

Chapter 21

The Personalistic Conception of Nature



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1 **Abstract** This chapter is Mary Whiton Calkins' articulation and defense of the
2 personalistic conception of reality.

3 II

4 The conception of the world, achieved in the first division of this paper, as made up in
5 part, at least, of conscious beings, or selves, is not yet a fully personalistic conception
6 of nature. For a completely personalistic doctrine must maintain, not that selves exist
7 along with other real though non-mental beings, but that the world consists wholly of
8 persons, or selves; and that so large a part of the world is accounted impersonal simply
9 because the selves in whom it consists are undistinguished and uncomprehended.
10 This paper espouses the fully personalistic conception of the universe as consisting
11 in innumerable selves, or persons, of different levels and degrees, more or less closely
12 related to each other. To establish this conception would demand the proof (1) that
13 supposedly non-mental beings are really mental; (2) that mental beings are inevitably
14 personal; (3) that more than one self may be known to exist. In negative terms,
15 the thorough-going personalist, before he has a philosophic right to his cosmology,
16 must successfully maintain (1) idealism against both dualism and materialism; (2)
17 personalism against ideistic idealism; (3) a non-solipsistic, a non-subjective, form
18 of personalism. The limits of this paper prohibit the adequate carrying out of any
19 part of this program, but the following may serve to suggest the main outlines of the
20 personalistic argument.

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217

21 1. The personalist as idealist begins by protesting against the common practice of
 22 dismissing his case before it is heard—in other words against the naive assump-
 23 tion that the physical world as we know it by observation is material in the sense
 24 of being non-mental and independent of mind. The idealist, like every other
 25 metaphysician, unreservedly accepts at their face value facts of every descrip-
 26 tion—facts such as redness, hotness and oscillation as well as facts such as like-
 27 ness, connectedness and uniformity. He therefore begins where “common sense
 28 and science ... begin, without any doubts concerning the reality of the world.”¹
 29 Whoever, however, identifies the statement that the physical world is real with
 30 the assertion that it is ipso facto non-mental is not, the idealist insists, arguing
 31 against idealism; he is simply postulating or assuming the conclusion which the
 32 idealist insists on putting to metaphysical test.

33 By idealism is here meant frankly what is sometimes called mentalism, the
 34 doctrine that any reality—electron, brain, protoplasm as well as self or purpose—
 35 is mental.^{2,3} Stripped of unessential features the argument for mentalism empha-
 36 sizes the fact, never disproved nor seriously disputed, that the only unchallenge-
 37 able assertions about alleged material, i. e., non-mental, reality are assertions of
 38 somebody’s way of being conscious. I say for example, that the sea is blue; you
 39 insist that it is green; my only certainty, but an impregnable certainty, is that I
 40 have the experience which I call seeing blue, not the experience which I call
 41 seeing green!

42 This argument, oddly enough, has never been better stated than by that pecu-
 43 liarly omniscient neo-realist, Bertrand Russell. In the third lecture of his *Scientific*
 44 *Methods of Philosophy* for example, in the effort to tell “what is known ... without
 45 any element of hypothesis,” Russell says definitely: “What we know by experi-
 46 ence,” in viewing a table, “what is really known, is a correlation of muscular and
 47 other bodily sensations with changes in visual sensations.” This is, in its essence,
 48 precisely the basal position of idealism. Russell, to be sure, at once supplements
 49 his “really known” sensations by extra-mental sense-data.⁴ And other neo-realists
 50 cavalierly dispose of the argument that unchallengeable statements about phys-
 51 ical objects are all in mental terms by the remark that some unchallengeable
 52 assertions are trivial.⁵ They do not, however, offer any proof that the idealist’s

¹ Cf. J. E. Creighton, “Two Types of Idealism,” this REVIEW, 1917, XVI, p. 525. Cf. p. 533² ff.

