

Among the distinguishing features of the new logic, when considered in contrast with that of the schoolmen, the most prominent is the regard which it professes to pay to *experience*, as the only solid foundation of human knowledge. It may be worth while, therefore, to consider, how far the notion commonly annexed to this word is definite and precise; and whether there may not sometimes be a possibility of its being employed in a sense more general and loose, than the authors who are looked up to as the great models of inductive investigation understood it to convey\*.

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\* As the reflections which follow are entirely of a practical nature, I shall express myself (as far as is consistent with a due regard to precision) agreeably to the modes of speaking in common use; without affecting a scrupulous attention to some speculative distinctions, which, however curious and interesting, when considered in connection with the Theory of the Mind, do not lead to any logical conclusions of essential importance in the conduct of the Understanding. In such sciences, for example, as Astronomy, Natural Philosophy, and Chemistry, which rest upon phenomena open to the scrutiny of every inquirer, it would obviously be puerile in the extreme to attempt drawing the line between facts which have been ascertained by our own personal observation, and those which we have implicitly adopted upon our faith in the universal consent of the scientific world. The evidence, in both cases, may be equally irresistible; and sometimes the most cautious reasoners may justly be disposed to consider that of testimony as the least fallible of the two.

By far the greater part, indeed, of what is commonly called experimental knowledge, will be found, when traced to its origin, to resolve entirely into our confidence in the judgment and the veracity of our fellow-creatures; nor (in the sciences already mentioned) has this identification of the evidence of testimony with that of experience, the slightest tendency to affect the legitimacy of our inductive conclusions.

In some other branches of knowledge, (more particularly in those political doctrines which assume as incontrovertible *data* the details of ancient history) the authority of testimony is, for obvious reasons, much more questionable; and to dignify it, in these, with the imposing character of *experience*, is to strengthen one of the chief bul-

In the course of the abstract speculations contained in the preceding section, I have remarked, that although the difference between the two sorts of evidence, which are commonly referred to the separate heads of *experience* and of *analogy*, be rather a difference in *degree* than in *kind*, yet that it is useful to keep these terms in view, in order to mark the contrast between cases which are separated from each other by a very wide and palpable interval;—more especially, to mark the difference between an argument from individual to individual of the same species, and an argument from species to species of the same genus. As this distinction, however, when accurately examined, turns out to be of a more vague and popular nature than at first sight appears, it is not surprising that instances should occasionally present themselves, in which it is difficult to say, of the evidence before us, to which of these descriptions it ought to be referred. Nor does

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warks of popular prejudices. This view of the subject, however, although well entitled to the attention of the logician, has no immediate connection with my present argument; and accordingly I shall make no scruple, in the sequel, to comprehend, under the name of *experience*, the grounds of our assent to all the *facts* on which our reasonings proceed, provided only that the certainty of these facts be, on either supposition, equally indisputable.

The logical errors which it is the aim of this section to correct, turn upon a still more dangerous latitude in the use of this word; in consequence of which, the authority of *experience* comes insensibly to be extended to innumerable opinions resting solely on *supposed analogies*; while, not unfrequently, the language of Bacon is quoted in bar of any theoretical argument on the other side of the question.

I have added this note, partly to obviate some criticisms, to which my own phraseology may, at first sight, appear liable; and partly to point out the connection between the following discussion, and some of the foregoing speculations.

this doubt lead merely to a question concerning phraseology: it produces a hesitation which must have some effect even on the judgment of a philosopher; the maxims to which we have been accustomed, in the course of our early studies, leading us to magnify the evidence of *experience* as the sole test of truth; and to depreciate that of *analogy*, as one of the most fertile sources of error. As these maxims proceed on the supposition, that the respective provinces of both are very precisely defined; it is evident, that, admitting them to be perfectly just in themselves, much danger may still be conceivable from their injudicious application. I shall endeavour to illustrate this remark by some familiar instances; which, I trust, will be sufficient to recommend it to the farther consideration of future logicians. To treat of the subject with that minuteness of detail which is suited to its importance, is incompatible with the subordinate place which belongs to it in my general design.

It is observed by Dr Reid \*, that “in medicine, physicians must, for the most part, be directed in their prescriptions by *analogy*. The constitution of one human body is so like to that of another, that it is reasonable to think, that what is the cause of health or sickness to one, may have the same effect on another. And this (he adds) is generally found true, though not without some exceptions.”

I am doubtful if this observation be justified by the common

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\* Essays on the Intellect. Powers, p. 53.

use of language ; which, as far as I am able to judge, uniformly refers the evidence on which a cautious physician proceeds, not to *analogy*, but to *experience*. The German monk, who, (according to the popular tradition) having observed the salutary effects of antimony upon some of the lower animals, ventured to prescribe the use of it to his own fraternity, might be justly said to reason analogically ;—inasmuch as his experience related to one species, and his inference to another. But if, after having thus poisoned all the monks of his own convent, he had persevered in recommending the same mineral to the monks of another, the example of our most correct writers would have authorized us to say, (how far justly is a different question) that he proceeded in direct opposition to the evidence of *experience*.

In offering this slight criticism on Dr Reid, I would be very far from being understood to say, that the common phraseology is more unexceptionable than his. I would only remark, that his phraseology on this occasion is almost peculiar to himself ; and that the prevailing opinions, both of philosophers and of the multitude, incline them to rank the grounds of our reasoning in the medical art, at a much higher point in the scale of evidence, than what is marked by the word *analogy*. Indeed, I should be glad to know, if there be any one branch of human knowledge, in which men are, in general, more disposed to boast of the lights of *experience*, than in the practice of medicine.

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It would, perhaps, have been better for the world, if the ge-



neral habits of thinking and of speaking, had, in this instance, been more agreeable than they seem to be in fact, to Dr Reid's ideas ;—or, at least, if some qualifying epithet had been invariably added to the word *experience*, to show with how very great latitude it is to be understood, when applied to the evidence on which the physician proceeds in the exercise of his art. The truth is, that, even on the most favourable supposition, this evidence, so far as it rests on experience, is weakened or destroyed by the uncertain conditions of every new case to which his former results are to be applied ; and that, without a peculiar sagacity and discrimination in marking, not only the resembling, but the characteristic features of disorders, classed under the same technical name, his practice cannot, with propriety, be said to be guided by any one rational principle of decision, but merely by blind and random conjecture. The more successfully this sagacity and discrimination are exercised, the more nearly does the evidence of medical practice approach to that of *experience* ; but, in every instance, without exception, so immense is the distance between them, as to render the meaning of the word *experience*, when applied to medicine, essentially different from its import in those sciences where it is possible for us, in all cases, by due attention to the circumstances of an experiment, to predict its result with an almost infallible certainty\*.

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\* “ L'art de conjecturer en Médecine ne sauroit consister dans une suite de raisonnemens appuyés sur un vain système. C'est uniquement l'art de comparer une maladie qu'on doit guérir, avec les maladies semblables qu'on a déjà connues par son expérience ou par celle des autres. Cet art consiste même quelquefois à appercevoir un

Notwithstanding this very obvious consideration, it has become fashionable among a certain class of medical practitioners, since the lustre thrown on the inductive logic of Bacon by the discoveries of Newton and the researches of Boyle, to number their art with the other branches of experimental philosophy; and to speak of the difference between the empiric and the scientific physician, as if it were exactly analogous to that between the cautious experimenter and the hypothetical theorist in physics. Experience, (we are told) and experience alone, must be our guide in medicine, as in all the other departments of physical knowledge:—Nor is any innovation, however rational, proposed in the established routine of practice, but an accumulation of alleged cases is immediately brought forward, as an experimental proof of the dangers which it threatens.

It was a frequent and favourite remark of the late Dr Cullen,—that there are more false facts current in the world than false theories; and a similar observation occurs, more than

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“ rapport entre des maladies qui paroissent n'en point avoir, comme aussi des différences essentielles, quoique fugitives, entre celles qui paroissent se ressembler le plus.  
 “ Plus on aura rassemblé de faits, plus on sera en état de conjecturer heureusement;  
 “ supposé néanmoins qu'on ait d'ailleurs cette justesse d'esprit que la nature seule peut donner.

“ Ainsi le meilleur médecin n'est pas (comme le préjugé le suppose) celui qui accumule en aveugle et en courant beaucoup de pratique, mais celui qui ne fait que des observations bien approfondies, et qui joint à ces observations le nombre beaucoup plus grand des observations faites dans tous les siècles par des hommes animés du même esprit que lui. Ces observations sont la véritable expérience du médecin.”  
 D'Alembert, *Eclaircissement sur les Elémens de Philosophie*, § vi.

once, in the *Novum Organon*. "Men of learning (says Bacon in one passage) are too often led, from indolence or credulity, to avail themselves of mere *rumours or whispers of experience*, as confirmations, and sometimes as the very groundwork of their philosophy; ascribing to them the same authority as if they rested on legitimate testimony. Like to a government which should regulate its measures, not by the official information received from its own accredited ambassadors, but by the gossipings of newsmongers in the streets. Such, in truth, is the manner in which the interests of philosophy, as far as *experience* is concerned, have been hitherto administered. Nothing is to be found which has been duly investigated; nothing which has been verified by a careful examination of proofs; nothing which has been reduced to the standard of number, weight, or measure\*."

