

THE
WORKS
OF
FRANCIS BACON.

VOL. IV.

LONDON:
PRINTED BY SPOTTISWOODS AND CO.
NEW-STREET SQUARE.

THE
WORKS
OF
FRANCIS BACON

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AND
LORD HIGH CHANCELLOR OF ENGLAND.

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VOL. IV.

TRANSLATIONS OF THE PHILOSOPHICAL WORKS, VOL. I.

LONDON:

LONGMAN AND CO.; SIMPKIN AND CO.; HAMILTON AND CO.; WHITTAKER
AND CO.; J. BAIN; E. HODGSON; WASHBOURNE AND CO.; RICHARDSON
BROTHERS; HOULSTON AND CO.; BICKERS AND BUSH; WILLIS AND
SOTHERAN; J. CORNISH; L. BOOTH; J. SNOW; AND AYLOTT AND CO.

1858.

~~250. a. 54.~~
~~265. i. 73.~~ 270. e. 22.

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P R E F A C E.

THOSE who have taken upon them to lay down the law of nature as a thing already searched out and understood, whether they have spoken in simple assurance or professional affectation, have therein done philosophy and the sciences great injury. For as they have been successful in inducing belief, so they have been effective in quenching and stopping inquiry; and have done more harm by spoiling and putting an end to other men's efforts than good by their own. Those on the other hand who have taken a contrary course, and asserted that absolutely nothing can be known, — whether it were from hatred of the ancient sophists, or from uncertainty and fluctuation of mind, or even from a kind of fulness of learning, that they fell upon this opinion, — have certainly advanced reasons for it that are not to be despised; but yet they have neither started from true principles nor rested in the just conclusion, zeal and affectation having carried them much too far. The more ancient of the Greeks (whose writings are lost) took up with better judgment a position between these two extremes, — between the presumption of pronouncing on everything, and the despair of comprehending anything; and though frequently and bitterly complaining of the difficulty of inquiry and the obscurity of things, and like impatient horses champing the bit, they did not the less follow up their object and engage with Nature; thinking (it seems) that this very question, — viz. whether or no anything can be known, — was to be settled not by arguing, but by trying. And yet they too, trusting entirely to the force of their understanding, applied no rule, but made everything turn upon hard thinking and perpetual working and exercise of the mind.

Now my method, though hard to practise, is easy to explain; and it is this. I propose to establish progressive stages of certainty. The evidence of the sense, helped and guarded by a certain process of correction, I retain. But the mental operation which follows the act of sense I for the most part reject; and instead of it I open and lay out a new and certain path for the mind to proceed in, starting directly from the simple sensuous perception. The necessity of this was felt no doubt by those who attributed so much importance to Logic; showing thereby that they were in search of helps for the understanding, and had no confidence in the native and spontaneous process of the mind. But this remedy comes too late to do any good, when the mind is already, through the daily intercourse and conversation of life, occupied with unsound doctrines and beset on all sides by vain imaginations. And therefore that art of Logic, coming (as I said) too late to the rescue, and no way able to set matters right again, has had the effect of fixing errors rather than disclosing truth. There remains but one course for the recovery of a sound and healthy condition,—namely, that the entire work of the understanding be commenced afresh, and the mind itself be from the very outset not left to take its own course, but guided at every step; and the business be done as if by machinery. Certainly if in things mechanical men had set to work with their naked hands, without help or force of instruments, just as in things intellectual they have set to work with little else than the naked forces of the understanding, very small would the matters have been which, even with their best efforts applied in conjunction, they could have attempted or accomplished. Now (to pause awhile upon this example and look in it as in a glass) let us suppose that some vast obelisk were (for the decoration of a triumph or some such magnificence) to be removed from its place, and that men should set to work upon it with their naked hands; would not any sober spectator think them mad? And if they should then send for more people, thinking that in that way they might manage it, would he not think them all the madder? And if they then proceeded to make a selection, putting away the weaker hands, and using only the strong and vigorous, would he not think them madder than ever? And if lastly, not content with this, they resolved to call in aid the art of athletics, and required all their men to come with hands, arms,

and sinews well anointed and medicated according to the rules of art, would he not cry out that they were only taking pains to show a kind of method and discretion in their madness? Yet just so it is that men proceed in matters intellectual,—with just the same kind of mad effort and useless combination of forces,—when they hope great things either from the number and co-operation or from the excellency and acuteness of individual wits; yea, and when they endeavour by Logic (which may be considered as a kind of athletic art) to strengthen the sinews of the understanding; and yet with all this study and endeavour it is apparent to any true judgment that they are but applying the naked intellect all the time; whereas in every great work to be done by the hand of man it is manifestly impossible, without instruments and machinery, either for the strength of each to be exerted or the strength of all to be united.

