nature, is left to the dominion of chance or fate or arbitrary intervention; and even to object to any attempted explanation by physical causes, if conjecturally thrown out for an apparently unaccountable phenomenon.

"The precise doctrine of the *generalization* of this idea of the uniformity of nature, so far from being obvious, natural, or intuitive, is utterly beyond the attainment of the many. In all the extent of its universality it is characteristic of the philosopher. It is clearly the result of philosophic cultivation and training, and by no means the spontaneous offspring of any primary principle naturally inherent in the mind, as some seem to believe. It is no mere vague persuasion taken up without examination, as a common prepossession to which we are always accustomed; on the contrary, all common prejudices and associations are against it. It is pre-eminently *an acquired idea*. It is not attained without deep study and reflection. The best informed philosopher is the man who most firmly believes it, even in opposition to received notions; its acceptance depends on the extent and profoundness of his inductive studies."

185. Supra, book iii., chap. iii., § 1

186. It deserves remark, that these early generalizations did not, like scientific inductions, presuppose causation. What they did presuppose, was *uniformity* in physical facts. But the observers were as ready to presume uniformity in the co-existence of facts as in the sequences. On the other hand, they never thought of assuming that this uniformity was a principle pervading all nature: their generalizations did not imply that there was uniformity in every thing, but only that as much uniformity as existed within their observation, existed also beyond it. The induction, fire burns, does not require for its validity that all nature should observe uniform laws, but only that there should be uniformity in one particular class of natural phenomena; the effects of fire on the senses and on combustible substances. And uniformity to this extent was not assumed, anterior to the experience, but proved by the experience. The same observed instances which proved the narrower truth, proved as much of the wider one as corresponded to it. It is from losing sight of this fact, and considering the law of causation in its full extent as necessarily presupposed in the very earliest generalizations, that persons have been led into the belief that the law of causation is known *a priori*, and is not itself a conclusion from experience.

187. Book ii., chap. iii.

188. One of the most rising thinkers of the new generation in France, M. Taine (who has given, in the *Revue des Deux Mondes*, the most masterly analysis, at least in one point of view, ever made of the present work), though he rejects, on this and similar points of psychology, the intuition theory in its ordinary form, nevertheless assigns to the law of causation, and to some other of the most universal laws, that certainty beyond the bounds of human experience, which I have not been able to accord to them. He does this on the faith of our faculty of abstraction, in which he seems to recognize an independent source of evidence, not indeed disclosing truths not contained in our experience, but affording an assurance which experience can not give, of the universality of those which it does contain. By abstraction M. Taine seems to think that we are able, not merely to analyze that part of nature which we see, and exhibit apart the elements which pervade it, but to distinguish such of them as are elements of the system of nature considered as a whole, not incidents belonging to our limited terrestrial experience. I am not sure that I fully enter into M. Taine's meaning; but I confess I do not see how any mere abstract conception, elicited by our minds from our experience, can be evidence of an objective fact in universal Nature, beyond what the

experience itself bears witness of; or how, in the process of interpreting in general language the testimony of experience, the limitations of the testimony itself can be cast off.

Dr. Ward, in an able article in the *Dublin Review* for October, 1871, contends that the uniformity of nature can not be proved from experience, but from "transcendental considerations" only, and that, consequently, all physical science would be deprived of its basis, if such transcendental proof were impossible.

When physical science is said to depend on the assumption that the course of nature is invariable, all that is meant is that the conclusions of physical science are not known as *absolute* truths: the truth of them is *conditional* on the uniformity of the course of nature; and all that the most conclusive observations and experiments can prove, is that the result arrived at will be true if, and as long as, the present laws of nature are valid. But this is all the assurance we require for the guidance of our conduct. Dr. Ward himself does not think that his transcendental proofs make it practically greater; for he believes, as a Catholic, that the course of nature not only has been, but frequently and even daily is, suspended by supernatural intervention.

But though this conditional conclusiveness of the evidence of experience, which is sufficient for the purposes of life, is all that I was necessarily concerned to prove, I have given reasons for thinking that the uniformity, as itself a part of experience, is sufficiently proved to justify undoubting reliance on it. This Dr. Ward contests, for the following reasons:

First (p. 315), supposing it true that there has hitherto been no well authenticated case of a breach in the uniformity of nature; "the number of natural agents constantly at work is incalculably large; and the observed cases of uniformity in their action must be immeasurably fewer than one thousandth of the whole. Scientific men, we assume for the moment, have discovered that in a certain proportion of instances—immeasurably fewer than one thousandth of the whole—a certain fact has prevailed; the fact of uniformity; and they have not found a single instance in which that fact does *not* prevail. Are they justified, we ask, in inferring from these premises that the fact is universal? Surely the question answers itself. Let us make a very grotesque supposition, in which, however, the conclusion would really be tried according to the arguments adduced. In some desert of Africa there is an enormous connected edifice, surrounding some vast space, in which dwell certain reasonable beings, who are unable to leave the inclosure. In this edifice are more than a thousand chambers, which some years ago were entirely locked up, and the keys no one knew where. By constant diligence twenty-five keys have been found, out of the whole number; and the corresponding chambers, situated promiscuously throughout the edifice, have been opened. Each chamber, when examined, is found to be in the precise shape of a dodecahedron. Are the inhabitants justified on that account in holding with certitude that the remaining 975 chambers are built on the same plan?"