This very important aphorism deserves the serious attention of those who, while they are perpetually declaiming against the uncertainty and fallacy of systems, are themselves employed in amassing a chaos of insulated particulars, which they admit upon the slenderest evidence. Such men, sensible of their own incapacity for scientific investigation, have often a malicious pleasure in destroying the fabrics of their predecessors; or, if they should be actuated by less unworthy motives, they may yet feel a certain gratification to their vanity, in astonishing the world with anomalous and unlooked for phenomena;—a weakness which results not less naturally from igno-

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\* Nov. Org. Lib. I. Aph. xcvi.

rance and folly, than a bias to premature generalization from the consciousness of genius.—Both of these weaknesses are undoubtedly adverse to the progress of science ; but, in the actual state of human knowledge, the former is perhaps the more dangerous of the two.

In the practice of *medicine* (to which topic I wish to confine myself more particularly at present) there are a variety of other circumstances, which, abstracting from any suspicion of bad faith in those on whose testimony the credibility of facts depends, have a tendency to vitiate the most candid accounts of what is commonly dignified with the title of *experience*. So deeply rooted in the constitution of the mind is that disposition on which philosophy is grafted, that the simplest narrative of the most illiterate observer involves more or less of hypothesis ; nay, in general, it will be found, that, in proportion to his ignorance, the greater is the number of conjectural principles involved in his statements.

A village-apothecary (and, if possible, in a still greater degree, an experienced nurse) is seldom able to describe the plainest case, without employing a phraseology of which every word is a theory ; whereas a simple and genuine specification of the phenomena which mark a particular disease ;—a specification unsophisticated by fancy, or by preconceived opinions, may be regarded as unequivocal evidence of a mind trained by long and successful study to the most difficult of all arts, that of the faithful *interpretation of nature*.

Independently, however, of all these circumstances, which tend so powerfully to vitiate the *data* whence the physician has to reason ; and supposing his assumed facts to be stated, not only with the most scrupulous regard to truth, but with the most jealous exclusion of theoretical expressions, still the evidence upon which he proceeds is, at best, conjectural and dubious, when compared with what is required in chemistry or in mechanics. It is seldom, if ever, possible, that the description of any medical case can include all the circumstances with which the result was connected ; and, therefore, how true soever the facts described may be, yet when the conclusion to which they lead comes to be applied as a general rule in practice, it is not only a rule rashly drawn from one single experiment, but a rule transferred from a case imperfectly known, to another of which we are equally ignorant. Here, too, it will be found, that the evidence of experience is incomparably less in favour of the empiric, than of the cautious theorist ; or rather, that it is by cautious theory alone, that experience can be rendered of any value. Nothing, indeed, can be more absurd than to contrast, as is commonly done, experience with theory, as if they stood in opposition to each other. Without theory, (or, in other words, without general principles, inferred from a sagacious comparison of a variety of phenomena), experience is a blind and useless guide ; while, on the other hand, a legitimate theory (and the same observation may be extended to hypothetical theories, supported by numerous analogies), necessarily presupposes a knowledge of connected and well ascertained facts, more comprehensive, by far, than any mere empiric is likely to possess. When a



scientific practitioner, accordingly, quits the empirical routine of his profession, in quest of a higher and more commanding ground, he does not proceed on the supposition that it is possible to supersede the necessity of experience by the most accurate reasonings *a priori*; but, distrusting conclusions which rest on the observation of this or that individual, he is anxious, by combining those of an immense multitude, to separate accidental conjunctions from established connections, and to ascertain those laws of the human frame which rest on the universal experience of mankind. The idea of following nature in the treatment of diseases;—an idea which, I believe, prevails more and more in the practice of every physician, in proportion as his views are enlarged by science, is founded, not on hypothesis, but on one of the most general laws yet known with respect to the animal economy; and it implies an acknowledgement, not only of the vanity of abstract theories, but of the limited province of human art\*.

These slight remarks are sufficient to show, how vague and

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\* “Gaudet corpus vi prorsus mirabili, qua contra morbos se tueatur; multos arceat;  
“multos jam inchoatos quam optime et citissime solvat; aliosque suo modo, ad felicem  
“exitum lentius perducatur.

“Hæc, *Autocrateia*, vis *Naturæ medicatrix*, vocatur; medicis, philosophis, notissima,  
“et jure celeberrima. Hæc sola ad multos morbos sanandos sufficit, in omnibus fere  
“prodest: Quin et medicamenta sua natura optima, tantum solummodo prosunt, quan-  
“tum hujus vires insitas excitent, dirigant, gubernent. Medicina enim neque agit in  
“cadaver, neque repugnante natura aliquid proficit.”

Conspectus Medicinæ Theoreticæ. Auctore Jacobo Gregory, M. D. §§. 59, 60.  
(Edin. 1782.)

indeterminate the notion is, which is commonly annexed to the word *experience* by the most zealous advocates for its paramount authority in medicine. They seem farther to show, that the question between them and their adversaries amounts to little more than a dispute about the comparative advantages of an experience guided by penetration and judgment, or of an experience which is to supersede all exercise of our rational faculties ; of an experience accurate, various, and discriminating, or of one which is gross and undistinguishing, like the perceptions of the lower animals.

Another department of knowledge in which constant appeals are made to *experience*, is the science of *politics* ; and, in this science also, I apprehend, as well as in the former, that word is used with a far greater degree of latitude than is generally suspected. Indeed, most of the remarks which have been already offered on the one subject may be extended (*mutatis mutandis*) to the other. I shall confine my attention, therefore, in what follows, to one or two peculiarities by which politics is specifically and exclusively characterized as an object of study ; and which seem to remove the species of evidence it admits of, to a still greater distance than that of *medicine* itself, from what the word *experience* naturally suggests to a careless inquirer.

The science of politics may be divided into two parts ; the first having for its object the theory of government ; the second, the general principles of legislation. That I may not lose myself in too wide a field, I shall, on the present occasion,

wave all consideration of the former ; and, for the sake of still greater precision, shall restrict my remarks to those branches of the latter, which are comprehended under the general title of *Political Economy* ;—a phrase, however, which I wish to be here understood in its most extensive meaning\*.

They who have turned their attention, during the last century, to inquiries connected with population, national wealth, and other collateral subjects, may be divided into two classes ; to the one of which we may, for the sake of distinction, give the title of *political arithmeticians*, or *statistical collectors* ; to the other, that of *political economists*, or *political philosophers*. The former are generally supposed to have the evidence of *experience* in their favour, and seldom fail to arrogate to themselves exclusively, the merit of treading closely in the footsteps of *Bacon*. In comparison with *them*, the latter are considered as little better than visionaries, or, at least, as entitled to no credit whatever, when their conclusions are at variance with the details of *statistics*.

In opposition to this prevailing prejudice it may, with confidence, be asserted, that, in so far as either of these branches of knowledge has any real value, it must rest on a basis of well-ascertained facts ; and that the difference between them consists only in the different nature of the facts with which they are respectively conversant. The facts accumulated by the statistical collector are merely *particular results*, which other

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\* See Note (Z.)

men have seldom an opportunity of verifying or of disproving; and which, to those who consider them in an insulated state, can never afford any important information. The facts which the political philosopher professes to investigate are exposed to the examination of all mankind; and while they enable him, like the general laws of physics, to ascertain numberless particulars by *synthetic reasoning*, they furnish the means of estimating the credibility of evidence resting on the testimony of individual observers.

It is acknowledged by Mr Smith, with respect to himself, that he had "no great faith in political arithmetic \*;" and I agree with him so far as to think that little, if any, regard is due to a *particular phenomenon*, when stated as an objection to a conclusion resting on the *general laws* which regulate the course of human affairs. Even admitting the phenomenon in question to have been accurately observed, and faithfully described, it is yet possible that we may be imperfectly acquainted with that combination of circumstances whereby the effect is modified; and that, if these circumstances were fully before us, this apparent exception would turn out an additional illustration of the very truth which it was brought to invalidate.

If these observations be just, instead of appealing to political arithmetic as a check on the conclusions of political economy, it would often be more reasonable to have recourse to political economy as a check on the extravagancies of

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\* Wealth of Nations, Vol. II. p. 310. 9th Edit.

political arithmetic. Nor will this assertion appear paradoxical to those who consider, that the object of the political arithmetician is too frequently to record apparent exceptions to rules sanctioned by the general experience of mankind; and, consequently, that in cases where there is an obvious or a demonstrative incompatibility between the alleged exception and the general principle, the fair logical inference is not against the truth of the latter, but against the possibility of the former.

It has long been an established opinion among the most judicious and enlightened philosophers,—that *as the desire of bettering our condition appears equally from a careful review of the motives which habitually influence our own conduct, and from a general survey of the history of our species, to be the master-spring of human industry*, the labour of slaves never can be so productive as that of freemen. Not many years have elapsed, since it was customary to stigmatize this reasoning as visionary and metaphysical; and to oppose to it that species of evidence to which we were often reminded that all theories must bend;—the evidence of experimental calculations, furnished by intelligent and credible observers on the other side of the Atlantic. An accurate examination of the fact has shewn how wide of the truth these calculations were;—but independently of any such detection of their fallacy, might it not have been justly affirmed, that the argument from *experience* was decidedly against their credibility;—the facts appealed to resting solely upon the good sense and good faith of individual witnesses; while the opposite argument, drawn from the principles of the



human frame, was supported by the united voice of all nations and ages?

