

Chapter 11

The General Nature of Reason



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1 **Abstract** In this chapter, Marie Collins Swabey critiques naturalism and defends a
2 rationalistic conception of knowledge.

3 11.1 The Naturalistic Interpretation

4 The relation of reason to its natural setting, of knowing to the physical world,
5 furnishes philosophy with one of its most crucial and difficult problems. To begin
6 with, reason may be regarded from two different points of view. On the one hand,
7 it may be considered simply as one of several natural capacities (or as a function
8 of them) marking by its presence a tendency of the organism toward abstraction,
9 comparison, and reflection. As such, it may be taken as standing on a level with
10 sensation, feeling, or will, and as differentiated from them only in degree, by virtue
11 of its superior organizing and synoptic power. Or, on the other hand, reason may be
12 regarded from a non-naturalistic standpoint as something preeminent and unique, as
13 a capacity qualitatively distinct from, and authoritative over, the special aptitudes,
14 and as lending man his peculiar supremacy over nature. Reserving discussion of
15 this latter view for the time being, let us begin with an examination of reason as
16 naturalistically conceived.

17 The developments of modern science seem to have shown, at least to the empiri-
18 cist's satisfaction, that man's mind no less than his body is wholly of animal extraction

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19 and a part of the world of nature. If this be assumed, the same great evolutionary
 20 processes and laws (physical, chemical, biological) that account for the rest of the
 21 physical world are held to explain exhaustively the constitution of man. Just as
 22 animal life is definable in terms of its physical and chemical constituents, heredi-
 23 tary tendencies, and environmental situation, so likewise human activities, including
 24 knowledge, are held to be fully interpretable as functions of these same conditions.
 25 Accordingly, from this point of view, what appears to be the mind's free selectivity,
 26 its power of abstracting certain features from the stream of experience, and of noting
 27 their likenesses and differences, is really nothing more than a mechanical response
 28 of the organism to its physical surroundings. In other words, the organism is said
 29 to abstract or select just those features of the total situation which impinge upon it
 30 with greatest strength and intensity; thus we inevitably react to the brightest colors
 31 and the loudest sounds, or at any rate to whatever stirs most strongly our organic
 32 needs and impulses. What looks at first sight like a process of self-determination
 33 in thinking turns out to be only, broadly speaking, a mechanism of natural selec-
 34 tion; and all man's so-called intellectually creative and constructive "action" proves,
 35 on closer inspection, to resolve into so many kinds of "reaction." The tendency to
 36 irritability, to motor response, apparently constitutes, from this standpoint, the funda-
 37 mental differentia of life in all its varying forms. At the basis of life, we are told,
 38 stand the class of substances known as protoplasm, which are extremely unstable
 39 compounds. Given these unstable compounds of C, H, O, N, P, S, and so forth,
 40 with their propensity to variation, then, by an inevitable process of interaction with
 41 the environment, certain of them break down; whereas others, better adapted to the
 42 surrounding physico-chemical conditions persist and win relative equilibrium and
 43 stability. This tendency of compounds to maintain their equilibrium as against their
 44 surroundings, their "inertia" or resistance to change, comes to be distinguished at
 45 the organic level as a definite propensity of things to "persist in their own being"
 46 (*conatus essendi*) or as a specific impulse to self-preservation. Accordingly, all the
 47 actions of living beings are to be interpreted, in this view, not merely as physical
 48 and chemical reactions but also specifically as "saving reactions," as mechanisms
 49 directed upon the preservation of protoplasm as protoplasm, of life as life.