Not with perfect certitude, but (if the chambers to which the keys have been found are really "situated promiscuously") with so high a degree of probability that they would be justified in acting upon the presumption until an exception appeared.

Dr. Ward's argument, however, does not touch mine as it stands in the text. My argument is grounded on the fact that the uniformity of the course of nature as a whole, is constituted by the uniform sequences of special effects from special natural agencies; that the number of these natural agencies in the part of the universe known to us is not incalculable, nor even extremely great; that we have now reason to think that at least the far greater number of them, if not separately, at least in some of the combinations into which they enter, have been made sufficiently amenable to observation, to have enabled us actually to ascertain some of their fixed laws; and that this amount of experience justifies the same degree of assurance that the course of nature is uniform throughout, which we previously had of the uniformity of sequence among the phenomena best known to us. This view of the subject, if correct, destroys the force of Dr. Ward's first argument.

His second argument is, that many or most persons, both scientific and unscientific, believe that there *are* well authenticated cases of breach in the uniformity of nature, namely, miracles. Neither does this consideration touch what I have said in the text. I admit no other uniformity in the events of nature than the law of Causation; and (as I have explained in the chapter of this volume which treats of the Grounds of Disbelief) a miracle is no exception to that law. In every case of alleged miracle, a *new antecedent* is affirmed to exist; a *counteracting cause*, namely, the volition of a supernatural being. To all, therefore, to whom beings with superhuman power over nature are a *vera causa*, a miracle is a *case* of the Law of Universal Causation, not a deviation from it.

Dr. Ward's last, and as he says, strongest argument, is the familiar one of Reid, Stewart, and their followers—that whatever knowledge experience gives us of the past and present, it gives us none of the future. I confess that I see no force whatever in this argument. Wherein does a future fact differ from a present or a past fact, except in their merely momentary relation to the human beings at present in existence? The answer made by Priestley, in his *Examination of Reid*, seems to me sufficient, viz., that though we have had no experience of what *is* future, we have had abundant experience of what *was* future. The "leap in the dark" (as Professor Bain calls it) from the past to the future, is exactly as much in the dark and no more, as the leap from a past which we have personally observed, to a past which we have not. I agree with Mr. Bain in the opinion that the resemblance of what we have not experienced to what we have, is, by a law of our nature, presumed through the mere energy of the idea, before experience has proved it. This *psychological* truth, however, is not, as Dr. Ward when criticising Mr. Bain appears to think, inconsistent with the *logical* truth that experience does prove it. The proof comes after the presumption, and consists in its invariable *verification* by experience when the experience arrives. The fact which while it was future could not be observed, having as yet no existence, is always, when it becomes present and *can* be observed, found conformable to the past.

Dr. M'Cosh maintains (*Examination of Mr. J. S. Mill's Philosophy*, p. 257) that the uniformity of the course of nature is a different thing from the law of causation; and while he allows that the former is only proved by a long continuance of experience, and that it is not inconceivable nor necessarily incredible that there may be worlds in which it does not prevail, he considers the law of causation to be known intuitively. There is, however, no other uniformity in the events of nature than that which arises from the law of causation: so long therefore as there remained any doubt that the course of nature was uniform throughout, at least when not modified by the intervention of a new (supernatural) cause, a doubt was necessarily implied, not indeed of the reality of causation, but of its universality. If the uniformity of the course of nature has any exceptions—if any events succeed one another without fixed laws—to that extent the law of causation fails; there are events which do not depend on causes.

189. Book i., chap. vii.

190. In some cases, a Kind is sufficiently identified by some one remarkable property: but most commonly several are required; each property considered singly, being a joint property of that and of other Kinds. The color and brightness of the diamond are common to it with the paste from which false diamonds are made; its octohedral form is common to it with alum, and magnetic iron ore; but the color and brightness and the form together, identify its Kind: that is, are a mark to us that it is combustible; that when burned it produces carbonic acid; that it can not be cut with any known substance; together with many other ascertained properties, and the fact that there exist an indefinite number still unascertained.

191. This doctrine of course assumes that the allotropic forms of what is chemically the same substance are so many different Kinds; and such, in the sense in which the word Kind is used in this treatise, they really are.

192. Professor Bain (Logic, ii., 13) mentions two empirical laws, which he considers to be, with the exception of the law connecting Gravity with Resistance to motion, "the two most widely operating laws as yet discovered whereby two distinct properties are conjoined throughout substances generally." The first is, "a law connecting Atomic Weight and Specific Heat by an inverse proportion. For equal weights of the simple

bodies, the atomic weight multiplied by a number expressing the specific heat, gives a nearly uniform product. The products, for all the elements, are near the constant number 6." The other is a law which obtains "between the specific gravity of substances in the gaseous state, and the atomic weights. The relationship of the two numbers is in some instances equality; in other instances the one is a multiple of the other."