If we examine the leading principles which run through Mr Smith's Inquiry into the Nature and Causes of the Wealth of Nations, we shall find, that all of them are general *facts* or general *results*, analogous to that which has been just mentioned. Of this kind, for instance, are the following propositions,—from which a very large proportion of his characteristic doctrines follow, as necessary and almost manifest corollaries: That what we call the Political Order, is much less the effect of human contrivance than is commonly imagined;—That every man is a better judge of his own interest than any legislator can be for him; and that this regard to private interest (or, in other words, this desire of bettering our condition) may be safely trusted to as a principle of action universal among men in its operation;—a principle stronger, indeed, in some than in others, but constant in its habitual influence upon all:—That, where the rights of individuals are completely protected by the magistrate, there is a strong tendency in human affairs, arising from what we are apt to consider as the selfish passions of our nature, to a progressive and rapid improvement in the state of society:—That this tendency to improvement in human affairs is often so very powerful, as to correct the inconveniencies threatened by the errors of the statesman:—And that, therefore, the reasonable presumption is in favour of every measure which is calculated to afford to its farther developement, a scope still freer than what it at present enjoys; or, which amounts very nearly to the same thing, in favour of as great a liberty in the

employment of industry, of capital, and of talents, as is consistent with the security of property, and of the other rights of our fellow-citizens.—The premises, it is perfectly obvious, from which these conclusions are deduced, are neither hypothetical assumptions, nor metaphysical abstractions. They are practical maxims of good sense, approved by the experience of men in all ages of the world ; and of which, if we wish for any additional confirmations, we have only to retire within our own bosoms, or to open our eyes on what is passing around us.

From these considerations it would appear, that in politics, as well as in many of the other sciences, the loudest advocates for experience are the least entitled to appeal to its authority in favour of their dogmas ; and that the charge of a presumptuous confidence in human wisdom and foresight, which they are perpetually urging against political philosophers, may, with far greater justice, be retorted on themselves. An additional illustration of this is presented by the strikingly contrasted effects of *statistical* and of *philosophical* studies on the intellectual habits in general ;—the former invariably encouraging a predilection for restraints and checks, and all the other technical combinations of an antiquated and scholastic policy ;—the latter, by inspiring, on the one hand, a distrust of the human powers, when they attempt to embrace in detail, interests at once so complicated and so momentous ; and, on the other, a religious attention to the designs of Nature, as displayed in the general laws which regulate her economy ;—leading, no less irresistibly, to a gradual and progressive simplification of the political mechanism. It is, in-

deed, the never failing result of all sound philosophy, to humble, more and more, the pride of science before that Wisdom which is infinite and divine ;—whereas, the farther back we carry our researches into those ages, the institutions of which have been credulously regarded as monuments of the superiority of unsophisticated good sense, over the false refinements of modern arrogance, we are the more struck with the numberless insults offered to the most obvious suggestions of nature and of reason. We may remark this, not only in the moral depravity of rude tribes, but in the universal disposition which they discover to disfigure and distort the bodies of their infants ;—in one case, new-modelling the form of the eyelids ;—in a second, lengthening the ears ;—in a third, checking the growth of the feet ;—in a fourth, by mechanical pressures applied to the head, attacking the seat of thought and intelligence. To allow the human form to attain, in perfection, its fair proportions, is one of the latest improvements of civilized society ; and the case is perfectly analogous in those sciences which have for their object to assist nature in the cure of diseases ; in the developement and improvement of the intellectual faculties ; in the correction of bad morals ; and in the regulations of *political economy*.

## SECTION VI.

*Of the Speculation concerning Final Causes.*

## I.

*Opinion of Lord Bacon on the subject.—Final Causes rejected by Des Cartes, and by the majority of French Philosophers.—Recognized as legitimate Objects of research by Newton.—Tacitly acknowledged by all as a useful logical Guide, even in Sciences which have no immediate relation to Theology.*

THE study of Final Causes may be considered in two different points of view ; first, as subservient to the evidences of natural religion ; and secondly, as a guide and auxiliary in the investigation of physical laws. Of these views it is the latter alone which is immediately connected with the principles of the inductive logic ; and it is to this, accordingly, that I shall chiefly direct my attention in the following observations. I shall not, however, adhere so scrupulously to a strict arrangement, as to avoid all reference to the former, where the train of my reflections may naturally lead to it. The truth is, that the two speculations will, on examination, be found much more nearly allied, than might at first sight be apprehended.

I before observed, that the phrase *Final Cause* was first intro-

duced by Aristotle; and that the extension thus given to the notion of *causation* contributed powerfully to divert the inquiries of his followers from the proper objects of physical science. In reading the strictures of Bacon on this mode of philosophizing, it is necessary always to bear in mind, that they have a particular reference to the theories of the schoolmen; and, if they should sometimes appear to be expressed in terms too unqualified, due allowances ought to be made for the undistinguishing zeal of a reformer, in attacking prejudices consecrated by long and undisturbed prescription. "*Causarum finalium inquisitio sterilis est, et tanquam Virgo Deo consecrata, nihil parit.*" Had a similar remark occurred in any philosophical work of the eighteenth century, it might perhaps have been fairly suspected to savour of the school of Epicurus; although, even in such a case, the quaintness and levity of the conceit would probably have inclined a cautious and candid reader to interpret the author's meaning with an indulgent latitude. On the present occasion, however, Bacon is his own best commentator; and I shall therefore quote, in a faithful, though abridged translation, the preparatory passage by which this allusion is introduced.

"The second part of *metaphysics* is the investigation of "*final causes*; which I object to, not as a speculation "*which ought to be neglected, but as one which has, in general, been very improperly regarded as a branch of physics.* If this were merely a fault of arrangement, I should "*not be disposed to lay great stress upon it; for arrangement is useful chiefly as a help to perspicuity, and does*



“not affect the substantial matter of science: But, in this instance, a disregard of *method* has occasioned the most fatal consequences to philosophy; inasmuch as the consideration of *final* causes in physics has supplanted and banished the study of *physical* causes; the fancy amusing itself with illusory explanations derived from the former, and misleading the curiosity from a steady prosecution of the latter.” After illustrating this remark by various examples, Bacon adds: “I would not, however, be understood, by these observations, to insinuate, that the *final causes* just mentioned may not be founded in truth, and, in a *metaphysical* view, extremely worthy of attention; but only, that when such disquisitions invade and overrun the appropriate province of *physics*, they are likely to lay waste and ruin that department of knowledge.” The passage concludes with these words: “And so much concerning *metaphysics*; the part of which relating to *final causes*, I do not deny, has been often enlarged upon in physical, as well as in metaphysical treatises. But while, in the latter of these, it is treated of with propriety, in the former, it is altogether misplaced; and that, not merely because it violates the rules of a logical order, but because it operates as a powerful obstacle to the progress of inductive science\*.”

The epigrammatic maxim which gave occasion to these extracts has, I believe, been oftener quoted (particularly by

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\* De Augm. Scient. Lib. III. Cap. iv. v. See Note (AA.)

French writers) than any other sentence in Bacon's works; and, as it has in general been stated, without any reference to the context, in the form of a detached aphorism, it has been commonly supposed to convey a meaning widely different from what appears to have been annexed to it by the author. The remarks with which he has prefaced it, and which I have here submitted to the consideration of my readers, sufficiently shew, not only that he meant his proposition to be restricted to the abuse of final causes in the physics of Aristotle, but that he was anxious to guard against the possibility of any misapprehension or misrepresentation of his opinion. A farther proof of this is afforded by the censure which, in the same paragraph, he bestows on Aristotle, for "substituting Nature, instead of God, as the fountain of final causes; and for treating of them rather as subservient to logic than to theology."

A similar observation may be made on another sentence in Bacon, in the interpretation of which a very learned writer, Dr Cudworth, seems to have altogether lost sight of his usual candour. "Incredibile est quantum agmen idolorum philosophiæ immiserit, naturalium operationum ad similitudinem actionum humanarum reductio." "If (says Cudworth) the Advancer of Learning here speaks of those who unskillfully attribute their own properties to inanimate bodies, (as when they say, that matter *desires* forms as the female does the male, and that heavy bodies descend down *by appetite* towards the centre, that they may rest therein) there is nothing to be reprehended in the passage. But, if his meaning be extended further to take away all final causes from the things

“ of nature, then is it the very spirit of atheism and infidelity.  
“ It is no *idol of the cave or den* (to use that affected language) that is, no prejudice or fallacy imposed on ourselves,  
“ from the attributing our own animalish properties to things  
“ without us, to think that the frame and system of this whole  
“ world was contrived by a perfect understanding and mind.”

It is difficult to conceive that any person who had read Bacon's works, and who, at the same time, was acquainted with the theories which it was their great object to explode, could, for a moment, have hesitated about rejecting the latter interpretation as altogether absurd; and yet the splenetic tone which marks the conclusion of Cudworth's strictures, plainly shews, that he had a decided leaning to it, in preference to the former\*. The comment does no honour to his liberality; and, on the most favourable supposition, must be imputed to

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\* Even the *former* interpretation is not agreeable (as appears manifestly from the context) to Bacon's idea. The prejudices which he has here more particularly in view, are those which take their rise from a bias in the mind to imagine a greater *equality* and *uniformity* in nature than really exists. As an instance of this, he mentions the universal assumption among the ancient astronomers, that all the celestial motions are performed in orbits perfectly circular;—an assumption, which, a few years before Bacon wrote, had been completely disproved by Kepler. To this he adds some other examples from physics and chemistry; after which he introduces the general reflection animadverted on by Cudworth.—The whole passage concludes with these words. “Tanta est harmoniæ discrepantia inter spiritum hominis et spiritum mundi.”