50 But if this account be correct in its essentials, the reasoning and intellectual life of
 51 man are nothing but so many determinate resultants of physico-chemical laws. Even
 52 the most complicated activities of the most highly developed nervous systems have to
 53 be accounted for purely in mechanistic terms. Of course, owing to the incompleteness
 54 of scientific knowledge at the present time regarding the processes involved, wide
 55 differences in emphasis and detail are to be expected among empirical explanations.
 56 In certain quarters, for instance, chief stress is laid upon the concept of the reflex
 57 arc as the unit of functional activity; and all higher manifestations of organisms are
 58 reduced to the compounding of such arcs. Other hardy empiricists prefer to dilate
 59 especially upon recent discoveries connected with the ductless glands and the aston-
 60 ishing variations in psychic life apparently attributable to their over-development or
 61 atrophy. Through this means, they find a way to explain man's reflective activities
 62 in terms of the chemistry of the body and its internal secretions. Still others incline
 63 to stress photo-chemical changes known in lower forms of life as "tropisms." The

64 turning of the sunflower to the sun or the flight of the moth to the candle they take as
65 expressive of the essential principle of behavior-reaction to which man in the highest
66 reaches of his thought must conform. But since, despite various unbridged gaps and
67 divergences in detail, these hypotheses agree in holding all activity to be explicable as
68 a conditioned response to a particular stimulus, they are obliged to construe rational
69 knowledge also (as a form of activity) as the expression of a positive or negative reac-
70 tion on the part of an organism toward some definite physical obstacle or incitement
71 in the environment.

72 **11.2 The Impossibility of Universal Knowledge** 73 **from the Standpoint of Naturalism**

74 From this point of view, man's most magnificent inferences, his dreams and theories,
75 his scientific laws, his engineering feats, and modification of species have all to
76 be interpreted as so many complex adumbrations of fundamental organic needs, as
77 ingenious adaptations or working devices accidentally evolved in the struggle for
78 existence. In the last analysis, we are led in fact to believe that the sole abiding
79 worth of man's religious, scientific, and aesthetic constructions is to be found in
80 their contributory function to life as life. And although this extreme conclusion is
81 sometimes overtly disavowed by evolutionary naturalists, the implications of their
82 doctrine are such that nothing else can well be meant. Theories, no less than claws,
83 wings, and tails, are finally evaluated in terms of the generic problems of survival
84 which they help to solve. The reason or intellect, no less than the leg or arm, is taken
85 as, in structural principle, only another weapon of refined musculature wherewith
86 to wrest subsistence from a recalcitrant world. Upon these assumptions, knowledge
87 is essentially preservative rather than creative, a defence or acquisitive reaction to a
88 particular stimulus, rather than an originaive enterprise for reshaping the materials
89 of experience to some pattern of the ideal.

90 But if man and his capacities are wholly part of nature, and if nature is an aggregate
91 of sensuous particulars, then clearly man can claim no genuine knowledge other than
92 of particulars or knowledge that rises above them. Hence when reflection seems to
93 soar above the world of special de facto considerations and to concern itself with
94 cosmic problems as if it were a universal spectator, let us not be deceived, says the
95 empiricist, but let us remember that man is simply an animal like other animals, a
96 chemical compound like other compounds (for there is no element entering into his
97 composition which is not common to the inorganic world), and that as such he is
98 constitutionally oriented, first and last, upon his organic needs and the maintenance of
99 the stability of his physical system. Accordingly, naturalism denies the pretensions
100 of reason to envisage genuinely formal and universal, as opposed to material and
101 particular, objects. Concepts or generic notions are accounted as nothing more than
102 "generalizations"; while theoretical grounds and reasons are denied all efficacy, being
103 construed as idle, compensatory "rationalizations" after the event. The real forces

104 guiding thought and action are held to be those of our physico-chemical constitution;
 105 yet because we are unaware of this control, we often mistakenly attempt to justify
 106 our irresistible motor tendencies by conjuring up *post facto* speculative grounds and
 107 ideal explanations of them. The plain fact is, according to naturalism, not only that
 108 man is unable to envisage true universals, but that (even if he could) he would be
 109 incapable of responding to such ideas as a stimulus. Accordingly, he must reconcile
 110 himself to being merely the product of certain specific, mechanical conditions; and
 111 must comprehend his moments of apparent initiative, spontaneity, and origination as
 112 only the effects of deeper-lying causes in the order of nature.