Neither of these generalizations has the smallest appearance of being an ultimate law. They point unmistakably to higher laws. Since the heat necessary to raise to a given temperature the same weight of different substances (called their specific heat) is inversely as their atomic weight, that is, directly as the number of atoms in a given weight of the substance, it follows that a single atom of every substance requires the same amount of heat to raise it to a given temperature; a most interesting and important law, but a law of causation. The other law mentioned by Mr. Bain points to the conclusion, that in the gaseous state all substances contain, in the same space, the same number of atoms; which, as the gaseous state suspends all cohesive force, might naturally be expected, though it could not have been positively assumed. This law may also be a result of the mode of action of causes, namely, of molecular motions. The cases in which one of the numbers is not identical with the other, but a multiple of it, may be explained on the nowise unlikely supposition, that in our present estimate of the atomic weights of some substances, we mistake two, or three, atoms for one, or one for several.

193. Dr. M'Cosh (p. 324 of his book) considers the laws of the chemical composition of bodies as not coming under the principle of Causation; and thinks it an omission in this work not to have provided special canons for their investigation and proof. But every case of chemical composition is, as I have explained, a case of causation. When it is said that water is composed of hydrogen and oxygen, the affirmation is that hydrogen and oxygen, by the action on one another which they exert under certain conditions, *generate* the properties of water. The Canons of Induction, therefore, as laid down in this treatise, are applicable to the case. Such special adaptations as the Inductive methods may require in their application to chemistry, or any other science, are a proper subject for any one who treats of the logic of the special sciences, as Professor Bain has done in the latter part of his work; but they do not appertain to General Logic.

Dr. M'Cosh also complains (p. 325) that I have given no canons for those sciences in which "the end sought is not the discovery of Causes or of Composition, but of Classes; that is, Natural Classes." Such canons could be no other than the principles and rules of Natural Classification, which I certainly thought that I had expounded at considerable length. But this is far from the only instance in which Dr. M'Cosh does not appear to be aware of the contents of the books he is criticising.

194. Mr. De Morgan, in his *Formal Logic*, makes the just remark, that from two such premises as Most A are B, and Most A are C, we may infer with certainty that some B are C. But this is the utmost limit of the conclusions which can be drawn from two approximate generalizations, when the precise degree of their approximation to universality is unknown or undefined.

195. *Rationale of Judicial Evidence*, vol. iii., p. 224.

196. The evaluation of the chances in this statement has been objected to by a mathematical friend. The correct mode, in his opinion, of setting out the possibilities is as follows. If the thing (let us call it T) which is both an A and a C, is a B, something is true which is only true twice in every thrice, and something else which is only true thrice in every four times. The first fact being true eight times in twelve, and the second being true six times in every eight, and consequently six times in those eight; both facts will be true only six times in twelve. On the other hand, if T, although it is both an A and a C, is not a B, something is true which is only true once in every thrice, and something else which is only true once in every four times. The former being true four times out of twelve, and the latter once in every four, and therefore once in those four; both are only true in one case out of twelve. So that T is a B six times in twelve, and T is not a

B, only once: making the comparative probabilities, not eleven to one, as I had previously made them, but six to one.

In the last edition I accepted this reasoning as conclusive. More attentive consideration, however, has convinced me that it contains a fallacy.

The objector argues, that the fact of A's being a B is true eight times in twelve, and the fact of C's being a B six times in eight, and consequently six times in those eight; both facts, therefore, are true only six times in every twelve. That is, he concludes that because among As taken indiscriminately only eight out of twelve are Bs and the remaining four are not, it must equally hold that four out of twelve are not Bs when the twelve are taken from the select portion of As which are also Cs. And by this assumption he arrives at the strange result, that there are fewer Bs among things which are both As and Cs than there are among either As or Cs taken indiscriminately; so that a thing which has both chances of being a B, is less likely to be so than if it had only the one chance or only the other.

The objector (as has been acutely remarked by another correspondent) applies to the problem under consideration, a mode of calculation only suited to the reverse problem. Had the question been—If two of every three Bs are As and three out of every four Bs are Cs, how many Bs will be both As and Cs, his reasoning would have been correct. For the Bs that are both As and Cs must be fewer than either the Bs that are As or the Bs that are Cs, and to find their number we must abate either of these numbers in the ratio due to the other. But when the problem is to find, not how many Bs are both As and Cs, but how many things that are both As and Cs are Bs, it is evident that among these the proportion of Bs must be not less, but greater, than among things which are only A, or among things which are only B.