The criticism may appear minute; but I cannot forbear to mention, as a proof of the carelessness with which Cudworth had read Bacon, that the prejudice supposed by the former to belong to the class of *idola specus*, is expressly quoted by the latter, as an example of the *idola tribus*. (See the 5th Book de Augment. Scient. Chap. iv.)

a superstitious reverence for the remains of Grecian wisdom, accompanied with a corresponding dread of the unknown dangers to be apprehended from philosophical innovations. Little was he aware, that, in turning the attention of men from the history of opinions and systems to the observation and study of nature, Bacon was laying the foundation of a bulwark against atheism, more stable and impregnable than the united labours of the ancients were able to rear;—a bulwark which derives additional strength from every new accession to the stock of human knowledge\*.

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\* *Extabit eximium Newtoni opus adversus Atheorum impetus munitissimum præsidium.* (Cotesii Præf. in Edit. Secund. Princip.)

In the above vindication of Bacon, I have abstained from any appeal to the instances in which he has himself forcibly and eloquently expressed the same sentiments here ascribed to him; because I conceive that an author's real opinions are to be most indisputably judged of from the *general* spirit and tendency of his writings. The following passage, however, is too precious a document to be omitted on the present occasion. It is indeed one of the most hackneyed quotations in our language; but it forms, on that very account, the more striking a contrast to the voluminous and now neglected erudition displayed by Cudworth in defence of the same argument.

"I had rather believe all the fables in the Legend, and the Talmud, and the Alcoran, than that this universal frame is without a mind! It is true that a little philosophy inclineth man's mind to atheism; but depth in philosophy bringeth men's minds about to religion; for while the mind of man looketh upon second causes scattered, it may sometimes rest in them and go no farther; but when it beholdeth the chain of them confederate and linked together, it must needs fly to providence and Deity: nay, even that school which is most accused of atheism, doth most demonstrate religion; that is, the school of Leucippus, and Democritus, and Epicurus; for it is a thousand times more credible, that four mutable elements and one immutable fifth essence, duly and eternally placed, need no God, than that an army of infinite small portions, or seeds unplaced, should have produced this order and beauty without a divine marshal." (Bacon's Essays.)

Whether Bacon's contempt for the Final Causes of the Aristotelians has not carried him to an extreme in recommending the *total* exclusion of them from physics, is a very different question; and a question of much importance in the theory of the inductive logic. My own opinion is, that his views on this point, if considered as applicable to the *present* state of experimental science, are extremely limited and erroneous. Perhaps, at the time when he wrote, such an exclusion may have appeared necessary, as the only effectual antidote against the errors which then infected every branch of philosophy; but, granting this to be true, no good reason can be given for continuing the same language, at a period when the proper object of physics is too well understood, to render it possible for the investigation of final causes to lead astray the most fanciful theorist. What harm can be apprehended from remarking those proofs of design which fall under the view of the physical inquirer in the course of his studies? Or, if it should be thought foreign to *his* province to speak of *design*, he may, at least, be permitted to remark what *ends* are really accomplished by particular *means*; and what *advantages* result from the general laws by which the phenomena of nature are regulated. In doing this, he only states a *fact*; and if it be illogical to go farther, he may leave the inference to the moralist or the divine.

In consequence, however, of the vague and common-place declamation against final causes, sanctioned (as has been absurdly supposed) by those detached expressions of Bacon, which have suggested the foregoing reflections, it has, for many years past, become fashionable to omit the consideration of them



entirely, as inconsistent with the acknowledged rules of sound philosophizing;—a caution (it may be remarked by the way) which is most scrupulously observed by those writers who are the most forward to censure every apparent *anomaly* or *disorder* in the economy of the universe. The effect of this has been, to divest the study of nature of its most attractive charms; and to sacrifice to a false idea of logical rigour, all the moral impressions and pleasures which physical knowledge is fitted to yield\*.

Nor is it merely in a *moral view*, that the consideration of *uses* is interesting. There are some parts of nature in which it is necessary to complete the *physical theory*; nay there are instances, in which it has proved a powerful and perhaps indispensable organ of *physical discovery*. That Bacon should not have been aware of this, will not appear surprising, when it is recollected, that the chief facts which justify the observation have been brought to light since his time.

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\* "If a traveller (says the great Mr Boyle) being in some ill-inhabited eastern country, should come to a large and fair building, such as one of the most stately of those they call caravanzeras, though he would esteem and be delighted with the magnificence of the structure, and the commodiousness of the apartments, yet supposing it to have been erected but for the honour or the pleasure of the founder, he would commend so stately a fabric, without thanking him for it; but, if he were satisfied that this commodious building was designed by the founder as a receptacle for passengers, who were freely to have the use of the many conveniences the apartments afforded, he would then think himself obliged, not only to praise the magnificence, but with gratitude to acknowledge the bounty and the philanthropy of so munificent a benefactor." (Boyle's Works, Vol. IV. p. 517. Folio edition.)

Of these *facts*, the most remarkable are furnished by the science of anatomy. To understand the structure of an animal body, it is necessary not only to examine the *conformation* of the parts, but to consider their *functions*; or, in other words, to consider their *ends* and *uses*: Nor, indeed, does the most accurate knowledge of the former, till perfected by the discovery of the latter, afford satisfaction to an inquisitive and scientific mind. Every anatomist, accordingly, whatever his metaphysical creed may be, proceeds, in his researches, upon the maxim, that no organ exists without its appropriate destination; and although he may often fail in his attempts to ascertain what this destination is, he never carries his scepticism so far, as, for a moment, to doubt of the general principle. I am inclined to think, that it is in this way the most important steps in physiology have been gained; the curiosity being constantly kept alive by some new problem in the animal machine; and, at the same time, checked in its wanderings, by an irresistible conviction, that nothing is made in vain. The memorable account given by Mr Boyle of the circumstances which led to the discovery of the circulation of the blood, is but one of the many testimonies which might be quoted in confirmation of this opinion.

“ I remember that when I asked our famous Harvey, in the  
“ only discourse I had with him (which was but a little while  
“ before he died) what were the things which induced him to  
“ think of a circulation of the blood? he answered me, that  
“ when he took notice, that the valves in the veins of so many  
“ parts of the body were so placed, that they gave free passage

“ to the blood towards the heart, but opposed the passage of  
 “ the venal blood the contrary way, he was invited to think,  
 “ that so provident a cause as nature had not placed so many  
 “ valves without design ; and no design seemed more probable,  
 “ than that, since the blood could not well, because of the in-  
 “ terposing valves, be sent by the veins to the limbs, it should  
 “ be sent through the arteries, and return through the veins,  
 “ whose valves did not oppose its course that way \*.”

This perception of design and contrivance is more peculiarly impressive, when we contemplate those instances in the animal economy, in which the same effect is produced, in *different*

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\* Boyle's Works, Vol. IV. p. 539. Folio Ed. See Outlines of Moral Philosophy, p. 185. (Edin. 1793.)

The reasoning here ascribed to Harvey seems now so very natural and obvious, that some have been disposed to question his claim to the high rank commonly assigned to him among the improvers of science. The late Dr William Hunter has said, that after the discovery of the valves in the veins, which Harvey learned, while in Italy, from his master Fabricius ab Aquapendente, the remaining step might easily have been made by any person of common abilities. “ This discovery (he observes) set Harvey to work upon the *use* of the heart and vascular system in animals: and, in the course of some years, he was so happy as to discover, and to prove beyond all possibility of doubt, the circulation of the blood.” He afterwards expresses his astonishment that this discovery should have been left for Harvey; adding, that “ Providence meant to reserve it for *him*, and would not let men *see what was before them*, nor understand what they read.” (Hunter's Introductory Lectures, p. 42. et seq.)

Whatever opinion be formed on this point, Dr Hunter's remarks are valuable, as an additional proof of the regard paid by anatomists to *Final Causes*, in the study of physiology.

See also Haller, Elem. Physiology. Tom I. p. 204.

combinations of circumstances, by *different* means ;—when we compare, for example, the circulation of the blood in the fœtus, with that in the body of the animal after it is born. On such an occasion, how is it possible to withhold the assent from the ingenious reflection of Baxter! “ Art and means are “ designedly multiplied, that we might not take it for the effects “ of chance; and, in some cases, the method itself is different, “ that we might see it is not the effect of surd necessity \*.”

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\* Inquiry into the Nature of the Human Soul, Vol. I. p. 136. (3d Ed.)

The following passage from an old English divine may be of use for the farther illustration of this argument. I quote it with the greater confidence, as I find that the most eminent and original physiologist of the present age (M. Cuvier) has been led, by his enlightened researches concerning the laws of the animal economy, into a train of thinking strikingly similar.

