

**Francis Bacon and the
Pragmatic Theory of Forms**

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Francis Bacon and the Pragmatic Theory of Forms¹

. . . philosophers have interpreted the world in various ways; the point, however is to change it.

Karl Marx²

. . . of myself I say nothing; but in behalf of the business which is in hand I entreat men to believe that it is not an opinion to be held, but a work to be done; and to be well assured that I am laboring to lay the foundation, not of any sect or doctrine, but of human utility and power.

Francis Bacon³

I

To Francis Bacon there were three "beams of man's knowledge"; the "Radius Directus" by which nature is known; the "Radius Refractus" by which God is known; and the "Radius Reflectus" by which "man beholdeth and contemplateth himself".⁴ These epistemological modes were distinct and self-sufficient, permitting no shift of method or content from one to another.

¹ I wish to thank Professor Donald C. Williams, one of my finest teachers, for introducing me to the writings of Francis Bacon and for carefully criticising an earlier draft of this paper with whose principal thesis he is in total, spirited yet scrupulously fair disagreement, as those who know and respect him as I do might well have expected.

² Karl Marx, from "Thesis #11 on Feuerbach's Philosophy", as quoted by Barrows Dunham, "On Teaching Marxist Epistemology", *Philosophy of Science*, Vol. 29, #4, October 1961, page 365.

³ From page 16 of the reproduction of Bacon's Preface to *The Great Instauration* within Francis Bacon [1], listed within the Bibliography of works at the end of this essay to which all further citations will be made. [I shall hereafter refer to Bacon's *New Organon* (or *Novum Organum*), as it appears within Francis Bacon [1], as NO.]

⁴ From page 256 of the reproduction of Bacon's *The Advancement of Learning* within Francis Bacon [2]. [I shall refer hereafter to Bacon's text, as it appears within Francis Bacon [2], as AOL.]

The theory of Forms was conceived by Bacon to be part of the "Radius Directus", and was thus assumed to be inapplicable to either of the other two modes of human knowledge. But what role did the Forms play in the Radius Directus? In particular, were they or were they not natural objects (i.e., entities in the natural universe)?

To answer the above questions, I shall firstly examine Bacon's ontology of nature. Against this ontological backdrop, I shall then argue for an interpretation of the theory of Forms that is pragmatic and non-ontological (as, I believe, Bacon himself once spent a lifetime doing).

II

Philosophers have interpreted the natural universe in various ways. In so doing, they have expressed with varying degrees of clarity and assurance a variety of conceptions concerning the ontological status of various types of entities. To most philosophers the question 'What is there?' could not be answered with insight in any simple fashion, and elaborate schemes of ontological classification have arisen in the face of it. Francis Bacon, however, thought otherwise. To the ontological question there was a simple, single and straightforward answer: *matter*. The particles of matter existed in widely varying patterns of motion and combination, of course, for otherwise the diversity of nature could hardly be explained. But to Bacon this was not to be confused with the false assertion that the patterns of notion and combination existed as entities in themselves distinct from matter.

The natural universe consisted of matter having properties; it did not consist of matter *and* properties.

Bacon's ontological position is most clearly express in *De Sapientia Veterum* (1609), a collection of classical fables interpreted in a charming though "thoroughly naturalistic" manner.⁵ While employing the fable of Cupid to explain the nature of the atom, "primary matter, together with its properties, is distinguished in treatment from matter's motion".⁶ What emerges is a conception of the elementary particles of matter as containing an intrinsic propensity toward combination and motion.

⁵ F. H. Anderson [2], page 57.

⁶ *Ibid.*, page 78.

Bacon's conception of matter as essentially alive, a thing developing out of an inherent principle of motion, is one of the most important of his contributions to philosophy and points forward to modern evolutionary views.⁷

Indeed, all the properties of formed matter (i.e., the simple natures with which the Forms were to be associated in the *Novum Organum*) are conceived as being ontologically grounded in a particular type of motion.

This is local motion. . . According to Bacon all activity is to be explained as the local juxtaposition of parts of matter.⁸

Yet it is not the *essence* of this primary motion with which Bacon's theory of Forms was to be concerned, for to Bacon the mode of power that structured matter into things is totally formless and hence "inexpressible" by finite man.⁹ Rather, Bacon was to be concerned with the patterns of its effect – its footprints as opposed to it.

Love seems to be the appetite, or incentive, of the primitive matter.. .the natural motion, or moving principle, of the original corpuscles, or atoms: this being the most ancient and only power that made and wrought things out of matter. . .it could have no natural cause; for, excepting God, nothing was before it. . . And as nothing is more inward with nature, it can neither be a genus nor a form; and therefore, whatever it is, it must be somewhat positive, though inexpressible.¹⁰

The theological sources of Bacon's ontological conception have seldom been sufficiently recognized, and a discussion lies beyond the scope of this paper. But it is clear that Bacon accepted the notion of the eternity of matter, though not the eternity of *formed* matter, in accordance with his theological and biblical persuasions. When interpreting the fable of Coelium, he expressly accepted the doctrine of Democritus,

. . . who expressly asserts the eternity of matter; but denies the eternity of the world: thereby approaching to the truth of sacred writ, which makes chaos, or uninformed matter, to exist before the six days works.¹¹

⁷ Benjamin Farrington [1], page 79.