Upon these premises two things occur to me of which, that they may not be overlooked, I would have men reminded. First it falls out fortunately as I think for the allaying of contradictions and heart-burnings, that the honour and reverence due to the ancients remains untouched and undiminished; while I may carry out my designs and at the same time reap the fruit of my modesty. For if I should profess that I, going the same road as the ancients, have something better to produce, there must needs have been some comparison or rivalry between us (not to be avoided by any art of words) in respect of excellency or ability of wit; and though in this there would be nothing unlawful or new (for if there be anything misapprehended by them, or falsely laid down, why may not I, using a liberty common to all, take exception to it?) yet the contest, however just and allowable, would have been an unequal one perhaps, in respect of the measure of my own powers. As it is however,—my object being to open a new way for the understanding, a way by them untried and unknown,—the case is altered; party zeal and emulation are at an end; and I appear merely as a guide to point out the road; an office of small authority, and depending more upon a kind of luck than upon any ability or excellency. And thus much relates to the persons only. The other point of which I would have men reminded relates to the matter itself.

Be it remembered then that I am far from wishing to

interfere with the philosophy which now flourishes, or with any other philosophy more correct and complete than this which has been or may hereafter be propounded. For I do not object to the use of this received philosophy, or others like it, for supplying matter for disputations or ornaments for discourse, —for the professor's lecture and for the business of life. Nay more, I declare openly that for these uses the philosophy which I bring forward will not be much available. It does not lie in the way. It cannot be caught up in passage. It does not flatter the understanding by conformity with preconceived notions. Nor will it come down to the apprehension of the vulgar except by its utility and effects.

Let there be therefore (and may it be for the benefit of both) two streams and two dispensations of knowledge; and in like manner two tribes or kindreds of students in philosophy — tribes not hostile or alien to each other, but bound together by mutual services; — let there in short be one method for the cultivation, another for the invention, of knowledge.

And for those who prefer the former, either from hurry or from considerations of business or for want of mental power to take in and embrace the other (which must needs be most men's case), I wish that they may succeed to their desire in what they are about, and obtain what they are pursuing. But if any man there be who, not content to rest in and use the knowledge which has already been discovered, aspires to penetrate further; to overcome, not an adversary in argument, but nature in action; to seek, not pretty and probable conjectures, but certain and demonstrable knowledge; — I invite all such to join themselves, as true sons of knowledge, with me, that passing by the outer courts of nature, which numbers have trodden, we may find a way at length into her inner chambers. And to make my meaning clearer and to familiarise the thing by giving it a name, I have chosen to call one of these methods or ways *Anticipation of the Mind*, the other *Interpretation of Nature*.

Moreover I have one request to make. I have on my own part made it my care and study that the things which I shall propound should not only be true, but should also be presented to men's minds, how strangely soever preoccupied and obstructed, in a manner not harsh or unpleasant. It is but reasonable however (especially in so great a restoration of learning

and knowledge) that I should claim of men one favour in return; which is this; If any one would form an opinion or judgment either out of his own observation, or out of the crowd of authorities, or out of the forms of demonstration (which have now acquired a sanction like that of judicial laws), concerning these speculations of mine, let him not hope that he can do it in passage or by the by; but let him examine the thing thoroughly; let him make some little trial for himself of the way which I describe and lay out; let him familiarise his thoughts with that subtlety of nature to which experience bears witness; let him correct by seasonable patience and due delay the depraved and deep-rooted habits of his mind; and when all this is done and he has begun to be his own master, let him (if he will) use his own judgment.

which is the door of the intellect, is affected by individuals only. The images of those individuals—that is, the impressions which they make on the sense—fix themselves in the memory, and pass into it in the first instance entire as it were, just as they come. These the human mind proceeds to review and ruminates; and thereupon either simply rehearses them, or makes fanciful imitations of them, or analyses and classifies them. Wherefore from these three fountains, Memory, Imagination, and Reason, flow these three emanations, History, Poesy, and Philosophy; and there can be no others. For I consider history and experience to be the same thing, as also philosophy and the sciences.

Nor do I think that any other division is wanted for Theology. The information derived from revelation and the information derived from the sense differ no doubt both in the matter and in the manner of conveyance; but the human mind is the same, and its repositories and cells the same. It is only like different liquids poured through different funnels into one and the same vessel. Theology therefore in like manner consists either of Sacred History, or of Parables, which are a divine poesy, or of Doctrines and Precepts, which are a perennial philosophy. For as for that part which seems supernumerary, which is Prophecy, it is but a kind of history: for divine history has this prerogative over human, that the narration may be before the event, as well as after.

CHAP. II.