“ Man is always mending and altering his works; but nature observes the same “ tenor, because her works are so perfect, that there is no place for amendments, no “ thing that can be reprehended. The most sagacious men in so many ages have not “ been able to find any flaw in these divinely contrived and formed machines; no blot “ or error in this great volume of the world, as if any thing had been an imperfect “ essay at the first; nothing that can be altered for the better; nothing but if it were “ altered would be marred. This could not have been, had man's body been the work “ of chance, and not counsel and providence. Why should there be constantly the “ same parts? Why should they retain constantly the same places? Nothing so con- “ trary as constancy and chance. Should I see a man throw the same number a thou- “ sand times together upon but three dice, could you persuade me that this were ac- “ cidental, and that there was no necessary cause for it? How much more incredible “ then is it, that constancy in such a variety, such a multiplicity of parts, should be the “ result of chance? Neither yet can these works be the effects of Necessity or Fate, “ for then there would be the same constancy observed in the smaller as well as in the “ larger parts and vessels; whereas *there* we see nature doth, as it were, sport itself, “ the minute ramifications of all the vessels, veins, arteries, and nerves,\* infinitely vary- “ ing in individuals of the same species, so that they are not in any two alike.” (Ray's Wisdom of God in the Creation.)

The study of comparative anatomy leads, at every step, so directly and so manifestly to the same conclusion, that even those physiologists who had nothing in view but the advancement of their own science, unanimously agree in recommending the dissection of animals of different kinds, as the most effectual of all helps for ascertaining the *functions* of the various organs in the human frame ;—tacitly assuming, as an incontrovertible truth, that, in proportion to the variety of means by which the same effect is accomplished, the presumption increases, that this effect was an *end* in the contemplation of the artist. “The intention of nature (says one author) in the formation of the different parts, can nowhere be so well learned as from comparative anatomy ; that is, if we would understand physiology, and reason on the functions of the animal economy, we must see how the same end is brought about in other species.—We must contemplate the part or

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“ Nature, (says Cuvier) while confining herself strictly within those limits which the conditions necessary for existence prescribed to her, has yielded to her spontaneous fecundity wherever these conditions did not limit her operations ; and without ever passing beyond the small number of combinations, that can be realized in the essential modifications of the important organs, she seems to have given full scope to her fancy, in filling up the subordinate parts. With respect to these, it is not inquired, whether an individual form, whether a particular arrangement be necessary ; it seems often not to have been asked, whether it be even useful, in order to reduce it to practice ; it is sufficient that it be possible, that it destroy not the harmony of the whole. Accordingly, as we recede from the principal organs, and approach to those of less importance, the varieties in structure and appearance become more numerous ; and when we arrive at the surface of the body, where the parts the least essential, and whose injuries are the least momentous, are necessarily placed, the number of varieties is so great, that the conjoined labours of naturalists have not yet been able to give us an adequate idea of them.” (Leçons d'Anatomie Comparée.)



“organ in *different* animals; its shape, position, and connexion with the other parts; and observe what thence arises. “If we find ONE COMMON EFFECT constantly produced, though in a very different way, we may safely conclude that this is the *use* or *function* of the part.—This reasoning can never betray us, if we are but sure of the facts \*.”

The celebrated Albinus expresses himself to the same purpose in his preface to Harvey's *Exercitatio de Motu Cordis*. “Incidenda autem animalia, quibus partes illæ quarum actiones quærimus eædem atque homini sunt, aut certe similes iis; ex quibus sine metu erroris judicare de illis hominis liceat. Quin et reliqua, si modo aliquam habeant ad hominem similitudinem, idonea sunt ad aliquod suppeditandum.”

If Bacon had lived to read such testimonies as these in favour of the investigation of Final Causes; or had witnessed the discoveries to which it has led in the study of the animal economy, he would, I doubt not, have readily admitted, that it was not altogether uninteresting and unprofitable, even to the *physiocal* inquirer. Such, however, is the influence of an illustrious name, that, in direct opposition to the evidence of historical facts, the assertion of the complete *sterility* of all these speculations is, to the present day, repeated, with undiminished confidence, by writers of unquestionable learning and talents. In one of the most noted physiological works which have lately

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\* Letter by an anonymous Correspondent, prefixed to Monro's *Comparative Anatomy*. London, 1744.

appeared on the Continent, Bacon's apothegm is cited more than once with unqualified approbation ; although the author candidly owns, that it is difficult for the most *reserved* philosopher always to keep it steadily in view, in the course of his inquiries \*.

The prejudice against final causes, so generally avowed by the most eminent philosophers of France, during the eighteenth century, was first introduced into that country by Des Cartes. It must not, however, be imagined, that, in the mind of this great man, it arose from any bias towards atheism. On the contrary, he himself tells us, that his objection to the research of *uses* or *ends*, was founded entirely on the presumptuous confidence which it seemed to argue in the powers of human reason ; as if it were conceivable, that the limited faculties of man could penetrate into the counsels of Divine wisdom. Of the existence of God he conceived that a demonstrative proof was afforded by the idea we are able to form of a Being infinitely perfect, and necessarily existing ; and it has with some probability been conjectured, that it was his partiality to this new argument of his own, which led him to reject the reasonings of his predecessors in support of the same conclusion †.

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\* " Je regarde, avec le grand Bacon, la philosophie des causes finales comme " stérile : mais il est bien difficile à l'homme le plus réservé, de n'y avoir jamais recours " dans ses explications." (Rapports du Physique et du Moral de l'Homme. Par M. le Sénateur Cabanis. Tome I. p. 352. Paris, 1805.)

† " Nullas unquam rationes circa res naturales a *fine* quam Deus aut natura in iis " faciendis sibi proposuit desumemus ; quia non tantum debemus nobis arrogare ut

To this objection of Des Cartes, an elaborate, and, in my opinion, a most satisfactory reply, is to be found in the works of Mr Boyle. The principal scope of his essay may be collected from the following short extract.

“ Suppose that a countryman, being in a clear day brought  
 “ into the garden of some famous mathematician, should see  
 “ there one of those curious gnomonic instruments, that shew at  
 “ once the place of the sun in the zodiac, his declination from  
 “ the equator, the day of the month, the length of the day, &c.  
 “ &c. It would indeed be presumption in him, being unac-  
 “ quainted both with the mathematical disciplines, and the  
 “ several intentions of the artist, to pretend or think himself  
 “ able to discover *all the ends* for which so curious and elabo-  
 “ rate a piece was framed : but when he sees it furnished with  
 “ a style, with horary lines and numbers, and in short with all  
 “ the requisites of a sun-dial, and manifestly perceives the sha-  
 “ dow to mark from time to time the hour of the day, it would

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“ ejus consiliorum participes nos esse putemus.” (Princip. Pars I. §. 28.) “ Dum hæc  
 “ perpendo attentius, occurrit primò non mihi esse mirandum si quædam à Deo fiant  
 “ quorum rationes non intelligam ; nec de ejus existentia ideo esse dubitandum, quod  
 “ forte quædam alia esse experiar quæ quare, vel quomodo ab illo facta sint non com-  
 “ prehendo ; cum enim jam sciam naturam meam esse valde infirmam et limitatam, Dei  
 “ autem naturam esse immensam, incomprehensibilem, infinitam, ex hoc satis etiam scio  
 “ innumerabilia illum posse quorum causas ignorem ; atque ob hanc unicam rationem  
 “ totum illud causarum genus quod a fine peti solet in rebus physicis nullum usum habere  
 “ existimo ; non enim absque temeritate me puto posse investigare fines Dei.” (Medi-  
 tatio Quarta.)

See Note (EB.)

“ be no more a presumption than an error in him to conclude,  
 “ that (whatever other uses the instrument was fit or was de-  
 “ signed for) it is a sun-dial, that was meant to shew the hour  
 “ of the day \*.”

With this opinion of Boyle that of Newton so entirely coincided, that (according to Maclaurin) he thought the consideration of final causes *essential* to true philosophy; and was accustomed to congratulate himself on the effect of his writings in reviving an attention to them, after the attempt of Des Cartes to discard them from physics. On this occasion, Maclaurin has remarked, “ that, of all sort of causes, final causes are the  
 “ most clearly placed in our view;—and that it is difficult to  
 “ comprehend, why it should be thought arrogant to attend to  
 “ the design and contrivance that is so evidently displayed in  
 “ nature, and obvious to all men;—to maintain, for instance,  
 “ that the eye was made for seeing, though we may not be able  
 “ either to account mechanically for the refraction of light in  
 “ its coats, or to explain how the image is propagated from the

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\* In the same Essay, Mr Boyle has offered some very judicious strictures on the abuses to which the research of final causes is liable, when incautiously and presumptuously pursued. An abstract of these, accompanied with a few illustrations from later writers, might form an interesting chapter in a treatise of inductive logic.

The subject has been since prosecuted with considerable ingenuity by Le Sage of Geneva, who has even attempted (and not altogether without success) to lay down logical rules for the investigation of *ends*. To this study, which he was anxious to form into a separate science, he gave the very ill chosen name of *Telologie*; a name, if I am not mistaken, first suggested by Wolfius.—For some valuable fragments of his intended work with respect to it, see the Account of his Life and Writings by his friend M. Prevost. (Geneva 1805.)

“retina to the mind\*.”—It is Newton’s own language, however, which alone can do justice to his sentiments on the present subject.

“The main business of natural philosophy is to argue from phenomena, without feigning hypotheses, and to deduce causes from effects till we come to the very first cause, which certainly is not mechanical; and not only to unfold the mechanism of the world, but chiefly to resolve these and such like questions: *Whence is it that Nature does nothing in vain; and whence arises all that order and beauty which we see in the world?—How came the bodies of animals to be contrived with so much art, and for what ends were their several parts? Was the eye contrived without skill in optics, and the ear without knowledge of sounds†?*”

In multiplying these quotations, I am well aware that authorities are not arguments; but when a prejudice to which authority alone has given currency is to be combated, what other refutation is likely to be effectual?