⁸ F. H. Anderson [2], pages 76 and 77.

⁹ I shall use double quotations marks " . . . " to indicate that a writer has used this exact word or phrase or a close derivative of it.

¹⁰ Francis Bacon [5], remarks on the fable of Cupid, page 51.

¹¹ *Ibid.*, remarks on the fable of Coelium, page 10.

Not only were the particles of matter eternal, in accordance with holy writ; but to Bacon the story of creation in Genesis had to do with the formation of bodies from particles of matter that already existed, for in the *Novum Organum* Bacon asserted that "the absolute quantum or sum total of matter remains unchanged, without increase or diminution".¹² Thus to Bacon "the universe is. . .the face of matter, not under constraint"¹³ (using the anthropomorphism "face" as in Genesis 2:1, "And the Spirit of God moved upon the face of the waters", to explain the universe of appearances as the *property* of matter rather than as a mode of existence distinct from matter).

But it is at this point that the question of the relevance of Bacon's ontology to his theory of Forms arises. For to Bacon the universe consisted solely of "individual bodies performing individual acts according to a fixed law", which bodies in turn were composed of substances composed in turn of the particles of matter.¹⁴ Bacon's substances were roughly equivalent to what we would today call 'elements' (although, as one might expect, Bacon included among his substances various things that we would no longer consider elemental): "wood, iron, lead, cloth, parchment. . .," ". . . a lion . . . oak. . . gold . . . water . . . air," etc..¹⁵ Only bodies and their composite substances could be observed on the *face* of Bacon's universe (hence the use of the Genesis metaphor). But the essences of substances were not to be the subject of Bacon's theory of Forms any more than were the essences of compound bodies, for Bacon sharply castigated Paracelsus for "polluting" the springs of knowledge by engaging upon such a fruitless quest.

Where you ought to have tried to calculate motions you grasped at the elusive, protean, nature of substances and thus polluted the springs of knowledge and left the human mind stripped of its aids.¹⁶

If Bacon's theory of Forms, therefore, was not to be concerned with the essences of either substances or compound bodies, with what was it to be concerned? If (for whatever reason) one holds that Bacon's theory of Forms *must* have been concerned with the essence of matter at some level of his ontological scale (i.e., particles of matter, substances and bodies), then one is left with the essence of the non-appearing primary particles of matter themselves. But surely Bacon saw such particles as primary precisely because they were *unanalyzable*. Indeed, whereas Democritus has asked "whether all

¹² Francis Bacon [1], NO (Book II, Aphorism 40), op. cit. (footnote 3), page 210.

¹³ From Francis Bacon [5], remarks on the fable of Proteus, page 49.

¹⁴ Francis Bacon [1], NO (Book II, Aphorism 2), page 122.

¹⁵ Ibid. (Book II, Aphorism 48), page 231; and Francis Bacon [2], AOL, op. cit. (footnote 4), page 257.

¹⁶ Benjamin Farrington [2], page 66.

things may be made out of all things", and, apparently believing an affirmative answer to be unreasonable, had accepted "diversity among atoms".¹⁷ Bacon rejected such a thesis as contrary to the principle of the nature of primary particles:

Nor shall we be led to the doctrine of atoms, which implies the hypothesis of a vacuum and that of the unchangeableness of matter (both false assumptions); we shall be led only to real particles, such as really exist.¹⁸

Of even greater significance is the fact that Bacon, in the development of his inductive philosophy, found the related problem of the ontological status of a vacuum to be mildly confusing but hardly disruptive of his philosophy. Bacon accepted the idea of a vacuum in interpreting the fable of Cupid," rejected it in the passage cited above, and finally settled down into gentle agnosticism in Aphorism 48 of Book II of the *Novum Organum*.

For I am not prepared to say for certain whether or no there be a vacuum, either collected in one place or interspersed in the pores of bodies. But of one thing I am satisfied, that the reason for which a vacuum was introduced by Leucippus and Democritus . . . is a false one.¹⁹

Such disinterest could hardly have been countenanced if his ontology of primary particles had been essential to the validity of his theory of Forms.