² This conception of idealism is sharply opposed to the ‘objective idealism,’ as it is sometimes called, which consists in the “direct acceptance of things as having value or significance.” Cf. Creighton, op. cit., p. 515².

³ In the face of contemporary criticism it is important to remind the reader that no serious idealist from Berkeley downward rests his case either (i) on the primary-secondary qualities argument or (2) on the argument from illusion. The first of these, the idealist is well aware, may cut either way. (Cf. Berkeley, *Principles*, XV, and May Sinclair, *A Defense of Idealism*, p. 175².) The second he regards as decisive against many forms of realism, not as conclusive for idealism.

⁴ His only argument, so far as I can find, for the existence of the sense datum, is based on the involuntariness of sensation (Op cit., p. 76.) The argument is indecisive since the involuntariness is stateable in personalistic terms also.

⁵ Cf. *The New Realism*, pp. 19–20. (Macmillan Co., 1912.)

unchallengeable assertion belongs with the trivial certainties. Accordingly, the idealist is still free to urge his fundamental thesis. If, he insists, the attempt to reach irrefragable certainty about alleged non-mental reality inevitably issues in mental and not in non-mental certainties, the philosopher is in honor bound first, to stop identifying the physical with the non-mental and second, to set down the alleged non-mental as, at the least, negligible for plain man and philosopher alike.

2. The personalist has next to argue for personal idealism. The idealistic conception of the world as mental does not, in the view of all philosophers, imply that it is also personal. On the contrary, a group of idealists—impersonal idealists, ideists or phenomenologists as they are called—follow Hume in conceiving the universe as through and through mental but impersonal, as consisting of a succession of mental contents or processes, psychic items or states. According to Karl Pearson and Ernst Mach, for example, well-known representatives of the school of mechanistic idealists, the world of nature with which science deals reduces to the ordered succession of ideas in the scientist's mind; and the laws of nature are the scientist's way of grouping and predicting phenomena. Pearson, for example, describes matter as a "union of immediate sense impressions with associated impressions."⁶

The personalist has therefore to justify his rejection of ideism, this conception of the world as a great complex of succeeding mental states. The basal objection to the theory is that, thoroughly understood, it implies the very conception which it opposes. For when, accepting at its face value the ideistic theory, one asks the meaning of the statements: "This or that nature object is a complex idea"; "the course of nature is a series of ideas;" "the law of nature is an experienced routine"—one finds that there are no really, independently existing ideas, that an idea, that is, a mental experience, always is part of a self, who has the idea, who experiences. In a word, the selfless or impersonal idea, like the impersonal value, is an abstraction from the concretely real self. The world, as mental, inevitably is a world made up not of ideas, or mental processes, but of selves.

The personalist is well aware that the foregoing paragraph constitutes no argument. Indeed, in the nature of the case, no argument is possible. As ultimately real, the self cannot be proved through being bolstered up by something more real; it is simply discovered, immediately known. Yet the personalist is not without resource in face of any Hume, past or present, who protests naively: "When I enter into myself . . . I can never catch myself."⁷ For such a protest overlooks the significant fact, stressed by Augustine and Descartes,⁸ that self is the one reality whose existence can neither be denied nor doubted, since neither denial nor doubt are possible without a self to do the denying or the doubting. I may question or

⁶ *The Grammar of Science*, second edition, p. 752.

⁷ *Treatise of Human Nature*, Bk. I, Part IV, Section VI.

⁸ Cf. Augustine, *De Libero Arbitrio*, II, 3, *De Trinitate*, X, IO, and XV, 12, 26; and Descartes, *Meditations*, II, *Principles of Philosophy*, I, 7. Descartes's self-doctrine is too often confused (by himself as well as by his critics) with his more medieval conception of the soul.

92 deny the existence of God or of my brother or of my breakfast without thereby
 93 implying the existence of any one of them, but as soon as I question or deny
 94 myself—*ecco*, I myself questioning or denying! The personalist has accordingly
 95 a right to assert the existence of the self which experiences and “has ideas.”