After all, it were to be wished that the scholastic phrase *final cause* could, without affectation, be dropped from our philosophical vocabulary; and some more unexceptionable mode of speaking substituted instead of it. In this elementary work, I have not presumed to lay aside entirely a form of expression

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\* Account of Newton’s Philosophical Discoveries, Book I. Chap. ii.

† Newton’s Optics, Query 28.



consecrated in the writings of Newton, and of his most eminent followers; but I am fully sensible of its impropriety, and am not without hopes that I may contribute something to encourage the gradual disuse of it, by the indiscriminate employment of the words *ends* and *uses* to convey the same idea. Little more perhaps than the general adoption of one or other of these terms is necessary, to bring candid and reflecting minds to a uniformity of language as well as of sentiment on the point in question.

It was before observed, with respect to anatomists, that all of them without exception, whether professedly friendly or hostile to the inquisition of final causes, concur in availing themselves of its guidance in their physiological researches. A similar remark will be found to apply to other classes of scientific inquirers. Whatever their speculative opinions may be, the moment their curiosity is fairly engaged in the pursuit of truth, either physical or moral, they involuntarily, and often perhaps unconsciously, submit their understandings to a logic borrowed neither from the schools of Aristotle nor of Bacon. The ethical system (for example) of those ancient philosophers who held that Virtue consists in following Nature, not only involves a recognition of final causes, but represents the study of them, in as far as regards the ends and destination of our own being, as the great business and duty of life \*. The system too of those

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\* "Discite, O miseri, et causas cognoscite rerum,

"Quid sumus, et quidnam victuri gignimur."

PERSIUS.

Εγώ δὲ τι βούλομαι καταμαθεῖν τὴν φύσιν, καὶ ταῦτα ἐπισθαι.

EPICETUS.

physicians who profess to follow Nature in the treatment of diseases, by watching and aiding her medicative powers, assumes the same doctrine as its fundamental principle. A still more remarkable illustration, however, of the influence which this species of evidence has over the belief, even when we are the least aware of its connection with metaphysical conclusions, occurs in the history of the French Economical System. Of the comprehensive and elevated views which at first suggested it, the title of *Physiocratie*, by which it was early distinguished, affords a strong presumptive proof; and the same thing is more fully demonstrated, by the frequent recurrence made in it to the physical and moral laws of Nature, as the unerring standard which the legislator should keep in view in all his positive institutions †. I do not speak at present of the justness of these opinions. I wish only to remark, that, in the statement of them given by their original authors, it is taken for granted as a truth self-evident and indisputable, not merely that benevolent design is manifested in all the physical and moral arrangements connected with this globe, but that the study of these arrangements is indispensably necessary to lay a solid foundation for political science.

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† “ Ces lois forment ensemble ce qu'on appelle *la loi naturelle*. Tous les hommes  
“ et toutes les puissances humaines doivent être soumis à ces lois souveraines, instituées  
“ par l'être suprême : elles sont immuables et irréfragables, et les meilleurs loix pos-  
“ sibles ; et par conséquent, la base du gouvernement le plus parfait, et la règle fonda-  
“ mentale de toutes les loix positives ; car les loix positives ne sont que des loix de ma-  
“ nution relatives à l'ordre naturel évidemment le plus avantageux au genre humain.”  
QUESNAY.

The same principles appear to have led Mr Smith into that train of thinking which gave birth to his inquiries concerning National Wealth. "Man (he observes in one of his oldest manuscripts now extant) is generally considered by statesmen and projectors as the materials of a sort of political mechanics. Projectors disturb Nature in the course of her operations in human affairs; and it requires no more than to let her alone, and give her fair play in the pursuit of her own designs."—And in another passage: "Little else is requisite to carry a state to the highest degree of opulence from the lowest barbarism, but peace, easy taxes, and a tolerable administration of justice; all the rest being brought about by the natural course of things. All governments which thwart this natural course; which force things into another channel; or which endeavour to arrest the progress of society at a particular point, are unnatural, and to support themselves are obliged to be oppressive and tyrannical\*." Various other passages of a similar import might be quoted, both from his *Wealth of Nations*, and from his *Theory of Moral Sentiments*.

This doctrine of Smith and Quesnay, which tends to simplify the theory of legislation, by exploding the policy of those complicated checks and restraints which swell the municipal codes of most nations, has now, I believe, become the prevailing creed of thinking men all over Europe; and, as commonly happens to prevailing creeds, has been pushed by many of its partizans far beyond the views and intentions of its ori-

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\* Biographical Memoirs of Smith, Robertson, and Reid, p. 100.

ginal authors. Such too is the effect of fashion, on the one hand, and of obnoxious phrases on the other, that it has found some of its most zealous abettors and propagators among writers who would, without a moment's hesitation, have rejected, as puerile and superstitious, any reference to *final causes* in a philosophical discussion.

## II.

### *Danger of confounding Final with Physical Causes in the Philosophy of the Human Mind.*

Having said so much upon the research of Final Causes in *Physics, properly so called*, I shall subjoin a few remarks on its application to the philosophy of the human mind;—a science in which the just rules of investigation are as yet far from being generally understood. Of this no stronger proof can be produced, than the confusion between final and efficient causes, which perpetually recurs in the writings of our latest and most eminent moralists. The same confusion, as I have already observed, prevailed in the *physical* reasonings of the Aristotelians; but, since the time of Bacon, has been so completely corrected, that, in the wildest theories of modern naturalists, hardly a vestige of it is to be traced.

To the logical error just mentioned it is owing, that so many false accounts have been given of the principles of human conduct, or of the motives by which men are stimulated to action.

When the general laws of our internal frame are attentively examined, they will be found to have for their object the happiness and improvement both of the individual and of society. This is their Final Cause, or the end for which we may presume they were destined by our Maker. But, in such cases, it seldom happens, that, while Man is obeying the *active impulses* of his nature, he has any idea of the ultimate ends which he is promoting ; or is able to calculate the remote effects of the movements which he impresses on the little wheels around him. These *active impulses*, therefore, may, in one sense, be considered as the *efficient causes* of his conduct ; inasmuch as they are the means employed to determine him to particular pursuits and habits ; and as they operate (in the *first* instance, at least,) without any reflection on his part on the purposes to which they are subservient. Philosophers, however, have in every age been extremely apt to conclude, when they had discovered the salutary tendency of any active principle, that it was from a sense or foreknowledge of this tendency that the principle derived its origin. Hence have arisen the theories which attempt to account for all our actions from self-love ; and also those which would resolve the whole of morality, either into political views of general expediency, or into an enlightened regard to our own best interests.

I do not know of any author who has been so completely aware of this common error as Mr Smith. In examining the principles connected with our moral constitution, he always treats separately of their *final causes*, and of the *mechanism* (as he calls it) by which nature accomplishes the effect ; and he



has even been at pains to point out to his successors the great importance of attending to the distinction between these two speculations.—“In every part of the universe, we observe  
“means adjusted with the nicest artifice to the ends which  
“they are intended to produce; and in the mechanism of  
“a plant or animal body, admire how everything is contriv-  
“ed for advancing the two great purposes of nature, the sup-  
“port of it, or individual, and the propagation of the species.  
“But in the expansion in all such objects, we still distinguish the  
“efficient from the final cause of their several motions and or-  
“ganizations. The digestion of the food, the circulation of the  
“blood, and the secretion of the several juices which are drawn  
“from it, are operations all of them necessary for the great pur-  
“poses of animal life; yet we never endeavour to account for  
“them from those purposes as from their efficient causes, nor  
“imagine that the blood circulates, or the food digests of its  
“own accord, and with a view or intention to the purposes of  
“circulation or digestion. The wheels of the watch are all ad-  
“mirably adapted to the end for which it was made, the point-  
“ing of the hour. All their various motions conspire in the  
“nicest manner to produce this effect. If they were endowed  
“with a desire and intention to produce it, they could not do  
“it better. Yet we never ascribe any such intention or desire  
“to them, but to the watch-maker, and we know that they are  
“put into motion by a spring, which intends the effect it pro-  
“duces as little as they do. But though, in accounting for the  
“operations of bodies, we never fail to distinguish, in this man-  
“ner, the efficient from the final cause, in accounting for those  
“of the mind, we are apt to confound these two different

“ things with one another. When, by natural principles, we  
 “ are led to advance those ends which a refined and enlighten-  
 “ ed reason would recommend to us, we are very apt to impute  
 “ to that reason, as to their efficient cause, the sentiments and  
 “ actions by which we advance those ends, and to imagine that  
 “ to be the wisdom of Man, which, in reality, is the wisdom of  
 “ God. Upon a superficial view, this cause seems sufficient to  
 “ produce the effects which are ascribed to it : the system  
 “ of Human Nature seems to be more simple and agreeable,  
 “ when all its different operations are, in this manner, deduced  
 “ from a single principle\*.”

These remarks apply with peculiar force to a theory of morals which has made much noise in our own times ;—a theory which resolves the obligation of all the different virtues into a sense of their *utility*. At the time when Mr Smith wrote, it had been recently brought into fashion by the ingenious and refined disquisitions of Mr Hume ; and there can be little doubt, that the foregoing strictures were meant by the author as an indirect refutation of his friend's doctrines.