But if the theory of Forms was not to be concerned with the nature of matter on any ontological level, it seems that we are left with a theory that was to be concerned with nothing that *is*. And indeed that is quite correct, for, as Bacon insisted, "We must lead men to the particular themselves, and their series and order", not to discover what matter is, but what it can be made to do!²⁰ Although nothing exists but matter, yet

Matter, for Bacon, is not something deprived, formless, indeterminate, and inert, but a formed and active entity. It has within it causes and laws of lesser and greater generality, from which issue, as components of one body or system, without segregation of parts, all the particulars of nature . . . The form is the law of actual operation *in matter*.²¹ (italics mine)

¹⁷ F. H. Anderson [2], page 72.

¹⁸ Francis Bacon [1], NO (Book II, Aphorism 8), page 129.

¹⁹ Francis Bacon [5], page 55.

²⁰ Francis Bacon [1], NO (Book II, Aphorism 48), page 248.

²¹ *Ibid.* (Book I, Aphorism 75), page 47.

It is the nature of the *properties* of matter, not of matter itself, with which Bacon's theory of Forms was to be concerned. The properties have no mode of existence apart from matter, for only matter can be said to exist. When we speak of the form of a property, therefore, we are not speaking of the essence of an existing entity, but rather of the law of a "pure act" of matter.²² The essence of a property is the form of that property, but the form is a *rule* of the activity of matter, for, as expressed in the fable of Proteus, Bacon was seeking to know what matter "does, has done, or can do" – not what matter *is*!

The addition in the fable that makes Proteus a prophet, who had the knowledge of things past, present, and future, excellently agrees with the nature of matter; as who knows the properties, the changes, and the processes of matter, must, of necessity, understand the effects and sum of what it does, has done, or can do; though his knowledge extends not to all the parts and particulars thereof.²³

III

I have argued in Section II that, given Bacon's natural ontology, one would not expect his later theory of Forms to be concerned with the essence of anything that is (i.e., matter), but rather with the essence of the *properties* of that which is (i.e., with the observable simple natures of bodies composed of matter). When the form of a property had been discovered, one would not expect Bacon to have claimed to have located a new ontological entity of any kind (for the only ontological entities are particles of matter), but rather a rule of some sort leading to certain actions performable upon bodies that already existed. Let me now turn to Bacon's formulation of the theory itself to substantiate these expectations.

On a given body, to generate and superinduce a new nature or new natures is the work and aim of human power. *Of a given nature* to discover the form, or true specific difference, or nature engendering nature, or source of emanation (for these are terms which come nearest to a description of the thing) is the work and aim of human knowledge.²⁴ (*italics mine*)

The work and aim of human knowledge is to discover the form of a given "nature" so that one may superinduce that nature upon a given body. What is the status of such a form in Bacon's philosophy? A form is not an entity that *exists*, for even though Anderson can say at one point "(Bacon) finally comes to regard forms both as the

²² F. H. Anderson [1], page 302.

²³ Francis Bacon [1], NO (Book I, Aphorism 75), page 73.

²⁴ Francis Bacon [5], remarks on the fable of Proteus, pages 49 and 50.

constituents of things and as the laws of their activity",²⁵ he later admits that Bacon must have meant something other than material "things", for

. . . granted nothing really exists as the object of natural science except individual bodies, performing individual acts according to law, yet this law, its investigation, discovery, and explication, is the basis of speculation and of works.²⁶

We are not to seek, therefore, for the forms of substances, for such forms

. . . are so perplexed as they are not to be inquired . . . to enquire the Form of a lion, of an oak, of gold, nay of water, of air, is a vain pursuit.²⁷

We are rather to seek to embrace "the unity of nature *in substances* the most unlike", even though this unity is not a material entity (and hence does not exist).²⁸ (italics mine) Nor are we to seek for the forms of compound bodies, for if one seeks to transform such bodies through the knowledge of *latent process* and *configuration*, one "proceeds not by simple natures" but by inquiries relating

. . .to natures concrete or combined into one structure, and have regard to what may be called particular and special habits of nature, *not to her fundamental and universal laws which constitute forms*.²⁹ (italics mine)

If, on the other hand, knowledge of forms is to permit us to transform such bodies, we must first

. . . regard(s) a body as a troop or collection of simple natures . . . this kind of axiom, therefore, deduces the thing from the forms of simple natures . . .the principle of generating some one simple nature is the same as generating many . . . It must be said, however, that this mode of operation (which looks to simple natures though in a compound body) proceeds from what in nature is *constant and eternal and universal*.³⁰ (italics mine)

²⁵ F. H. Anderson [2], page 79.

²⁶ *Ibid.*, pages 159 and 160.

²⁷ Francis Bacon [1], AOL, page 257.

²⁸ Francis Bacon [1], NO (Book II, Aphorism 3), page 122.

²⁹ *Ibid.*, NO (Book II, Aphorism 5), page 125.

³⁰ *Ibid.*, NO (Book II, Aphorism 5), page 124.