113 In the extreme form in which it is here represented, naturalism is open to obvious
 114 criticisms. The chief objection to be offered is, of course, that these ends (life for
 115 life's sake and the maintenance of the equilibrium of systems, etc.) upon which nature
 116 is said to be directed, are themselves metaphysical and teleological constructions of
 117 man's reasoning *about* his supposed animalism, chemical constitution, and so on.
 118 Here is more than a suggestion of paradox. For naturalism, despite its disclaimers of
 119 all but the strictest empirical and scientific accounts of nature, must find that its very
 120 position, if systematically adhered to, constitutes a teleological-metaphysical theory
 121 about the world which goes far beyond the warrant of direct experience, yet which
 122 seemingly must be granted if the results of the sciences are to be construed by it as
 123 either trustworthy or significant.

124 Furthermore, question may well be raised regarding the view of thought as a
 125 biological instrument, on the ground that, even if one grant that it has in certain
 126 contexts an instrumental aspect, abstract thinking is so different in kind from the
 127 sense organs, from legs and arms, and from other particulars of organic equipment,
 128 as to be hardly comparable with them. The chief mark of most biological tools is the
 129 fact that they are bound up with the structure and locus of the organism. The leg, for
 130 instance, is attached to the body, and where the body cannot go, the legs cannot go; and
 131 similarly with the other members. In other words, the organ apparently requires some
 132 direct contact with the environment for any experience or knowledge of it. Thus, even
 133 in the case of an instrument of distance-reception like sight, the environment has to
 134 come to it. That is, specific vibrations must be given off by the object visioned, must
 135 be transmitted by the ether, strike the retina, be carried to the optic nerve, and so on; in
 136 short, the experience seems to presuppose something like adjacent or contact action
 137 through space between the stimulus-object and the responding organ. In thinking,
 138 on the other hand, such direct conjunction or overlapping appears unnecessary; and,
 139 as a result, questions of motion from place to place and bodily behavior become far
 140 less important. A thinker may presumably sit quietly with closed eyes and conceive
 141 events in Betelgeux or what will happen in the year 3,000 A.D., or review the age
 142 of reptiles in prehistoric evolution. In such cases, reflection claims to grasp objects
 143 in the past, present, or future environment with which the organism has not, and
 144 in all probability will never have, any direct sensible contact. In thus prospectively
 145 delineating a state of non-experienced experience and retrospectively describing
 146 what the world looked like when there was nobody to look at it, mind seemingly
 147 assumes its power to transcend the narrow boundaries of direct acquaintance which
 148 circumscribe the organism. and to make use of an organon of knowledge distinct

149 from a particular form of bodily behavior. Of course, it may be flatly objected by
 150 some that thought is simply mistaken in its presuppositions; and that, being only as
 151 it were a feeble chemical glow of an animal sensorium on a minor planet, it cannot
 152 possibly reliably envisage such remote and transcendent objects. Yet if this be so,
 153 and if reflection cannot be trusted to mean what it claims to mean as regards its basic
 154 postulates, the entire structure of knowledge seems threatened, with the result that
 155 not merely thought itself but the whole body of its discoveries (including planets,
 156 sensoria, organisms, and environments) appear thrown open to question.

157 Before taking up these difficulties more fully, however, let us note the existence
 158 of certain modified forms of naturalism of wider scope than the foregoing. Many
 159 of these broader interpretations recognize the genuineness of reason as a distinctive
 160 aptitude and, though still denying its supremacy, nevertheless admit its parity with
 161 the other functions of mind.