The same theory (which is of a very ancient date†) has been since revived by Mr Godwin, and by the late excellent Dr Paley. Widely as these two writers differ in the *source* whence they derive their rule of conduct, and the *sanctions* by which they enforce its observance, they are perfectly agreed about

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\* Theory of Moral Sentiments, Vol. I. p. 216, et seq. 6th Edit.

† “ Ipsa utilitas, justi prope mater et æqui,” HORAT. Sat. Lib. I. 3.

its paramount authority over every other principle of action. "Whatever is *expedient* (says Dr Paley) is *right*. It is the utility of any moral rule alone which constitutes the obligation of it\*. . . . But then, it must be expedient *on the whole*, at the long run, in all its effects collateral and remote, as well as those which are immediate and direct; as it is obvious, that, in computing consequences, it makes no difference in what way, or at what distance they ensue†."—Mr Godwin has nowhere expressed himself, on this fundamental question of practical ethics, in terms more decided and unqualified.

The observations quoted from Mr Smith on the proneness of the mind, in moral speculations, to confound together efficient and final causes, furnish a key to the chief difficulty by which the patrons of this specious but very dangerous system have been misled.

Among the qualities connected with the different virtues,

\* Principles of Moral and Political Philosophy, Vol. I. p. 70. (5th Edit.)

† Ibid. p. 78.

In another part of his work, Dr Paley explicitly asserts, that *every* moral rule is liable to be superseded in particular cases on the ground of expediency. "Moral philosophy cannot pronounce that any rule of morality is so rigid as to bend to no exceptions; nor, on the other hand, can she comprise these exceptions within any previous description. She confesses, that the obligation of every law depends upon its ultimate utility; that this utility, having a finite and determinate value, situations may be feigned, and consequently may possibly arise, in which the general tendency is outweighed by the enormity of the particular mischief; and of course, where ultimate utility renders it as much an act of duty to break the rule, as it is on other occasions to observe it." Vol. II. p. 411.

there is none more striking than their beneficial influence on social happiness ; and accordingly, moralists of all descriptions, when employed in enforcing particular duties, such as justice, veracity, temperance, and the various charities of private life, never fail to enlarge on the numerous blessings which follow in their train. The same observation may be applied to *self-interest* ; inasmuch, as the most effectual way of promoting it is universally acknowledged to be by a strict and habitual regard to the obligations of morality.—In consequence of this *unity of design*, which is not less conspicuous in the moral than in the natural world, it is easy for a philosopher to give a plausible explanation of all our duties from *one* principle ; because the general tendency of all of them is to determine us to the same course of life. It does not, however, follow from this, that it is from such a comprehensive survey of the consequences of human conduct, that our ideas of right and wrong are derived ; or that we are entitled, in particular cases, to form rules of action to ourselves, drawn from speculative conclusions concerning the *final causes* of our moral constitution. If it be true (as some theologians have presumed to assert) that benevolence is the sole principle of action in the Deity, we must suppose that the duties of veracity and justice were enjoined by Him, *not* on account of their intrinsic rectitude, but of their utility : but still, with respect to man, these are sacred and indispensable laws—laws which he never transgresses, without incurring the penalties of self-condemnation and remorse : And indeed if, without the guidance of any internal monitor, he were left to infer the duties incumbent on him from a calculation and comparison of remote effects, we may venture to affirm, that there would

not be enough of virtue left in the world to hold society together.

To those who have been accustomed to reflect on the general analogy of the human constitution, and on the admirable adaptation of its various parts to that scene in which we are destined to act, this last consideration will, independently of any examination of the fact, suggest a very strong presumption *a priori* against the doctrine to which the foregoing remarks relate. For is it at all consonant with the other arrangements so wisely calculated for human happiness to suppose, that the conduct of such a fallible and short-sighted creature as Man, would be left to be regulated by no other principle than the private opinion of each individual concerning the *expediency* of his own actions? or, in other words, by the conjectures which he might form on the good or evil resulting *on the whole* from an endless train of future contingencies? Were this the case, the opinions of mankind with respect to the rules of morality would be as various as their judgments about the probable issue of the most doubtful and difficult determinations in politics. Numberless cases might be fancied, in which a person would not only *claim* merit but actually *possess* it, in consequence of actions which are generally regarded with indignation and abhorrence;—for unless we admit such duties as justice, veracity, and gratitude, to be immediately and imperatively sanctioned by the authority of reason and of conscience, it follows as a necessary inference, that we are *bound* to violate them, whenever, by doing so, we have a prospect of advancing any of the essential interests of society; or (which amounts



to the same thing) that a good *end* is sufficient to sanctify whatever *means* may appear to us to be necessary for its accomplishment. Even men of the soundest and most penetrating understandings might frequently be led to the perpetration of enormities, if they had no other light to guide them but what they derived from their own uncertain anticipations of futurity. And when we consider how small the number of such men is, in comparison of those whose judgments are perverted by the prejudices of education and their own selfish passions, it is easy to see what a scene of anarchy the world would become. Of this indeed we have too melancholy an experimental proof, in the history of those individuals who have in practice adopted the rule of *general expediency* as their whole code of morality;—a rule which the most execrable scourges of the human race have, in all ages, professed to follow, and of which they have uniformly availed themselves, as an apology for their deviations from the ordinary maxims of right and wrong.

Fortunately for mankind, the peace of society is not thus entrusted to accident, the great rules of a virtuous conduct being confessedly of such a nature as to be obvious to every sincere and well-disposed mind. And it is in a peculiar degree striking, that, while the *theory* of ethics involves some of the most abstruse questions which have ever employed the human faculties, the moral judgments and moral feelings of the most distant ages and nations, with respect to all the most essential duties of life, are one and the same.

Of this theory of utility, so strongly recommended to some by the powerful genius of Hume, and to others by the well-merited popularity of Paley, the most satisfactory of all refutations is to be found in the work of Mr Godwin. It is unnecessary to inquire how far the practical lessons he has inculcated are logically inferred from his fundamental principle; for although I apprehend much might be objected to these, even on his own hypothesis, yet, if such be the conclusions to which, in the judgment of so acute a reasoner, it *appeared* to lead with demonstrative evidence, nothing farther is requisite to illustrate the practical tendency of a system, which, absolving men from the obligations imposed on them with so commanding an authority by the moral constitution of human nature, abandons every individual to the guidance of his own narrow views concerning the complicated interests of political society\*.

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\* It is remarkable that Mr Hume, by far the ablest advocate for the theory in question, has indirectly acknowledged its inconsistency with some of the most important facts which it professes to explain. "Though the *heart* (he observes in the 5th section of his "Inquiry concerning Morals) takes not part entirely with those general notions, nor regulates all its love and hatred by the universal abstract differences of vice and virtue, without regard to self, and the persons with whom we are more intimately connected; yet have these moral differences a considerable influence, and being sufficient, at least for discourse, serve all the purposes in company, in the pulpit, on the theatre, and in the schools."—On this passage, the following very curious note is to be found at the end of the volume; a note (by the way) which deserves to be added to the other proofs already given of the irresistible influence which the doctrine of final causes occasionally exercises over the most sceptical minds. "*It is wisely ordained by nature,* that private connections should *commonly* prevail over universal views and considerations; otherwise our affections and actions would be dissipated and lost, for want of a proper limited object."—Does not this remark imply an acknowledgment, First, That the principle of general expediency (the *sole* principle of virtuous conduct, ac-

One very obvious consideration seems to have entirely escaped the notice of this, as well as of many other late inquirers : That, in ethical researches, not less than in those which relate to the material universe, the business of the philosopher is limited to the analytical investigation of general laws from the observed phenomena ; and that if, in any instance, his conclusions should be found inconsistent with acknowledged facts, the former must necessarily be corrected or modified by the latter. On such occasions, the ultimate appeal must be always made to the moral sentiments and emotions of the human race. The representations, for example, which we read with so much delight, in those poets, of whatever age and country, who have most successfully touched the human heart ;—of the heroical sacrifices made to gratitude, to parental duty, to filial piety, to conjugal affection ;—are not amenable to the authority of any ethical theory, but are the most authentic records of the phenomena which it is the object of such theories to generalize. The sentiment of Publius Syrus—*Omne dixeris maledictum, quum ingratum hominem dixeris*—speaks a language which accords with every feeling of an unperverted mind ;—it speaks the language of Nature, which it is the province of the moralist, *not* to criticize, but to listen to with reverence. By employing our reason to interpret and to obey this, and the other moral suggestions of the heart, we may trust with confidence, that we take the most effectual means in our power to augment

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cording to Mr Hume, in our most important transactions with our fellow-creatures) would not contribute to the happiness of society, if men should *commonly* act upon it ; and, Secondly, That some provision is made in our moral constitution, that we shall, in fact, be influenced by other motives in discharging the offices of private life ?

the sum of human happiness ;—but the discovery of this connection between *virtue* and *utility* is the slow result of extensive and philosophical combinations ; and it would soon cease to have a foundation in truth, if men were to substitute their own conceptions of expediency, instead of those rules of action which are inspired by the wisdom of God \*.

It must not be concluded from the foregoing observations, that, even in ethical inquiries, the consideration of final causes is to be rejected. On the contrary, Mr Smith himself, whose logical precepts on this subject I have now been endeavouring to illustrate and enforce, has frequently indulged his curiosity in speculations about *uses* or *advantages* ; seems plainly to have considered them as important objects of philosophical study, not less than *efficient* causes. Every caution to be observed is, that the one may not be confounded with the other.