In neither case does Bacon permit us to speak of the forms of bodies themselves. (Though he directs us explicitly to "regard" bodies as a "collection of simple natures", he never suggests that bodies ontologically *are* such.)

Forms, therefore, as eternal and universal laws, *refer* to the activity of matter but *express* only the essences of the *properties* of matter (i.e., the simple natures "upheld by matter") that constitute *for all practical purposes* the bodies themselves.

. . . the essences (upheld by matter) of all creatures do consist (in simple natures); to enquire I say the true form of these is that part of Metaphysic which we now define of.³¹

By investigating the forms of simple natures, that are "few in number", we should be able to control for practical purposes "all this variety" of nature. But this *Metaphysical* investigation of forms should not be confused with the *Physical* investigation of matter itself.³²

Thus, let the investigation of forms, which are (in the eye of reason at least, and in their essential law) eternal and immutable, constitute Metaphysics; and let the investigation of the efficient cause, and of matter, and of the latent process, and the latent configuration (all of which have reference to the common and ordinary course of nature, not to her eternal and fundamental laws) constitute Physics.³³

For the aim of Metaphysics is "to discover the virtues and actions of bodies, with their laws *as determined in matter*."³⁴ (italics mine) It is thus an error to hold that Bacon's theory of Forms effects a non-naturalistic modification of his earlier ontological position, for Bacon is quite explicit to the contrary: Forms do not "give existence" at all!

I noted and corrected as an error of the human mind the opinion that forms give existence. For though in nature nothing really exists besides individual bodies, performing pure individual acts according to a fixed law, yet in philosophy this very law, and the investigation, discovery, and explanation of it, is the foundation as well of knowledge as of operation. And it is this law with its clauses that I mean when I speak of *forms*, a name which I rather adopt because it has grown into use and become familiar.³⁵

³¹ Francis Bacon [2], AOL, page 257.

³² Ibid., page 258.

³³ Francis Bacon [1], NO (Book II, Aphorism 9), page 129.

³⁴ Ibid. (Book II, Aphorism 51), page 266.

³⁵ Ibid. (Book II, Aphorism 2), page 122.

In a word, Bacon's forms are abstract, and one must recognize "the essential character of Bacon's philosophy, the analysis of the concrete into the abstract."³⁶ Yet it is obvious that Bacon himself often used the word 'abstract' in a polemical and derogatory manner. Can these two factors be reconciled? Only if Bacon was often inclined to use the word 'abstract' to mean something different from what we mean normally when we use the word (i.e., the opposite of 'concrete'). But I think that this is clearly the case, and that Bacon may have his abstract cake and eat it, too.

Bacon warned us to be careful

. . . that we may not either stick fast in things already known, or loosely grasp at shadows and abstract forms, not at things solid and realized in matter . . .³⁷,

for we must avoid "figments of the human mind".

But to resolve nature into abstractions is less to our purpose than to dissect her into parts . . . Matter rather than forms should be the object of our attention, its configurations and changes of configuration, and simple action, and law of action or motion; for forms are figments of the human mind, unless you call those laws of action forms.³⁸

But why must we avoid such "figments"? When discussing axioms, Bacon almost let the cat from the bag: he was searching for those axioms "on which depend the affairs and fortunes of men".

The highest and most general (which we now have) are notional and abstract and without solidity. But the middle are the true and the solid and living axioms, on which depend the affairs and fortunes of men; and above them again, last of all, those which are indeed the most general; such, I mean, as are not abstract, but of which those intermediate axioms are really limitations.³⁹

The meaning of 'abstract' in Bacon's normal usage should now be clear. An axiom is not to be considered abstract in virtue of its indirect derivation from (and hence indirect relationship to) the concrete world, but rather in virtue of its inability to lead men to a modification of that world (i.e., its inability to affect the "fortunes of men").

³⁶ Robert Leslie Ellis, page 24.

³⁷ Francis Bacon [1], NO (Book I, Aphorism 106), page 99.

³⁸ Ibid., (Book I, Aphorism 51), page 53.

³⁹ Ibid. (Book I, Aphorism 104), page 98.

. . . nor do I think it matters much to the fortunes of men what abstract notions one may entertain concerning nature and the principles of things . . . for my part I do not trouble myself with any such speculative and withal unprofitable matters. My purpose . . . is to try whether I cannot in fact lay more firmly the foundations and extend more widely the limits of the power and greatness of man.⁴⁰

The methods of the ancients were "evil" in that

. . . they make the quiescent principles, *wherfrom*, and not the moving principles, *whereby*, things are produced, the object of their contemplation and inquiry. For the former tend to discourse, the latter to works.⁴¹

The aim of Bacon's method of induction, therefore (that "must be used not only to discover axioms, but also in the formation of notions"⁴²), was not to avoid abstraction, as one might have been led to think, but rather to avoid "overhasty" abstraction.