The true theory of the chances is best found by going back to the scientific grounds on which the proportions rest. The degree of frequency of a coincidence depends on, and is a measure of, the frequency, combined with the efficacy, of the causes in operation that are favorable to it. If out of every twelve As taken indiscriminately eight are Bs and four are not, it is implied that there are causes operating on A which tend to make it a B, and that these causes are sufficiently constant and sufficiently powerful to succeed in eight out of twelve cases, but fail in the remaining four. So if of twelve Cs, nine are Bs and three are not, there must be causes of the same tendency operating on C, which succeed in nine cases and fail in three. Now suppose twelve cases which are both As and Cs. The whole twelve are now under the operation of both sets of causes. One set is sufficient to prevail in eight of the twelve cases, the other in nine. The analysis of the cases shows that six of the twelve will be Bs through the operation of both sets of causes; two more in virtue of the causes operating on A; and three more through those operating on C, and that there will be only one case in which all the causes will be inoperative. The total number, therefore, which are Bs will be eleven in twelve, and the evaluation in the text is correct.

197. Supra, book i., chap. v.

198. Supra, book i., chap. v., § 1, and book ii., chap, v., § 5.

199. The axiom, "Equals subtracted from equals leave equal differences," may be demonstrated from the two axioms in the text. If A = *a* and B = *b*, A-B = *a*-*b*. For if not, let A-B = *a*-*b*+*c*. Then since B = *b*, adding equals to equals, A = *a*+*c*. But A = *a*. Therefore *a* = *a*+*c*, which is impossible.

This proposition having been demonstrated, we may, by means of it, demonstrate the following: "If equals be added to unequals, the sums are unequal." If A = *a* and B not = *b*, A+B is not = *a*+*b*. For suppose it to be so. Then, since A = *a* and A+B = *a*+*b*, subtracting equals from equals, B = *b*; which is contrary to the hypothesis.

So again, it may be proved that two things, one of which is equal and the other unequal to a third thing, are unequal to one another. If A = *a* and A not = B, neither is *a* = B. For suppose it to be equal. Then since A = *a* and *a* = B, and since things equal to the same thing are equal to one another A = B; which is contrary to the hypothesis.

200. Geometers have usually preferred to define parallel lines by the property of being in the same plane and never meeting. This, however, has rendered it necessary for them to assume, as an additional axiom, some other property of parallel lines; and the unsatisfactory manner in which properties for that purpose have been selected by Euclid and others has always been deemed the opprobrium of elementary geometry. Even as a verbal definition, equidistance is a fitter property to characterize parallels by, since it is the attribute really involved in the signification of the name. If to be in the same plane and never to meet were all that is meant by being parallel, we should feel no incongruity in speaking of a curve as parallel to its asymptote. The meaning of parallel lines is, lines which pursue exactly the same direction, and which, therefore, neither draw nearer nor go farther from one another; a conception suggested at once by the contemplation of nature. That the lines will never meet is of course included in the more comprehensive proposition that they are everywhere equally distant. And that any straight lines which are in the same plane and not equidistant will certainly meet, may be demonstrated in the most rigorous manner from the fundamental property of straight lines assumed in the text, viz., that if they set out from the same point, they diverge more and more without limit.

201. *Philosophie Positive*, iii., 414-416.

202. See the two remarkable notes (A) and (F), appended to his *Inquiry into the Relation of Cause and Effect*.

203. Supra, p. 413.

204. A writer to whom I have several times referred, gives as the definition of an impossibility, that which there exists in the world no cause adequate to produce. This definition does not take in such impossibilities as these—that two and two should make five; that two straight lines should inclose a space; or that any thing should begin to exist without a cause. I can think of no definition of impossibility comprehensive enough to include all its varieties, except the one which I have given: viz., An impossibility is that, the truth of which would conflict with a complete induction, that is, with the most conclusive evidence which we possess of universal truth.

As to the reputed impossibilities which rest on no other grounds than our ignorance of any cause capable of producing the supposed effects; very few of them are certainly impossible, or permanently incredible. The facts of traveling seventy miles an hour, painless surgical operations, and conversing by instantaneous signals between London and New York, held a high place, not many years ago, among such impossibilities.

205. Not, however, as might at first sight appear, 999 times as much. A complete analysis of the cases shows that (always assuming the veracity of the witness to be $^{9}/_{10}$) in 10,000 drawings, the drawing of No. 79 will occur nine times, and be announced incorrectly once; the credibility, therefore, of the announcement of No. 79 is $^{9}/_{10}$; while the drawing of a white ball will occur nine times, and be announced incorrectly 999 times. The credibility, therefore, of the announcement of white is $^{9}/_{1008}$, and the ratio of the two 1008:10; the one announcement being thus only about a hundred times more credible than the other, instead of 999 times.