The Division of History into Natural and Civil; Ecclesiastical and Literary History being included in Civil. Division of Natural History into History of Generations, Pretergenerations, and Arts.

HISTORY is either Natural or Civil. Natural History treats of the deeds and works of nature; Civil History of those of men. Matter of Divinity shows itself no doubt in both, but principally in the latter; so much so as to form a species of history proper to itself, which I call Sacred or Ecclesiastical.

And a similar distinction is in my opinion also due to Learning and the Arts — their importance being such as to entitle them to a separate history of their own. And this (as well as the Ecclesiastical) I mean to be included in Civil History.

The division which I will make of Natural History is founded upon the state and condition of nature herself. For I find nature in three different states, and subject to three different conditions of existence. She is either free, and follows her ordinary course of development; as in the heavens, in the animal and vegetable creation, and in the general array of the universe; or she is driven out of her ordinary course by the perverseness, insolence, and frowardness of matter, and violence of impediments; as in the case of monsters; or lastly, she is put in constraint, moulded, and made as it were new by art and the hand of man; as in things artificial. Let Natural History therefore be divided into the History of Generations, of Pretergenerations, and of Arts; which last I also call Mechanical and Experimental History. Of these the first treats of the Freedom of Nature, the second of her Errors, the third of her Bonds. And I am the more induced to set down the History of the Arts as a species of Natural History, because an opinion has long been prevalent, that art is something different from nature, and things artificial different from things natural; whence this evil has arisen, — that most writers of Natural History think they have done enough when they have given an account of animals or plants or minerals, omitting all mention of the experiments of mechanical arts. But there is likewise another and more subtle error which has crept into the human mind; namely, that of considering art as merely an assistant to nature, having the power indeed to finish what nature has begun, to correct her when lapsing into error, or to set her free when in bondage, but by no means to change, transmute, or fundamentally alter nature. And this has bred a premature despair in human enterprises. Whereas men ought on the contrary to be surely persuaded of this; that the artificial does not differ from the natural in form or essence, but only in the efficient; in that man has no power over nature except that of motion; he can put natural bodies together, and he can separate them; and therefore that wherever the case admits of the uniting or disuniting of natural bodies, by joining (as they say) actives with passives, man can do everything; where the case does not admit this, he

can do nothing. Nor matters it, provided things are put in the way to produce an effect, whether it be done by human means or otherwise. Gold is sometimes refined in the fire and sometimes found pure in the sands, nature having done the work for herself. So also the rainbow is made in the sky out of a dripping cloud; it is also made here below with a jet of water. Still therefore it is nature which governs everything; but under nature are included these three; the *course* of nature, the *wanderings* of nature, and *art*, or nature with man to help; which three must therefore all be included in Natural History; as indeed they are in great measure by Pliny, the only person who ever undertook a Natural History according to the dignity of it; though he was far from carrying out his undertaking in a manner worthy of the conception.

The first of these, the history of nature in course, is extant, and that in moderate perfection; but the two latter are so weakly and unprofitably handled that they may be set down as deficient. For you will find no sufficient and competent collection of those works of nature which have a digression and deflexion from the ordinary course of generations, productions, and motions; whether they be singularities of place and region, or the strange events of time, or *casuum ingenia* (as they have been called) — devices of chance, or the effects of hidden properties, or productions of nature singular in their kind. It is true, I find books more than enough filled with fabulous experiments, idle secrets, and frivolous impostures, for pleasure and novelty; but a substantial and methodical collection of the Heteroclitcs or Irregulars of nature well examined and described I find not; especially not with due rejection and as it were public proscription of fables and popular errors. For as things now are, if an untruth in nature once get a footing and be made common, what by reason of men's reverence for antiquity, what by reason of the troublesomeness of putting it to the test anew, and what by reason of the use of the opinion in similitudes and ornaments of speech, it is never overthrown or retracted.

The end of this work, honoured with a precedent in Aristotle, is nothing less than to gratify the appetite of curious and vain wits, as the manner of mirabilaries is to do; but for two reasons, both of great weight; the one to correct the partiality of axioms and opinions, which are framed for the most part

upon common and familiar examples; the other, because from the wonders of nature is the most clear and open passage to the wonders of art. For you have but to follow and as it were hound nature in her wanderings, and you will be able, when you like, to lead and drive her afterwards to the same place again. Neither am I of opinion in this history of marvels, that superstitious narratives of sorceries, witchcrafts, charms, dreams, divinations, and the like, where there is an assurance and clear evidence of the fact, should be altogether excluded. For it is not yet known in what cases, and how far, effects attributed to superstition participate of natural causes; and therefore howsoever the use and practice of such arts is to be condemned, yet from the speculation and consideration of them (if they be diligently unravelled) a useful light may be gained, not only for the true judgment of the offences of persons charged with such practices, but likewise for the further disclosing of the secrets of nature. Neither ought a man to make scruple of entering and penetrating into these holes and corners, when the inquisition of truth is his sole object, — as your Majesty has shown in your own example; who, with the two clear and acute eyes of religion and natural philosophy, have looked deeply and wisely into those shadows, and yet proved yourself to be truly of the nature of the sun, which passes through pollutions and is not defiled. I would recommend however that those narrations which are tinged with superstition be sorted by themselves, and not mingled with those which are purely and sincerely natural. But as for narrations touching the prodigies and miracles of religions, they are either not true or not natural; and therefore impertinent for the story of nature.