162 11.3 Admissions of a More Liberal Naturalism

163 From the standpoint of a more liberal naturalism, one of the most striking marks of
 164 reasoning as compared with the other capacities of mind is its range of comprehen-
 165 siveness coupled with an apparent economy of effort. Thus, the objects of reason do
 166 not require full pictorial representation in consciousness as do, for instance, objects
 167 of memory, imagination, or perception. These latter are held to be trustworthy only
 168 when they can be presented as particular existences before the mind in consider-
 169 able detail. Yet, if we credit current psychology, our range of attention is limited to
 170 the apprehension of some five or six discrete objects simultaneously, so that we are
 171 plainly handicapped in processes like memory, imagination, or perception, by the
 172 time and effort required to marshal a small number of presentations on and off the
 173 stage of consciousness. Fortunately, however, there is another aptitude that is largely
 174 free of this requirement. Reason or understanding has the power to arrive at conclu-
 175 sions regarding its objects without the laborious, time-wasting necessity of grasping
 176 them as particular existences and holding them individually before attention. This is
 177 because it is able to lay hold of the form or abstract schema of objects as distinct from
 178 their particular content. Thus reason with its capacity for representation through the
 179 relational structure of ideas rather than their matter, seems to offer quite incredible
 180 resources for the enlargement of knowledge; vastly wider possibilities of synthesis,
 181 in fact, than could be won presumably by memory in history or imagination in art.¹
 182 This greater scope is also, as was said, correlated with greater saving of time and
 183 energy. Were it not, indeed, possible for reasoning to dispense with most of the details
 184 of presentation in consciousness, we should sit and perish while seeking to arrive at
 185 a small number of conclusions.

¹ Of course, this does not deny that rational activity may include and make use of memory and imagination, but only stresses that it can never be identical with them.

186 Another mark of reason duly recorded by a broader naturalism is the propensity to
 187 organize data into systems and to disclose interrelationships among objects hitherto
 188 apparently disconnected. Indeed, some have even gone so far as to define reasoning
 189 as just this tendency to interconnection persistently applied. In conformity with this
 190 inclination, understanding never apparently accepts a “fact” offhand at its face value
 191 or takes an isolated judgment as more than provisional; but requires that each shall
 192 be confirmed by linkage with other facts and judgments which mutually sustain
 193 and support it. My belief, for instance, that “This azalea is red” appeals for tacit
 194 corroboration to the body of my sensory judgments, to their power of correcting
 195 and supplementing one another, to the verdict of competent witnesses, and so forth.
 196 Moreover, each group of consilient judgments seems to lead on to other groups. In
 197 the end, although our reasoning presumably never realizes its ideal, which is that
 198 of a single, all-inclusive system with no grounds outside itself, it is customary to
 199 assume that, other things being equal, the more comprehensive a coherent body of
 200 judgments is, and the richer in interconnections, the more reliable it is likely to be.
 201 No other capacity of mind appears comparable to reasoning in respect of this power
 202 of organizing the data of experience on the one hand, and, on the other, of performing
 203 the equally valuable negative function of exposing contradictions.

204 **11.4 The Ultimate Weakness of Naturalism** 205 **and the Assumption of Transcendentalism**

206 But even such broad, eclectic descriptions of reason as the foregoing are open to the
 207 charges preferred against naturalism, as it seems to me, in so far as they deny the
 208 priority of reason to experience. It is not enough to distinguish reasoning from the
 209 other capacities merely in degree, or to note its superior aptitude for synoptic and
 210 symbolic representation as compared with them. Its supremacy over the rest of mind
 211 must also be recognized, together with its power of illuminating the objective order
 212 of things. Only by supplementing the foregoing views with a second view of reason,
 213 regarded as logically prior to experience and in so far possessed of a supra-natural
 214 character, can the contradictions of naturalism be avoided.