206. Supra, book iii., chap. ii., § 3, 4, 5.

207. Mr. Bailey has given the best statement of this theory. “The general name,” he says, “raises up the image sometimes of one individual of the class formerly seen, sometimes of another, not unfrequently of many individuals in succession; and it sometimes suggests an image made up of elements from several different objects, by a latent process of which I am not conscious.” (Letters on the Philosophy of the Human Mind, 1st series, letter 22.) But Mr. Bailey must allow that we carry on inductions and ratiocinations respecting the class, by means of this idea or conception of some one individual in it. This is all I require. The name of a class calls up some idea, through which we can, to all intents and purposes, think of the class as such, and not solely of an individual member of it.

208. I have entered rather fully into this question in chap. xvii. of *An Examination of Sir William Hamilton's Philosophy*, headed “The Doctrine of Concepts or General Notions,” which contains my last views on the subject.

209. Other examples of inappropriate conceptions are given by Dr. Whewell (*Phil. Ind. Sc.* ii., 185) as follows: "Aristotle and his followers endeavored in vain to account for the mechanical relation of forces in the lever, by applying the *inappropriate* geometrical conceptions of the properties of the circle: they failed in explaining the *form* of the luminous spot made by the sun shining through a hole, because they applied the *inappropriate* conception of a circular *quality* in the sun's light: they speculated to no purpose about the elementary composition of bodies, because they assumed the *inappropriate* conception of *likeness* between the elements and the compound, instead of the genuine notion of elements merely *determining* the qualities of the compound." But in these cases there is more than an inappropriate conception; there is a false conception; one which has no prototype in nature, nothing corresponding to it in facts. This is evident in the last two examples, and is equally true in the first; the "properties of the circle" which were referred to, being purely fantastical. There is, therefore, an error beyond the wrong choice of a principle of generalization; there is a false assumption of matters of fact. The attempt is made to resolve certain laws of nature into a more general law, that law not being one which, though real, is inappropriate, but one wholly imaginary.

210. Professor Bain.

211. This sentence having been erroneously understood as if I had meant to assert that belief is nothing but an irresistible association, I think it necessary to observe that I express no theory respecting the ultimate analysis either of reasoning or of belief, two of the most obscure points in analytical psychology. I am speaking not of the powers themselves, but of the previous conditions necessary to enable those powers to exert themselves: of which conditions I am contending that language is not one, senses and association being sufficient without it. The irresistible association theory of belief, and the difficulties connected with the subject, have been discussed at length in the notes to the new edition of Mr. James Mill's *Analysis of the Phenomena of the Human Mind*.

212. Mr. Bailey agrees with me in thinking that whenever "from something actually present to my senses, conjoined with past experience, I feel satisfied that something has happened, or will happen, or is happening, beyond the sphere of my personal observation," I may with strict propriety be said to reason: and of course to reason inductively, for demonstrative reasoning is excluded by the circumstances of the case. (*The Theory of Reasoning*, 2d ed., p. 27.)

213. *Novum Organum Renovatum*, pp. 35-37.

214. *Novum Organum Renovatum*, pp. 39, 40.

215. P. 217, 4to edition.

216. "E, ex, extra, extraneus, étranger, stranger."

Another etymological example sometimes cited is the derivation of the English *uncle* from the Latin *avus*. It is scarcely possible for two words to bear fewer outward marks of relationship, yet there is but one step between them, *avus*, *avunculus*, *uncle*. So *pilgrim*, from *ager*: *per agrum*, *peragrinus*, *peregrinus*, *pellegrino*, *pilgrim*. Professor Bain gives some apt examples of these transitions of meaning. "The word 'damp' primarily signified moist, humid, wet. But the property is often accompanied with the feeling of cold or chilliness, and hence the idea of cold is strongly suggested by the word. This is not all. Proceeding upon the superadded meaning, we speak of damping a man's ardor, a metaphor where the cooling is the only circumstance concerned; we go on still further to designate the iron slide that shuts off the draft of a stove, 'the damper,' the primary meaning being now entirely dropped. 'Dry,' in like manner, through signifying the absence of moisture, water, or liquidity, is applied to sulphuric acid containing water, although not thereby ceasing to be a moist, wet, or liquid substance." So in the phrases, dry sherry, or Champagne.

" 'Street,' originally a paved way, with or without houses, has been extended to roads lined with houses, whether paved or unpaved. 'Impertinent' signified at first irrelevant, alien to the purpose in hand: through which it has come to mean, meddling, intrusive, unmannerly, insolent." (*Logic*, ii., 173, 174.)

217. Pp. 226, 227.

218. *Essays*, p. 214.

219. *Essays*, p. 215.

220. Though no such evil consequences as take place in these instances are likely to arise from the modern freak of writing *sanatory* instead of sanitary, it deserves notice as a charming specimen of pedantry ingrafted upon ignorance. Those who thus undertake to correct the spelling of the classical English writers, are not aware that the meaning of *sanatory*, if there were such a word in the language, would have reference not to the preservation of health, but to the cure of disease.

221. *Historical Introduction*, vol. i., pp. 66-68.

222. *History of Scientific Ideas*, ii., 110, 111.

223. *History of Scientific Ideas*, ii., 111-113.

224. *Nov. Org. Renov.*, pp. 286, 287.