Between these two different researches, however, there is, both in physics and ethics, a very intimate connection. In various cases, the consideration of final causes has led to the discovery of some general law of nature ; and, in almost every case, the discovery of a general law clearly points out some wise and beneficent purposes to which it is subservient. Indeed it is chiefly the prospect of such applications which renders the investigation of general laws interesting to the mind †.

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\* See Note (CC.) † See Note (DD.)

## CONCLUSION OF PART SECOND.

IN the foregoing chapters of this Second Part, I have endeavoured to turn the attention of my readers to various important questions relating to the Human Understanding; aiming, in the first place, to correct some fundamental errors in the theories commonly received with respect to the powers of intuition and reasoning; and, secondly, to illustrate some doctrines connected with the ground-work of the inductive logic, which have been either overlooked, or misapprehended by the generality of preceding writers. The bulk to which the volume has already extended, renders it impossible for me now to attempt a detailed recapitulation of its contents:—Nor do I much regret the necessity of this omission, having endeavoured, in every instance, as far as I could, to enable the intelligent reader to trace the thread of my discussions.

In a work professedly elementary, the frequent references made to the opinions of others may, at first sight, appear out of place; and it may not unnaturally be thought, that I have too often indulged in *critical* strictures, where I ought to have confined myself to a didactic exposition of first principles. To



this objection I have only to reply, that my aim is not to supplant any of the established branches of academical study ; but, by inviting and encouraging the young philosopher, when his academical career is closed, to review with attention and candour, his past acquisitions, to put him in the way of supplying what is defective in the present systems of education. I have accordingly entitled my book, Elements—not of Logic or of Pneumatology, but—of the Philosophy of the Human Mind ; a study which, according to my idea of it, presupposes a general acquaintance with the particular departments of literature and of science, but to which I do not know that any elementary introduction has yet been attempted. It is a study, indeed, whereof little more perhaps than *the elements* can be communicated by the mind of one individual to that of another.

In proof of this, it is sufficient here to hint, (for I must not at present enlarge on so extensive a topic), that a knowledge of the general laws which regulate the intellectual phenomena is, to the logical student, of little practical value, but as a preparation for the study of Himself. In this respect, the anatomy of the mind differs essentially from that of the body ; the structure of the former (whatever collateral aids may be derived from observing the varieties of genius in our fellow-creatures) being accessible to those alone who can retire into the deepest recesses of their own internal frame ; and even to *these* presenting, along with the generic attributes of the race, many of the specific peculiarities of the individual. The truth is, that on this subject every writer, whose speculations are at all worthy

of notice, must draw his chief materials from within ; and that it is only by comparing the conclusions of *different* writers, and subjecting all of them to the test of our personal experience, that we can hope to separate the essential principles of the human constitution from the unsuspected effects of education and of temperament\* ; or to apply with advantage, to our particular circumstances, the combined results of our reading and of our reflections. The constant appeal which, in such inquiries, the reader is thus forced to make to his own consciousness and to his own judgment, has a powerful tendency to form a habit, not more essential to the success of his metaphysical researches, than of all his other speculative pursuits.

Nearly connected with this habit, is a propensity to weigh and to ascertain the exact import of words ; one of the nicest and most difficult of all analytical processes ; and *that* upon which more stress has been justly laid by our best modern logicians, than upon any other *organ* for the investigation of truth. For the culture of this propensity, no science is so peculiarly calculated to prepare the mind, as the study of its own operations. *Here*, the imperfections of words constitute the principal obstacle to our progress ; nor is it possible to advance a single step, without struggling against the associations im-

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\* I use the word *temperament*, in this instance, as synonymous with the *idiosyncrasy* of medical authors ; a term which I thought might have savoured of affectation if applied to the *mind* ; although authorities for such an employment of it are not wanting among old English writers. One example, directly in point, is quoted by Johnson from Glanville. "The understanding also hath its *idiosyncracies*, as well as other faculties."

posed by the illusions of metaphorical terms, and of analogical theories. Abstracting, therefore, from its various practical applications, and considering it merely as a gymnastic exercise to the reasoning powers, this study seems pointed out by nature, as the best of all schools for inuring the understanding to a cautious and skilful employment of language as the instrument of thought.

The two first chapters of this volume relate to logical questions, on which the established opinions appear to me to present stumbling-blocks at the very threshold of the science. In treating of these, I have canvassed with freedom, but, I hope, with due respect, the doctrines of some illustrious moderns, whom I am proud to acknowledge as my masters; of those more particularly, whose works are in the highest repute in our British Universities, and whose errors I was, on that account, the most solicitous to rectify. For the space allotted to my criticisms on Condillac, no apology is necessary to those, who have the slightest acquaintance with the present state of philosophy on the Continent, or who have remarked the growing spread, in this Island, of some of his weakest and most exceptionable theories.—On various controverted points connected with the theory of evidence, both demonstrative and experimental, I trust, with some confidence, that I shall be found to have thrown considerable light: in other instances, I have been forced to content myself with proposing my doubts; leaving the task of solving them to future inquirers. To awaken a dormant spirit of discussion, by pointing out the imperfections of accredited systems, is at least one step gained towards the farther advancement of knowledge.

It is justly and philosophically remarked by Burke, that “no-  
“ thing tends more to the corruption of science than to suffer it  
“ to stagnate. These waters must be troubled before they can  
“ exert their virtues. A man who works beyond the surface of  
“ things, though he may be wrong himself, yet he clears the  
“ way for others, and may chance to make even his errors sub-  
“ servient to the cause of truth \*.”

The subsequent chapters, relative to the Baconian Logic, bear, all of them, more or less, in their general scope, on the theory of the intellectual powers, and on the first principles of human knowledge. In this part of my work, the reader will easily perceive, that I do not profess to deliver logical precepts; but to concentrate, and to reflect back on the Philosophy of the Mind, whatever scattered lights I have been able to collect from the experimental researches to which that Philosophy has given birth. I have aimed, at the same time (and I hope not altogether without success), to give somewhat more of precision to the technical phraseology of the Baconian school, and of correctness to their metaphysical ideas.

Before concluding these speculations, it may not be improper to caution my readers against supposing, that when I speak of the Baconian school, or of the Baconian logic, I mean to ascribe entirely to the *Novum Organon*, the advances made in physical science, since the period of its publication. The singular effects of this, and of the other inestimable writings

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\* Inquiry into the Sublime and Beautiful, Part I. Sect. xix

of the same author, in forwarding the subsequent progress of scientific discovery, certainly entitle his name, far more than that of any other individual, to be applied as a distinguishing epithet to the modern rules of philosophizing ; but (as I have elsewhere observed) “ the genius and writings of Bacon himself “ were powerfully influenced by the circumstances and character of his age : Nor can there be a doubt, that he only accelerated a revolution which was already prepared by many “ concurrent causes \*.”—My reasons for thinking so, which rest chiefly on historical retrospects, altogether foreign to my present design, I must delay stating, till another opportunity.

To this observation it is of still greater importance to add, that, in contrasting the spirit and the utility of the new logic with those of the old, I have no wish to see the former substituted, in our universities, in room of the latter. By a strange inversion in the order of instruction, Logic, instead of occupying its natural place at the close of the academical course, has always been considered as an introduction to the study of the sciences ; and has, accordingly, been obtruded on the uninformed minds of youth, at their first entrance into the schools. While the syllogistic art maintained its reputation, this inversion was probably attended with little practical inconvenience ; the trite and puerile examples commonly resorted to for the illustration of its rules, presupposing a very slender stock of scientific attainments ; but now, when the word Logic is universally

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\* Outlines of Moral Philosophy, first printed in 1793.



understood in a more extensive sense, as comprehending, along with an outline of Aristotle's *Organon*, some account of the doctrines of Bacon, of Locke, and of their successors, it seems indispensably necessary, that this branch of education should be delayed till the understanding has acquired a wider and more varied range of ideas, and till the power of *reflection* (the last of our faculties which nature unfolds) begins to solicit its appropriate nourishment. What notions can be annexed to such words as analysis, synthesis, induction, experience, analogy, hypothetical and legitimate theories, demonstrative and moral certainty, by those whose attention has hitherto been exclusively devoted to the pursuits of classical learning? A fluent command, indeed, of this technical phraseology may be easily communicated; but it would be difficult to devise a more effectual expedient for misleading, at the very outset of life, the inexperienced and unassured judgment. The perusal of Bacon's writings, in particular, disfigured as they are by the frequent use of quaint and barbarous expressions, suited to the scholastic taste of his contemporaries, ought to be carefully reserved for a riper age\*.

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\* Haller mentions, in his *Elements of Physiology*, that he was forced to enter on the study of logic in the tenth year of his age. "Memini me annum natum decimum, quo avidus historiam et poesin devorassem, ad logicam, et ad CLAUBERGIANAM logicam ediscendam coactum fuisse, quâ nihil poterat esse, pro hujusmodi homuncione, sterilius." (*Tomus VIII. Pars Secunda*, p. 24. Lausannæ, 1778.) It seems difficult to imagine any apt more extravagant, than that of instructing a child, only ten years old, in the logic of the schools; and yet it is by no means a task so completely impracticable, as to convey to a pupil, altogether uninitiated in the *Elements of Physics*, a distinct idea of the object and rules of the *Novum Organon*.

The example of Mr Smith, during the short time he held the Professorship of Lo-