215 The paradox of naturalism rests, if I am not mistaken, in its assumption that the
 216 rational mind and its constructions can be wholly included as a finite part within
 217 the sphere of nature. For any attempt to explain the mind and reason as the product
 218 of a naturalistic process must tacitly allow the self-refuting assumption that the
 219 process described is itself the product of reasoning. In other words, despite itself
 220 the intellect comes to be admitted as both the source and the product of nature. Nor
 221 is the contradiction to be avoided by taking refuge in the distinction between the
 222 *facts of nature* and the *theory* about them, and by claiming that only the latter is the
 223 mind’s creation: for this very distinction is itself a construction of mind. Had not
 224 the mind been adequate to comprehend evolution as a theory, we should have no
 225 reason whatever to believe in evolution as a process. Moreover, once naturalism can

226 be brought to see that the nature of nature (i.e. its laws and operations) is disclosed
 227 only to intelligence, and that our contact with facts is always in a context of theory
 228 (admittedly of the mind's creation) it surely cannot deny, in the absence of all negative
 229 instances, that nature as the object of thought is inseparable from the activity and
 230 construction of thought which reveals it.

231 Apparently, the only way in which thought can escape the contradiction of
 232 conceiving the intellect as both the source and product of evolution is through the
 233 frank recognition of the self-transcendent competency of reasoning to raise itself
 234 above the natural order and to be the spectator of its own development in experience.
 235 But if, on the contrary, we accept the naturalistic account of mind and endeavor to
 236 limit our thinking rigidly to these assumptions, the riddle becomes insoluble how so
 237 fragile, uncertain, and accidental a phenomenon as intelligence should be qualified
 238 to pronounce a verdict or draw credible conclusions regarding the nature of things
 239 in general. What warrant can we have of the reliability of the human mind as a crite-
 240 rion, when, by its own admission, it is so deficient and circumscribed in power and
 241 extent? What guarantee have we of the strictness of its leading or the veracity of its
 242 conclusions?

243 Broadly speaking, the tenets of naturalism as apparent in present philosophy may
 244 be summarized somewhat as follows: First, all knowledge is derived from experience
 245 by methods ultimately empirical; and nothing can be said to exist save what is defin-
 246 able in terms of experience. Second, the favorable maintenance of existence and of
 247 the stability of systems appears to be a fundamental tendency of natural processes.
 248 Third, the basic order of nature is temporal and causal and there is no separate order
 249 discoverable of logical dependence. Fourth, intellect or reasoning is only a *proper*
 250 *part* of nature, and, as such is always less than and included within the *whole* of
 251 it. Our contention, on the contrary, is that naturalism, wherever it adheres strictly
 252 to the implications of these propositions, involves itself in a self-refuting position
 253 whereby knowledge itself becomes impossible. The only plausible escape from this
 254 predicament, as we see it, is through acceptance of the transcendent competence of
 255 reasoning and the recognition of its capacity as an infinite part to encompass the
 256 whole, by which means alone the paradox of intellect (its inclusion within the object
 257 revealed by it) seems resolvable.

258 For if, as naturalism maintains, all knowledge is limited to experience, man can
 259 hardly claim to arrive at any accurate estimates of universal processes of the world
 260 order; since in the nature of the case, his organism can never wholly traverse or
 261 sensibly examine all parts of the enviroing totality, or even, for that matter, a single
 262 aspect of it.² Yet, if this be so, clearly man can have no assurance of the trustworthiness
 263 of the second proposition of naturalism, that survival-value is the ultimate scale

² Thus, the propositions "All water is H₂O" or "Ammonia is NH₃" make assertions that go far beyond the empirical evidence of the cases examined, since only a very limited number of samples have actually been analyzed. Clearly *mere experience* is not entitled to authorize a pronouncement here as to the nature of the *non-experienced* cases.

To this, the empiricist may reply that the proposition means only that "So far as experience has gone, such has been the case; and, therefore, man has an empirically justified tendency to expect that future experiences will resemble past ones."