- 96 3. Even with this conception of the world as personal we have not, it must next
 97 be pointed out, achieved the fully personalistic conception of the world as a
 98 society of interrelated conscious beings, or selves. For directly in the path toward
 99 such a conception looms the specter of solipsism: the conception of the world
 100 as personal, to be sure, but as narrowed to the confines of myself, the only
 101 undoubtable, immediately known self. Thus conceived, solipsistic or subjective
 102 personalism as a nature philosophy differs little from impersonal idealism, or
 103 ideism. For if only I myself can be metaphysically known to exist, then the
 104 physical universe—plants and stars and evolving forms of life—must reduce to
 105 a mere system of ideas in a single mind—my mind, the mind which (on this
 106 hypothesis) constitutes reality. Now, according to the realistic critic,⁹ solipsism
 107 is the only valid form of idealistic personalism. My certainty of the self, he
 108 reminds me, is rooted in my introspective discovery that I can not doubt my own
 109 existence; the argument against alleged extra-mental reality pivots on the fact that
 110 what I know is my experience. Obviously, the critic insists, the only certainty
 111 here is that of myself, of the solitary me, and of my individual experience. Were
 112 it necessary to accept this conclusion each of us would accordingly be shut
 113 up to the philosophic conception of the universe as a system of his own ideas
 114 exclusively.¹⁰ A careful consideration of this criticism would, therefore, be the
 115 logically next step of this paper. But limits of time prevent this undertaking save
 116 in schematic outline. In brief: the personalist holds that the object of my alleged
 117 knowledge alike of other-self and of thing is *both* my own experience, or idea,
 118 and *something-beside*. The personalist justifies himself in asserting the existence
 119 of this something-beside-me on the ground that I directly experience myself
 120 as a limited, hampered self—limited in my perceptual experience to just these
 121 special seeings and hearings, and limited also in my personal disappointments
 122 and in my baffled purposes. But a direct experience of being limited is, as Fichte
 123 long ago suggested, a direct (not an inferred) knowledge of something existing
 124 beyond the limit. When, therefore (to repeat the old illustration), I perceive the
 125 sea as blue, my only unchallengeable certainty *about the blueness* is indeed my
 126 own consciousness, but I have also the certainty of being limited to just this
 127 sensation of blueness; and this direct experience of being limited includes in it
 128 the knowledge of a something-besides-me. But this conclusion constitutes the

⁹ Cf. G. E. Moore, *Proceedings of the Aristotelian Society*, 1905–06, VI, “The Nature and Reality of Objects of Perception”; cf. also, *The New Realism*, 1912, pp. 146²–147¹. It is not without interest to add that, some two hundred years before the rise of neo-realism, Berkeley put a closely similar argument into the mouth of Hylas. Cf. the third of the *Dialogues between Hylas and Philonous*, the passage beginning: “Answer me Philonous. Are all our ideas perfectly inert beings?” (The personalist agrees with the realist in discrediting Philonous’s handling of the situation.).

¹⁰ Most neo-realists, on the other hand, unjustifiably imply that to prove idealism solipsistic would *ipso facto* discredit it.

129 first step only of the personalist's refutation of solipsism. He has still to show
 130 reason why the something-besides-me must be conceived as invariably personal.
 131 And here the pluralistic and the absolutistic personal idealist part company. Both
 132 find that I know objects in some sense beyond myself. The pluralist asserts that I
 133 could not know these objects unless they were essentially like me, and that non-
 134 mental and impersonal objects would be unknown.¹¹ The absolutist, on the other
 135 hand, argues that knowledge implies identity of knower and known; that I know
 136 the Absolute by being identically a part of Him; and that I know other selves in
 137 so far as they, like me, are genuinely though partially identical with Him.¹² Both
 138 pluralist and absolutist, however, argue that knowledge is inexplicable unless its
 139 objects are personal.