Therefore, if the notions themselves (which is the root of the matter) are confused and overhastily abstracted from the facts, there can be no firmness in the superstructure. Our only hope therefore lies in a true induction.⁴³

Forms can be spoken of correctly as "inventions" of man, if they are not (as with Plato) "absolutely abstracted from matter" and are thus "fruitful and important to the state of man".⁴⁴ And in the same paragraph in which he says blankly "I would not be understood to speak of abstract forms", Bacon implies most clearly the abstract nature of his forms.

For when I speak of forms, I mean nothing more than those laws and determinations of absolute actuality which govern and constitute any simple nature, as heat, light, weight, in every kind of matter and subject that is susceptible of them. Thus the form of heat or the form of light is the same thing as the law of heat or the law of light. . . And therefore when I say (for instance) in the investigation of the form of heat, "reject rarity", or "rarity does not belong to the form of heat", it is the same as if I said, "It is possible to superinduce heat on a dense body"; or, "It is possible to take away or keep out heat from a rare body."⁴⁵

⁴⁰ Ibid. (Book I, Aphorism 114), page 106.

⁴¹ Ibid. (Book I, Aphorism 66), page 64.

⁴² Ibid. (Book I, Aphorism 105), page 99.

⁴³ Ibid. (Book I, Aphorism 14), page 41.

⁴⁴ Francis Bacon [2], AOL, page 256.

⁴⁵ Francis Bacon [1], NO (Book II, Aphorism 17), page 152.

The forms of simple natures are elsewhere compared with "the letters of the alphabet (which) in themselves and apart have no use or meaning, yet they are the subject matter for the composition and apparatus of all discourse."⁴⁶ A form that is useless is meaningless – and *hence* abstract. That this was, indeed, the essential polemical meaning of 'abstract' for Bacon received final confirmation in Aphorism 17 of Book II of the *Novum Organum*, for here Bacon, sensing the "somewhat abstract nature" of his forms, reacted by saying that his forms cannot be considered abstract, not because they do not resemble *as propositions* other abstract assertions, but rather because they have proven *to be useful*.

But if anyone conceive that my forms too are of a somewhat abstract nature, because they mix and combine things heterogeneous (red objects, hot objects, dead objects). . . he may be assured that his mind is held in captivity by custom, by the gross appearance of things, and by men's opinions. For it is most certain that these things, however heterogeneous and alien from each other, agree in the form or law which governs heat, redness and death; and that the power of man cannot possibly be emancipated and exalted to new efficiencies and new modes of operation, except by the revelation and discovery of forms of this kind.⁴⁷

It is thus apparent that Bacon was polemically prone to use 'abstract' as synonymous with 'useless', though in more sober moments he could indeed unpolemically characterize the goal of Metaphysics as "abstract" in the conventional sense.

I may preserve this much of the conceit of antiquity, that Physic should contemplate that which is inherent in matter and therefore transitory, and Metaphysic that which is abstracted and fixed. And again that Physic should handle that which supposeth in nature only a being and moving, and Metaphysic should handle that which supposeth further in nature a reason, understanding, and platform.⁴⁸

Forms, therefore, are not material but "materiate" (i.e., useless if separated from matter).

⁴⁶ Ibid. (Book I, Aphorism 121), page 110.

⁴⁷ Ibid. (Book II, Aphorism 17), page 153.

⁴⁸ Francis Bacon [2], AOL, page 255.

Forms are materiate, and not. . . separate, or separable from matter. Matter is subject to inherent causation, but the cause itself is not caused. The only authority beyond any sense is a more general cause: to this it stands not in the relation of effect but as species to genus.⁴⁹

The form of a simple nature does not purport to indicate the material *cause* of the simple nature, but only its abstract essence (i.e., its genus, asserted in terms of another general simple nature).

When I say of motion that it is the genus of which heat is the species, I would be understood to mean not that heat generates motion or that motion generates heat (though both are true in certain cases), but that heat itself, its essence and quiddity, is motion and nothing else . . .⁵⁰

And it should be noted that Bacon did *not* believe (as some critics have claimed) "that, if the *form* of any quality were known, we should be able, by inducing that form on any body, to communicate to it the said quality",⁵¹ for Bacon clearly conceded that knowledge of its abstract form in no sense assured the universal inductibility of a simple nature.

So that it is probable that there may exist materials in the bowels of the earth which altogether refuse to be heated, because through their greater condensation they are destitute of that spirit with which this motion of excitation generally begins.⁵²

Bacon's forms are the "true differences of things"⁵³ (that are in fact laws of pure act). The direction of a perfect rule of operation must be "that it be certain, free, and disposing or leading to action"; the direction of a true and perfect axiom of knowledge "that another nature be discovered which is convertible with the given nature and yet is a limitation of a more general nature, as of a true and real genus"; and

These two directions, the one active and the other contemplative, *are one and the same thing*; and what in operation is most useful, that in knowledge is most true.⁵⁴ (*italics mine*)

⁴⁹ F. H. Anderson [1], page 304.