264 by which everything is tested. Such an assertion not only transcends the scope of
 265 empirical verification, but also expresses a metaphysical insight into the nature of
 266 the universe, which is precisely the sort of knowledge which naturalism disclaims
 267 as impossible. In the third place, when naturalism denies the reality of the logical
 268 order and reduces all processes to those of temporal succession, it conflicts with
 269 science and even contradicts its own conclusions in so far as derived from science.
 270 For, wherever science establishes an hypothesis regarding nature, it does so by means
 271 of a reflective analysis working in reverse order from that of the temporal genesis
 272 assumed to hold in the natural process itself. Furthermore, the very formulation of the
 273 law or theory seems to imply that it is revealed to a logical spectator or disembodied
 274 intelligence which is able in a single *coup d'oeil* to survey the sequence of events in
 275 time and space. Acceptance of the evolutionary hypothesis plainly presupposes the
 276 power of mind to raise itself above the natural order. That is, unless we suppose the
 277 competence of intellect to outflank and encompass the natural process (unless we
 278 assume the part as equal to the whole), it appears impossible to credit as trustworthy
 279 this same intellect's account of the world-process including its claim to be itself a
 280 product of it. The logical status of intellect must, if genuine knowledge is possible,
 281 be assumed to be independent of the conditions of the emergence of mind in the
 282 space–time order; since, on the one hand, the primacy and priority of reason must
 283 be granted in a logical sense before, on the other, the evolutionary account of its
 284 late appearance in phenomenal history becomes credible. Here, as elsewhere in the
 285 system of knowledge, the relation of causal sequence may run directly counter to the
 286 order of logical dependence.

287 **11.5 Can the Act of Measuring Be Itself Part of the System** 288 **Measured?**

289 But naturalism, in its zeal to construe man as wholly part of nature, apparently
 290 overlooks both the inconsistencies in its own premises and the presuppositions of
 291 scientific method. That the transcendence of mind over nature is tacitly granted by
 292 science in its procedure, seems to us something that can hardly be denied, considering
 293 the logic of its assumptions. For only by presuming the adequacy of intellect to
 294 embrace the phenomenal course of events, is science able to place confidence in its

But that mere experience entitles us to make this kind of generalization involving past and future is precisely what the rationalist questions. Both past and future for the radical empiricist, he maintains, must be constructions from the immediately present “given” of the organism; and, as such, they never fall within the limits of actual experience at any given time. What we call the past, for instance, is really the work of memory, which constantly selects and arranges sensory material in reverse order, daubing it with the light and shade of imaginative emphasis and, in general, creating an extraordinary fiction of *experience as it was never experienced*. Even more obviously, the futures which figure in our predictions are fictions respecting non-existent experiences, since, strictly speaking, we cannot by any twist of interpretation claim *actually to have lived through* future futures.

295 own results. Were this power of transcendence denied, the belief in uniformity, the
 296 belief that the past and future are as they are thought to be—for that matter, the whole
 297 of inferred history and scientific hypothesis—would be undermined.

298 Moreover, scientists themselves are to-day calling attention to the limitations
 299 involved in the strictly empirical or observational standpoint. Recent discoveries
 300 have emphasized the enormous biological and physical handicaps to which man is
 301 subject in laboratory experimentation. Owing to the fact that the scientific observer is
 302 always planted in a human body upon a larger planetary body, from both of which he
 303 is powerless to detach himself, universality and objectivity can hardly be claimed for
 304 a particular set of observations made from a particular standpoint. For where the locus
 305 and activity of the observer are themselves part of what is observed, absoluteness can
 306 hardly attach to the individual results, which are bound to be colored by naturalistic
 307 peculiarities. Introspective methods in psychology, for instance, and experiments
 308 like those of Michelson and Morley in physics would seem to have shown by their
 309 negative results the impossibility of determining the behavior or movement of a
 310 system by observations within the system.³

311 Yet at the same time that science to-day recognizes that the observer cannot
 312 jump out of his skin in a natural sense, it nevertheless admits that he can stand
 313 outside his private viewpoint intellectually. That is, although we remain imprisoned
 314 within the confines of our sensori-motor system and chained to its locus as regards
 315 our immediate perceptions, we are still able by means of theoretical reckoning and
 316 calculation to discount these impediments through correlating the standpoints of
 317 different observers with one another according to definite rules, so that the laws
 318 of nature or ideal relationships disclosed may be freed from dependence upon the
 319 accidental features of individuality and hold not merely for one but for a plurality of
 320 systems. This is only another way of saying, as I understand it, that science admits
 321 the competence of reason (although a part) to step outside itself, as it were, and to
 322 assess the whole in which it is contained.