225. *History of Scientific Ideas*, ii., 120-122.

226. *Nov. Org. Renov.*, p. 274.

227. *Hist. Sc. Id.*, i. 133.

228. Dr. Whewell, in his reply (*Philosophy of Discovery*, p. 270) says that he "stopped short of, or rather passed by, the doctrine of a series of organized beings," because he "thought it bad and narrow philosophy." If he did, it was evidently without understanding this form of the doctrine; for he proceeds to quote a passage from his "History," in which the doctrine he condemns is designated as that of "a mere linear progression in nature, which would place each genus in contact only with the preceding and succeeding ones." Now the series treated of in the text agrees with this linear progression in nothing whatever but in being a progression.

229. Supra, p. 137.

230. *Vulgar Errors*, book v., chap. 21.

231. *Pharmacologia*, Historical Introduction, p. 16.

232. The author of one of the Bridgewater Treatises has fallen, as it seems to me, into a similar fallacy when, after arguing in rather a curious way to prove that matter may exist without any of the known properties of matter, and may therefore be changeable, he concludes that it can not be eternal, because "eternal (passive) existence necessarily involves incapability of change." I believe it would be difficult to point out any other connection between the facts of eternity and unchangeableness, than a strong association between the two ideas. Most of the *a priori* arguments, both religious and anti-religious, on the origin of things, are fallacies drawn from the same source.

233. Supra, book ii., chap. v., § 6, and chap. vii., § 1, 2, 3, 4. See also *Examination of Sir William Hamilton's Philosophy*, chap. vi. and elsewhere.

234. It seems that this doctrine was, before the time I have mentioned, disputed by some thinkers. Dr. Ward mentions Scotus, Vasquez, Biel, Francis Lugo, and Valentia.

235. I quote this passage from Playfair's celebrated *Dissertation on the Progress of Mathematical and Physical Science*.

236. This statement I must now correct, as too unqualified. The maxim in question was maintained with full conviction by no less an authority than Sir William Hamilton. See my *Examination*, chap. xxiv.

237. *Nouveaux Essais sur l'Entendement Humain—Avant-propos.* (Œuvres, Paris ed., 1842, vol. i., p. 19.)

238. This doctrine also was accepted as true, and conclusions were grounded on it, by Sir William Hamilton. See *Examination*, chap. xxiv.

239. Not that of Leibnitz, but the principle commonly appealed to under that name by mathematicians.

240. *Dissertation*, p. 27.

241. *Hist. Ind. Sc.*, Book i., chap. i.

242. *Novum Organum*, Aph. 75.

243. Supra, book iii., chap. vii., § 4.

244. It is hardly needful to remark that nothing is here intended to be said against the possibility at some future period of making gold—by first discovering it to be a compound, and putting together its different elements or ingredients. But this is a totally different idea from that of the seekers of the grand arcanum.

245. *Pharmacologia*, pp. 43-45.

246. Vol. i., chap. 8.

247. *Nov. Org.*, Aph. 46.

248. Playfair's *Dissertation*, sect. 4.

249. *Nov. Org. Renov.*, p. 61.

250. *Pharmacologia*, p. 21.

251. *Pharmacologia*, pp. 23, 24.

252. Ibid., p. 28.

253. Ibid., p. 62.

254. Ibid., pp. 61, 62.

255. *Supra*, p. 450.

256. *Elements of the Philosophy of the Mind*, vol. ii., chap. 4, sect. 5.

257. "Thus Fourcroy," says Dr. Paris, "explained the operation of mercury by its specific gravity, and the advocates of this doctrine favored the general introduction of the preparations of iron, especially in scirrhus of the spleen or liver, upon the same hypothetical principle; for, say they, whatever is most forcible in removing the obstruction must be the most proper instrument of cure: such is steel, which, besides the attenuating power with which it is furnished, has still a greater force in this case from the gravity of its particles, which, being seven times specifically heavier than any vegetable, acts in proportion with a stronger impulse, and therefore is a more powerful deobstruent. This may be taken as a specimen of the style in which these mechanical physicians reasoned and practiced."—*Pharmacologia*, pp. 38, 39.

258. *Pharmacologia*, pp. 39, 40.

259. I quote from Dr. Whewell's *Hist. Ind. Sc.*, 3d ed., i., 129.

260. *Hist. Ind. Sc.*, i., 52.

261. *Nov. Org.*, Aph. 60.

262. "An advocate," says Mr. De Morgan (*Formal Logic*, p. 270), "is sometimes guilty of the argument *à dicto secundum quid ad dictum simpliciter*: it is his business to do for his client all that his client might *honestly* do for himself. Is not the word in italics frequently omitted? *Might* any man honestly try to do for himself all that counsel frequently try to do for him? We are often reminded of the two men who stole the leg of mutton; one could swear he had not got it, the other that he had not taken it. The counsel is doing his duty by his client, the client has left the matter to his counsel. Between the unexecuted intention of the client, and the unintended execution of the counsel, there may be a wrong done, and, if we are to believe the usual maxims, no wrong-doer."