⁵⁰ Francis Bacon [1], NO (Book II, Aphorism 20), page 157.

⁵¹ George L. Craik, page 418. Craik is here speaking in agreement with a 'Professor Playfair'. See also Benjamin Farrington [1], page 121.

⁵² Francis Bacon [1], NO (Book II, Aphorism 48), page 242.

⁵³ *Ibid.* (Book I, Aphorism 75), page 73.

⁵⁴ *Ibid.* (Book II, Aphorism 4), page 123.

It is in this sense that the "form of a thing is the very thing itself",⁵⁵ for that which is most useful in operation is that form which describes most clearly the essence of a simple nature (i.e., the simple nature "in relation to the universe, not simply in relation to man")⁵⁶. The mark of a true form was to be its usefulness, for a form was to be considered as relating "to the universe" to the extent that it was useful. Aside from divine revelation, no other criterion was possible, for Bacon wished to build "in the human understanding a true model of the world, such as it is in fact, not such as man's own reason would have it to be".⁵⁷

(idols of the human mind) are nothing more than arbitrary abstractions . . .
 (ideas of the divine) are the Creator's own stamp upon creation, impressed and defined in matter by true and exquisite lines. Truth and utility are in this kind the very things we seek for; and works themselves are of greater value as pledges of truth than as contributing to the comforts of life.⁵⁸

⁵⁵ Ibid. (Book II, Aphorism 13), page 142. Note that the word 'thing' in the quotation does not refer to *body*. As Spedding puts it, in a note to the passage in its original Latin on page 148 of Francis Bacon [4], "'res' is to be taken in a general sense, so as to include not only substances, but also what Bacon calls naturae. It is therefore not to be translated as if it were synonymous with 'corpus'. I should like to emphasize that, in this particular instance, it refers solely to the class of simple natures and does not include substances at all."

⁵⁶ Ibid. (Book II, Aphorism 20), page 161.

⁵⁷ Ibid. (Book I, Aphorism 124), page 113.

⁵⁸ Ibid. (Book I, Aphorism 124), pages 113 and 114. The sentence "Truth and utility are in this kind the very things we seek for" has been substituted for the original translation of Spedding that read 'Truth and utility are here the very same things'. The Latin (see Francis Bacon [4], page 218) reads "Itaque ipsissimae es sunt (in hoc genere) veritas et utilitas". In a note on the same page, Spedding comments:

I do not think the use of *ipsissimae* here can be justified; if the meaning be (as far as I think it must) that truth and utility are (in this kind) 'the very same things'. If *ipsissimae* be used correctly, the meaning must be that things themselves, the very facts of nature, *are* truth and utility both. But in that case we should expect 'et veritas et utilitas'. Mr. Ellis proposes to render the phrase thus: Truth and utility are in this kind the very things we seek for'. But to me it seems less probable that Bacon would have expressed such a meaning by such a phrase than that he used the word *ipsissimae* incorrectly in the sense I have attributed to it.

I cannot agree with Mr. Spedding's conclusion, for if Bacon had indeed meant to say 'the very same things', he would have used the construction that he usually employs to say it – i.e., 'res eadem sunt' (e.g., Francis Bacon [1], NO (Book II, Aphorism 4), page 230): "Now these two

A useful work indeed was to be valued as a pledge of truth, but this should not be confused with the false assertion that a work could be known to be true apart from being shown to be useful.

Science also must be known by works. It is by witness of works, rather than by logic or even observation, that truth is revealed and established. Whence it follows that the improvement of man's mind and the improvement of his lot are one and the same thing.⁵⁹ (*italics mine*)

In *Valerius Terminus* (1603) "no mention is made of the necessity of correcting commonly received notions of simple natures".⁶⁰ Yet some critics, familiar only with the *Novum Organum* and the method therein stated solely in terms of the theory of Forms, have misunderstood Bacon's conception of form and wondered how he could assume either that every simple nature had a form or that all forms would be useful. The answers should now be apparent.

(1) Every simple nature had a form, for the form was a rule or direction showing how this nature could be superinduced upon a body. It did not purport to say anything at all about the essence of what is (i.e., matter), only about what could be done with the properties of what is (i.e., the simple natures); the essence of a simple nature was identical with the rule of its inducibility.

(2) Every form was useful, for to Bacon nothing that was not useful could count as a form. *By definition* only a useful rule or direction could qualify as a form.

In the words of Ellis:

Bacon always assumes that the knowledge of Forms would greatly increase our command over nature . . . (because) Bacon connected the doctrine of Forms with practical operations, because this doctrine, so to speak, represented to him his original notion of the *freeing of a direction*, which, as the phrase itself implies, had altogether a practical significance.⁶¹

directions, the one active and the other contemplative, are one and the same thing" (see page 12 above for citation to different anthology.) Thus, I have followed the suggestion of Mr. Ellis that I believe to be the more correct.