323 On any other assumption, the possibility of obtaining genuinely universal propo-
 324 sitions would almost certainly have to be denied; yet science seems to assert just such
 325 universal propositions. For instance, anyone who affirms that “all bodies gravitate”
 326 is himself possessed of a body, and, as such, claims to come under the law that he
 327 enunciates. Now, from the standpoint of naturalism, it follows that, if the formulator
 328 of a law falls within its scope, the law is open to suspicion. For, since naturalism
 329 denies the possibility of transcendence, it can hardly do otherwise—when confronted
 330 with a clear case of the inclusion of the *part* which does the measuring within the
 331 *whole* which is measured—than question the authenticity of the results. Nor is the
 332 difficulty to be avoided by saying that Newton or the observer did not mean to include
 333 his own body under the principle of gravitation; since, in that case, he did not say
 334 what he meant. If, by “all bodies,” he did not mean “all bodies” but made an important
 335 exception of his own, then the vaunted universality of the law is unfounded. Similar
 336 contradictions are discoverable in the principle of the conservation of energy, so long
 337 as it is interpreted on naturalistic assumptions. That is, either the formulation of the

³ Cf. [Swabey, *Logic and Nature*], pp. 271–272; also 269–270.

338 principle must aim to cover even the particular amount of energy required in the
 339 enunciation of the law (in which case, we have admission of the self-transcendence
 340 of the part to include the whole) or else, if not intended to be included, the preten-
 341 sions to universality are false. And the same thing holds of evolution. Man, when he
 342 formulates the proposition that “all life evolves,” plainly claims that he himself falls
 343 within the process. And what is this but to declare his body, mind, and whole scale
 344 of measurement part of the object measured? Yet, if this be so, what credence can
 345 be placed in the theory itself, in the feeble attempt of the creature to embrace the
 346 creative process, of the effect to reabsorb the cause? Acceptance of the naturalistic
 347 account of evolution with its emphasis upon the tardy, trivial, and casual appearance
 348 of mind in the cosmic sequence, seems here in conflict with the assumed priority
 349 of reason as a presupposition of scientific knowledge. Our conclusion is, therefore,
 350 that so long as mind and reason continue to be used as the master-key to unlock the
 351 riddles of nature, unequivocal recognition should be given to the logical supremacy
 352 of the instrument over the object and its adequacy to compass the task.

353 11.6 The Transcendental Interpretation

354 Only by admitting the transcendental character of reason, its capacity to raise itself
 355 above the natural order and to survey the spectacle in which it moves as a spectator,
 356 only so can we gain some notion of an organon that might comprehend the universe.

357 When inquiry is made as to the outstanding features of reflection viewed as a self-
 358 transcendent process, the answer is often that it places the significance of everything
 359 in its referable and inferable character. By this is meant that nothing is considered
 360 purely in itself or on its own account, but that everything is taken as the sign of
 361 something else. In other words, the reasoning mind does not assume its object to
 362 be a bare datum; but, on the contrary, takes what is given as the representation of
 363 something not given, which serves as its evidence or support. The deliverances of
 364 sense, imagination, and feeling, on the other hand, take their stand primarily upon
 365 immediate experience, not sharing the assumption of reflection that data derive their
 366 significance from a source outside them. In the language of empirical procedure,
 367 “everything is precisely what it is given as, and is not to be explained away in terms
 368 of something else.” So long as we stand within the actual sensuous, emotional, or
 369 imaginative experience, it raises no doubts as to the object, but treats it as so much
 370 given fact devoid of extraneous implications. Now, although in most of the enterprises
 371 of knowledge both rational and empirical factors are so interwoven as to be scarcely
 372 separable, it is nevertheless possible to contrast the two in a broad way by equating
 373 them with the methods of induction and deduction as ordinarily interpreted. In the
 374 one case, description, in the other, explanation, becomes the ideal of knowledge.