The same writer justly remarks (p. 251) that there is a converse fallacy, *à dicto simpliciter ad dictum secundum quid*, called by the scholastic logicians *fallacia accidentis*; and another which may be called *à dicto secundum quid ad dictum secundum alterum quid* (p. 265). For apt instances of both, I must refer the reader to Mr. De Morgan's able chapter on Fallacies.

263. An example of this fallacy is the popular error that *strong* drink must be a cause of *strength*. There is here fallacy within fallacy; for granting that the words "strong" and "strength" were not (as they are) applied in a totally different sense to fermented

liquors and to the human body, there would still be involved the error of supposing that an effect must be like its cause; that the conditions of a phenomenon are likely to resemble the phenomenon itself; which we have already treated of as an *a priori* fallacy of the first rank. As well might it be supposed that a strong poison will make the person who takes it strong.

264. In his later editions, Archbishop Whately confines the name of Petitio Principii "to those cases in which one of the premises either is manifestly the same in sense with the conclusion, or is actually proved from it, or is such as the persons you are addressing are not likely to know, or to admit, except as an inference from the conclusion; as, *e.g.*, if any one should infer the authenticity of a certain history, from its recording such and such facts, the reality of which rests on the evidence of that history."

265. No longer even a probable hypothesis, since the establishment of the atomic theory; it being now certain that the integral particles of different substances gravitate unequally. It is true that these particles, though real *minima* for the purposes of chemical combination, may not be the ultimate particles of the substance; and this doubt alone renders the hypothesis admissible, even as an hypothesis.

266. *Hist. Ind. Sc.*, i., 34.

267. "And coxcombs vanquish Berkeley with a grin."

268. Some arguments and explanations, supplementary to those in the text, will be found in *An Examination of Sir William Hamilton's Philosophy*, chap. xxvi.

269. *Supra*, p. 424.

270. When this chapter was written, Professor Bain had not yet published even the first part ("The Senses and the Intellect") of his profound Treatise on the Mind. In this the laws of association have been more comprehensively stated and more largely exemplified than by any previous writer; and the work, having been completed by the publication of "The Emotions and the Will," may now be referred to as incomparably the most complete analytical exposition of the mental phenomena, on the basis of a legitimate Induction, which has yet been produced. More recently still, Mr. Bain has joined with me in appending to a new edition of the "Analysis," notes intended to bring up the analytic science of Mind to its latest improvements.

    Many striking applications of the laws of association to the explanation of complex mental phenomena are also to be found in Mr. Herbert Spencer's "Principles of Psychology."

271. In the case of the moral sentiments the place of direct experiment is to a considerable extent supplied by historical experience, and we are able to trace with a tolerable approach to certainty the particular associations by which those sentiments are engendered. This has been attempted, so far as respects the sentiment of justice, in a little work by the present author, entitled *Utilitarianism*.

272. The most favorable cases for making such approximate generalizations are what may be termed collective instances; where we are fortunately enabled to see the whole class respecting which we are inquiring in action at once, and, from the qualities displayed by the collective body, are able to judge what must be the qualities of the majority of the individuals composing it. Thus the character of a nation is shown in its acts as a nation; not so much in the acts of its government, for those are much influenced by other causes; but in the current popular maxims, and other marks of the general direction of public opinion; in the character of the persons or writings that are held in permanent esteem or admiration; in laws and institutions, so far as they are the work of the nation itself, or are acknowledged and supported by it; and so forth. But even here there is a large margin of doubt and uncertainty. These things are liable to be influenced by many circumstances; they are partially determined by the distinctive qualities of that nation or body of persons, but partly also by external causes which would influence any other body of persons in the same manner. In order, therefore, to make the experiment really complete, we ought to be able to try it without variation upon other nations: to try how Englishmen would act or feel if placed in the same circumstances in which we have supposed Frenchmen to be placed; to apply, in short,

the Method of Differences as well as that of Agreement. Now these experiments we can not try, nor even approximate to.

273. "To which," says Dr. Whewell, "we may add, that it is certain, from the history of the subject, that in that case the hypothesis would never have been framed at all."

Dr. Whewell (*Philosophy of Discovery*, pp. 277-282) defends Bacon's rule against the preceding strictures. But his defense consists only in asserting and exemplifying a proposition which I had myself stated, viz., that though the largest generalizations may be the earliest made, they are not at first seen in their entire generality, but acquire it by degrees, as they are found to explain one class after another of phenomena. The laws of motion, for example, were not known to extend to the celestial regions, until the motions of the celestial bodies had been deduced from them. This, however, does not in any way affect the fact, that the middle principles of astronomy, the central force, for example, and the law of the inverse square, could not have been discovered, if the laws of motion, which are so much more universal, had not been known first. On Bacon's system of step-by-step generalization, it would be impossible in any science to ascend higher than the empirical laws; a remark which Dr. Whewell's own Inductive Tables, referred to by him in support of his argument, amply bear out.