⁵⁹ From Francis Bacon's "Thoughts and Conclusion" as translated by Benjamin Farrington [2], page 93.

⁶⁰ Robert Leslie Ellis, from Francis Bacon [3], page 23.

⁶¹ *Ibid.*, page 25.

Or again, in Bacon's own words:

For first of all we must prepare a natural and experimental history, sufficient and good; and this is the foundation of all, for we are not to imagine or suppose, but to discover, what nature does or may be made to do.⁶²

IV

The purpose of this paper has been to clarify and defend the pragmatic (i.e., non-ontological) function of Bacon's theory of Forms. Such a defense would hardly have been necessary, I think, if sufficient notice had been taken in Baconian criticism of the limitations that Bacon himself came to impose upon his method (the disregard of which can serve only to foster a mistaken notion of the aim and content of the method itself).

In concluding Section III above, I quoted from Aphorism 10 of Book II of the *Novum Organum* in which Bacon referred to the compilation of a "sufficient and good" natural history as "the foundation of all." As his work progressed, Bacon was to become even more insistent, for in the last aphorism of Book I, written at a later date than the contents of Book II,⁶³ Bacon "announces the decision to abandon the Logic for the Encyclopedia"⁶⁴ in terms that hardly permit one to interpret the Forms with which his method had been concerned as possessing a definitive ontological status.

And now it is time for me to propound the art itself of interpreting nature, in which, although I conceive that I have given true and most useful precepts, yet I do not say either that it is absolutely necessary (as if nothing could be done without it) or that it is perfect. For I am of the opinion that if men had ready at hand a just history of nature and experience, and labored diligently thereon, and if they could bind themselves to two rules—the first, to lay aside received opinions and notions; and the second, to refrain the mind for a time from the highest generalizations, and those next to them – they would be able by the native and genuine force of the mind, without any other art, to fall into my form of interpretation. For interpretation is the true and natural work of the mind when freed from impediments. It is true, however, that by my precepts everything will be in more readiness, and much more sure.

⁶² Francis Bacon [1], NO (Book II, Aphorism 10), page 130.

⁶³ Benjamin Farrington [1], page 133.

⁶⁴ *Ibid.*, page 133.

Nor again do I mean to say that no improvement can be made upon these. On the contrary, I regard that the mind, not only in its own faculties, but in its connection with things, must needs hold that the art of discovery may advance as discoveries advance.⁶⁵

The precepts of Bacon's method were seen by Bacon as "true and most useful" but hardly perfect. In other words, they did not purport to bring certainty, but only to make things "much more sure."

In the preface to *The Great Instauration*, Bacon had brazenly suggested that "I suppose that I have established forever a true and lawful marriage between the empirical and the rational faculty," whose "divorce and separation. . . has thrown into confusion all the affairs of the human family".⁶⁶ But as Book I of the *Novum Organum* is nearing its conclusion, we can hear the proper and less pretentious echo of Bacon's aim: to effect "a closer and purer league between these two faculties, the experimental and the rational."⁶⁷ Bacon had hoped to "supply the mind such rules and guidance that it may in every case apply itself to the nature of things",⁶⁸ but knowledge could only expect "to abridge the infinity of individual experience as much as the conception of truth will permit".⁶⁹ Man should strive to have knowledge of the Forms, so that he might then effect the "transformation of concrete bodies, so far as this is possible".⁷⁰

Bacon did not construe his method of Forms, therefore, as leading to certainty, but rather to sufficiency; indeed, his theory purported to bear as close a family resemblance to the theories of the sceptics as to the theories of any other philosophical house.

⁶⁵ Francis Bacon [1], NO (Book I, Aphorism 130), pages 119 and 120.

⁶⁶ Ibid., Preface to *The Great Instauration*, page 14.

⁶⁷ Ibid., NO (Book I, Aphorism 95), page 93.

⁶⁸ Ibid., (Book I, Aphorism 127), page 116.

⁶⁹ Francis Bacon [2], AOL, op. cit. (footnote 4), page 258. See also Francis Bacon [1], NO (Aphorism 1, Book II), page 121.

⁷⁰ Francis Bacon [1], NO (Book II, Aphorism 1), page 121.

(I am) one who maintains not simply that nothing can be known, but only that nothing can be known except in a certain course and way; and yet establishes provisionally certain degrees of assurance for use and relief until the mind shall arrive at a knowledge of causes in which it can rest. For even those schools of philosophy which held the absolute impossibility of knowing any- thing were not inferior to those which took upon them to pronounce. But then they did not provide helps for the sense and understanding, as I have done, but simply took away all their authority; which is quite a different thing – almost the reverse.⁷¹

As early as 1607 Bacon had remarked that

. . . a valid axiom . . . should not be narrowly cut to the measure of the facts from which it is drawn. It should have a more ample scope, permitting the inclusion of new facts under it by which its final limits would be fixed.⁷²

And in the Preface to the *Novum Organum*, Bacon could hardly have been more explicit.