375 Wherever we aim primarily at acquaintance with particulars, and are satisfied to
 376 learn about “some” without knowing about “all” members of a class, the empirical
 377 way of looking at things is of the greatest value. Under these circumstances, obser-
 378 vation, enumeration of instances, experiment, and practice play an important part.

379 When, however, our intention is rather to obtain universal insights into the nature of
 380 orders or groups as wholes, the standpoint of concrete experience becomes insuffi-
 381 cient, and has to be supplemented by some super-experiential means. Considering,
 382 as we must, the inexhaustibility of our world, the countless number of beings of any
 383 kind that one cares to mention (amoebae, crystals, stars, men), and the impossibility
 384 of our encompassing more than a trifling fraction of any given class empirically,
 385 it becomes clear that, if we are to claim the right to frame universal laws and to
 386 deal with infinite kinds, we must employ some method whereby a limited amount
 387 of direct acquaintance can be made to suffice for a more or less adequate theoretical
 388 knowledge of the whole.⁴ In other words, sooner or later, knowledge is forced to fall
 389 back upon deduction, upon the symbolic representation of whole by part, and the
 390 methods of rationalism.

391 An illustration from Leibniz may help to enforce the contrast here between the
 392 capacity of rational procedure to master an infinite subject matter and the impotence
 393 of empirical procedure to cope with other than a strictly limited material. When,
 394 for instance, we consider the series of squares of the natural whole numbers (1,
 395 4, 9, 16, etc.), we may discover by direct examination that the difference between
 396 each square and its predecessor is an odd number, and that these differences, when
 397 arranged successively, appear to form the progressive series of the odd numbers. On
 398 the basis of this knowledge, we are led to expect that, if we take a given member
 399 from the series of squares (e.g., 9) and add to it the corresponding number from
 400 the series of odd numbers (i.e., 7), the result will be the next higher square in the
 401 series of squares (i.e., 16). This expectation, however, is based upon merely empirical
 402 considerations; so that, no matter in how many instances we find that it holds good, it
 403 still remains possible that, at some further point in the number series, the correlation
 404 will be interrupted. Only by adopting a rational deductive approach, in place of an
 405 empirical inductive one, is it possible to obtain evidence of a universal and necessary
 406 connection between the series of squares and that of the odd numbers. Such an
 407 approach discards particular numbers with their peculiar properties, and instead takes
 408 number in general; thus n is conceived as any natural whole number. By means of n ,
 409 the difference between any square and its predecessor may be expressed algebraically
 410 as $(n + 1)^2 - n^2$, a difference which is $2n + 1$ or the value of an odd number. Thus, the
 411 universal, non-empirical formula $(n + 1)^2 - n^2 = 2n + 1$, shows conclusively that the
 412 difference between the squares of any two successive numbers must, in every case,
 413 be an odd number; and that a fixed connection subsists between the progression of
 414 squares and that of the odd numbers, so that (by means of the formula) the position
 415 of any given odd number can be definitely determined with reference to the series
 416 of squares. In brief, the totality of squares and that of odd numbers are shown to be
 417 linked together as parts of one system, each side of which can be known through the
 418 other. So long as numbers continued to be treated empirically and individually, no
 419 such discovery was possible; and they remained in a merely external, unexplained
 420 correspondence. Once an equation expressive of their essential relation was deduced,
 421 however, empirical tests involving the multiplication of instances were rendered

⁴ Cf. [Swabey, *Logic and Nature*, pp. 285–287], Ch. VII, Sect. IV, for further discussion.

422 superfluous. By the analysis of such examples, the incapacity of empirical methods
423 to comprehend a universal object is made plain, together with the striking capacity
424 of deductive procedure to compass an infinite subject-matter.

UNCORRECTED PROOF