For History of Nature Wrought, or Mechanical, as I also call it, I find some collections made of agriculture and likewise of many manual arts; but always (which is a great detriment in this kind of learning) with a neglect and rejection of experiments familiar and vulgar; which yet in the interpretation of nature are of equal, if not of more value than those which are less common. For it is esteemed a kind of dishonour upon learning for learned men to descend to inquiry or meditation upon matters mechanical; except they be such as may be thought secrets of art, or rarities and special subtleties. Which humour of vain and supercilious arrogancy is justly derided in Plato, where he brings in Hippias, a vaunting Sophist, dis-

puting with Socrates, a true and unfeigned inquisitor of truth ; where, the discourse being touching beauty, Socrates, after his loose and wandering manner of inductions, put first an example of a fair virgin, then of a fair horse, then of a fair pot well glazed. Whereat Hippias was offended, and said, " Were it not for courtesy's sake, I should be loth to dispute with one that did allege such base and sordid instances." Whereunto Socrates answered, " You have reason, and it becomes you well, being a man so trim in your vestments, and so fairly shod ;" and so goes on in irony. But the truth is, that they are not the highest instances, which give the best or securest information ; as is expressed not inelegantly in the common story of the philosopher, who, while he gazed upwards to the stars, fell into the water ; for if he had looked down he might have seen the stars in the water, but looking aloft he could not see the water in the stars. So it often comes to pass that mean and small things discover great better than great can discover small, and therefore it was well observed by Aristotle " that the nature of everything is best seen in its smallest portions." For which cause he inquires the nature of a commonwealth first in a family and the simplest conjugations of society—(man and wife, parent and child, master and servant)— which are present in every cottage.¹ Even so likewise the nature of this great city of the world, and the policy thereof, must be first sought in its primary concordances, and smallest portions ; as we see that that secret of nature (esteemed one of the great mysteries) of the turning of iron touched with the loadstone towards the north, was found out not in bars of iron but in needles.

But if my judgment be of any weight, the use of History Mechanical is, of all others, the most radical and fundamental towards natural philosophy ; such natural philosophy I mean as shall not vanish in the fumes of subtle or sublime speculations, but such as shall be operative to relieve the inconveniences of man's estate. For it will not only be of immediate benefit, by connecting and transferring the observations of one art to the use of others, and thereby discovering new commodities ; a result which must needs follow when the experience of different arts shall fall under the observation and consideration of one man's mind ; but further, it will give a more true and real illumination concerning the investigation of causes of things

¹ Arist. Politica, l. 1.

and axioms of arts, than has hitherto shone upon mankind. For like as a man's disposition is never well known or proved till he be crossed, nor Proteus ever changed shapes till he was straitened and held fast; so nature exhibits herself more clearly under the trials and vexations of art than when left to herself.

Before I dismiss this part of Natural History (which I call mechanical and experimental) I must add that the body of this kind of history should not be made up from the mechanical arts alone, but also from the operative part of the liberal sciences, as well as from many other practices which have not as yet grown up into arts; so as to omit nothing which may tend to inform the intellect. And this is the first division of Natural History.

CHAP. III.

The Second Division of Natural History, according to its Use and End, into Narrative and Inductive; and that the noblest end of Natural History is to minister and be in order for the Foundation of Philosophy; which is the end aimed at in Induction. The Division of the History of Generations into the History of the Heavenly Bodies, the History of Meteors, the History of the Globe of Earth and Sea, the History of the Masses or Greater Colleges, and the History of the Species or Lesser Colleges.

NATURAL History, which is threefold (as I said) in subject, is in use twofold. For it is used either for the sake of the knowledge of the things themselves that are committed to the history, or as the primary matter of philosophy. Now the first kind, which aims either to please by the agreeableness of the narrative or to help by the use of experiments, and is pursued for the sake of such pleasure or such profit, I account as far inferior in importance to that which is the stuff and material of a solid and lawful Induction, and may be called the nursing-mother of philosophy. Accordingly I shall now make a second division of Natural History into Narrative and Inductive; the