Now my method, though hard to practice, is easy to explain; and it is this. I propose to establish progressive stages of certainty.⁷³

"Progressive stages of certainty" are all finite man can expect to find.

To God, truly, the Giver and Architect of Forms . . . it belongs to have an affirmative knowledge of forms immediately, and from the first contemplation. But this assuredly is more than man can do . . .⁷⁴

For since every body contains in itself many forms of natures united together in a concrete state. . . they severally crush, depress, break, and enthrall one another, and thus the individual forms are obscured.⁷⁵

⁷¹ Francis Bacon [1], Plan of *The Great Instauration*, page 28.

⁷² From Francis Bacon, "Thoughts and Conclusions", as translated by Benjamin Farrington in Farrington [2], page 99.

⁷³ Francis Bacon [1], NO ("Preface"), page 33.

⁷⁴ Ibid., (Book II, Aphorism 15), page 151.

⁷⁵ Ibid., (Book II, Aphorism 24), page 166.

Bacon's method therefore recognizes a resting at stages upon "a sort of *Lesser Form*".

For since the genuine forms (which are always convertible with the proposed nature) lie deep and are hard to find, it is required by the circumstances of the case and the infirmity of human understanding that particular forms, which collect together certain groups of instances (though not all) into some common notion, be not neglected, but rather be diligently observed. For whatever unites nature, though imperfectly, paves the way to the discovery of forms.⁷⁶

The important thing is not to have arrived, but to be sufficiently on the way. For "the true and lawful goal of the sciences is none other than this: that human life be endowed with new discoveries and powers"; and it is little wonder that science had not advanced in the past.

And if by chance there be one who seeks after truth in earnest, yet even he will propose to himself such a kind of truth as shall yield satisfaction to the mind and understanding in rendering causes for things long since discovered, and not the truth which shall lead to new assurance of works and new light of axioms. If then the end of the sciences has not as yet been well placed, it is not strange that men have erred as to the means.⁷⁷

The "means" of science (i.e., the method of induction employed upon the history and tables of discovery) are to be justified because they are useful, *not* because they have been shown to be ontologically grounded. For no "felicity of art or wit" could provide a non-experimental confirmation or correction of such a natural history.

It is nevertheless true that if the mistakes in natural history and experiments are important, frequent, and continual, they cannot possibly be corrected or amended by any felicity of wit or art. And therefore, if in my natural history, which has been collected and tested with so much diligence, severity, and I may say religious care, there still lurk at intervals certain falsities or errors in the particulars, what is to be said of common natural history, which in comparison with mine is so negligent and inexact? And what of the philosophy and sciences built on such a sand (or rather quicksand)? Let no man therefore trouble himself for this.⁷⁸

Bacon did not equate all knowledge relevant to the natural world with power, "for to form judicious wishes is as much a part of knowledge as to ask judicious questions".⁷⁹

⁷⁶ Ibid. (Book II, Aphorism 26), page 170.

⁷⁷ Ibid. (Book I, Aphorism 81), page 78.

⁷⁸ Ibid. (Book I, Aphorism 118), page 108.

⁷⁹ Ibid. (Book II, Aphorism 49), page 251.

Yet it must be insisted again that Bacon wished mankind to know all that "we need to know" to increase our power and empire. Perfect knowledge was not the goal, though sufficient knowledge was; for only that which was most useful *was* most perfect.

It will also be thought that by forbidding men to pronounce and to set down principles as established until they have duly arrived through the intermediate steps at the highest generalities, I maintain a sort of suspension of the judgment . . . But in reality that which I mediate and propound is . . . not denial of the capacity to understand, but provision for understanding truly. . . better surely it is that we should know all we need to know, and yet think our knowledge imperfect, than that we should think our knowledge perfect, and yet not know anything we need to know.⁸⁰

I have argued that it is a distortion to consider Bacon's theory of Forms as having an ontological rather than a pragmatic interpretation, for neither his ontological nor his methodological formulations support such an interpretation, while the expressed *raison d'être* of the latter is utilitarian in the extreme. To Bacon, that which was true of the natural world could not be distinguished from that which was useful in transforming it to the benefit of mankind. Or as the empathetic Ellis was to put it,

. . . (Bacon) has often been called an utilitarian; not because he loved truth less than others, but because he loved men more.⁸¹

⁸⁰ Ibid. (Book I, Aphorism 126), page 115.

⁸¹ Robert Leslie Ellis, from Bacon [3], page 34.

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