274. *Supra*, page 317 to the end of the chapter.

275. *Biographia Literaria*, i., 214.

276. *Supra*, p. 321.

277. *Essays on some Unsettled Questions of Political Economy*, pp. 137-140.

278. The quotations in this paragraph are from a paper written by the author, and published in a periodical in 1834.

279. *Cours de Philosophie Positive*, iv., 325-29.

280. Since reprinted entire in *Dissertations and Discussions*, as the concluding paper of the first volume.

281. Written and first published in 1840.

282. This great generalization is often unfavorably criticised (as by Dr. Whewell, for instance) under a misapprehension of its real import. The doctrine, that the theological explanation of phenomena belongs only to the infancy of our knowledge of them, ought not to be construed as if it was equivalent to the assertion, that mankind, as their knowledge advances, will necessarily cease to believe in any kind of theology. This was M. Comte's opinion; but it is by no means implied in his fundamental theorem. All that is implied is, that in an advanced state of human knowledge, no other Ruler of the World will be acknowledged than one who rules by universal laws, and does not at all, or does not unless in very peculiar cases, produce events by special interpositions. Originally all natural events were ascribed to such interpositions. At present every educated person rejects this explanation in regard to all classes of phenomena of which the laws have been fully ascertained; though some have not yet reached the point of referring all phenomena to the idea of Law, but believe that rain and sunshine, famine and pestilence, victory and defeat, death and life, are issues which the Creator does not leave to the operation of his general laws, but reserves to be decided by express acts of volition. M. Comte's theory is the negation of this doctrine.

Dr. Whewell equally misunderstands M. Comte's doctrine respecting the second or metaphysical stage of speculation. M. Comte did not mean that "discussions concerning ideas" are limited to an early stage of inquiry, and cease when science enters into the positive stage. (*Philosophy of Discovery*, pp. 226 et seq.) In all M. Comte's speculations as much stress is laid on the process of clearing up our conceptions as on the ascertainment of facts. When M. Comte speaks of the metaphysical stage of speculation, he means the stage in which men speak of "Nature" and other abstractions as if they were active forces, producing effects; when Nature is said to do this, or forbid that; when Nature's horror of a vacuum, Nature's non-admission of a break, Nature's *vis medicatrix*, were offered as explanations of phenomena; when the qualities of things were mistaken for real entities dwelling in the things; when the phenomena of living bodies were thought to be accounted for by

being referred to a “vital force;” when, in short, the abstract names of phenomena were mistaken for the causes of their existence. In this sense of the word it can not be reasonably denied that the metaphysical explanation of phenomena, equally with the theological, gives way before the advance of real science.

That the final, or positive stage, as conceived by M. Comte, has been equally misunderstood, and that, notwithstanding some expressions open to just criticism, M. Comte never dreamed of denying the legitimacy of inquiry into all causes which are accessible to human investigation, I have pointed out in a former place.

283. Buckle’s *History of Civilization*, i., 30.

284. I have been assured by an intimate friend of Mr. Buckle that he would not have withheld his assent from these remarks, and that he never intended to affirm or imply that mankind are not progressive in their moral as well as in their intellectual qualities. “In dealing with his problem, he availed himself of the artifice resorted to by the Political Economist, who leaves out of consideration the generous and benevolent sentiments, and founds his science on the proposition that mankind are actuated by acquisitive propensities alone,” not because such is the fact, but because it is necessary to begin by treating the principal influence as if it was the sole one, and make the due corrections afterward. “He desired to make abstraction of the intellect as the determining and dynamical element of the progression, eliminating the more dependent set of conditions, and treating the more active one as if it were an entirely independent variable.”

The same friend of Mr. Buckle states that when he used expressions which seemed to exaggerate the influence of general at the expense of special causes, and especially at the expense of the influence of individual minds, Mr. Buckle really intended no more than to affirm emphatically that the greatest men can not effect great changes in human affairs unless the general mind has been in some considerable degree prepared for them by the general circumstances of the age; a truth which, of course, no one thinks of denying. And there certainly are passages in Mr. Buckle’s writings which speak of the influence exercised by great individual intellects in as strong terms as could be desired.

285. Essay on Dryden, in Miscellaneous Writings, i., 186.

286. In the *Cornhill Magazine* for June and July, 1861.

287. It is almost superfluous to observe, that there is another meaning of the word Art, in which it may be said to denote the poetical department or aspect of things in general, in contradistinction to the scientific. In the text, the word is used in its older, and I hope, not yet obsolete sense.

288. Professor Bain and others call the selection from the truths of science made for the purposes of an art, a Practical Science, and confine the name Art to the actual rules.

289. The word Teleology is also, but inconveniently and improperly, employed by some writers as a name for the attempt to explain the phenomena of the universe from final causes.

290. For an express discussion and vindication of this principle, see the little volume entitled “Utilitarianism.”

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