140 Herewith, the second division of this paper reaches the end toward which it has
 141 hastened. It has indicated, very summarily, the outlines of the argument at the base of
 142 the conception of the universe as completely personal. No resentful hearer or reader
 143 can realize more keenly than I the indecent brevity and consequent inadequacy of
 144 this statement of the grounds of a personalistic cosmology. The main concern of
 145 this paper is, however, with the consequences of the doctrine if true, not with the
 146 arguments to prove it true. I propose, therefore, boldly to ask you, whether or not
 147 you are satisfied with the metaphysical grounds for the conception, to assume, if you
 148 do not believe, that the universe is personal and not confined to the limits of a single
 149 self. The way is then open for the discussion of the nature of the personalist's world.

150 III

151 The third division of this paper is devoted to the working out, in rough fashion, of
 152 certain details of an unsolipsistic but personalistic nature philosophy, a conception
 153 of the universe as constituted by an indefinitely great number of interrelated selves.
 154 The phrase 'great number of selves' is used without prejudice to the possibility,
 155 which preceding pages have suggested, that the many selves may turn out to be
 156 members of an all-including Absolute Self. It matters little to students of nature
 157 philosophy whether or not this absolutist doctrine is correct. For the Absolute of
 158 modern philosophy is a respecter of persons. Therefore even if the many selves are
 159 parts of the One Self they will retain both their personality and their relation with
 160 each other through the Absolute.

161 Fundamental to such a sketch of personalistic cosmology is a delimitation of the
 162 term self. The self, in the first place, is not the entelechist's soul: that is to say, the self
 163 need not be conceived as having inherently a decisive influence on phenomena; it has
 164 not by definition the power to intrude itself, as ultimate cause, among phenomena.¹³

¹¹ Cf. J. Ward, *The Realm of Ends*, Lecture I, pp. 10 ff., and passim; C. A. Richardson, "Scientific Method in Philosophy and the Foundations of Pluralism," this REVIEW, 1918, XXVII, pp. 233 ff., 267 ff.

¹² Cf. J. Royce, *The World and the Individual*, Vol. II, Lecture IV ff.; B. Varisco, *The Great Problems*, pp. 16 ff., 292 ff.; M. W. Calkins, *The Persistent Problems of Philosophy*, pp. 410 ff. There is need for a fuller statement of the absolutist view and a more critical discussion of its difficulties.

¹³ This unqualified denial of the propriety of defining the self as an essentially potent being, a controlling influence, is not of course a dogmatic denial of the possibility of later proving the self

165 Self, in the second place, is not to be confused with soul, in Locke's sense of the
 166 term: that is to say, the self is no underlying substratum, no unknown substance,
 167 no "something I know not what to support ideas,"¹⁴ but is a directly experienced
 168 reality. To turn from negative to positive: By self is meant a being essentially similar
 169 to that which any man means when he says 'I' or is conscious of 'myself.' The
 170 self is, strictly speaking, indefinable since there exists nothing else of its class from
 171 which to distinguish it. The self is, none the less, a complex being^{15,16} possessed
 172 of at least the following characters: relative persistence, or identity, which need
 173 not mean immortality; change, or growth; uniqueness, that is, irreplaceableness, or
 174 individuality; and relatedness to its environment. These characters of self, according
 175 to the fully personalistic conception, are directly experienced and not inferred. And
 176 it cannot be stated too unequivocally that the personalist in asserting that the world
 177 of organic and inorganic nature is, in concrete reality, a world of selves must use
 178 the word self with the psychological meaning gained through introspection, that he
 179 must mean by self a being essentially similar, in its nature, to himself. Otherwise
 180 cosmological personalism becomes logomachy, mere metaphorical play on words.

181 The conception of the world of nature as a world of genuine selves does not,
 182 however, preclude the possibility or probability that these selves differ vastly from
 183 the human selves and from each other. One empirical consideration, later to be
 184 discussed in more detail, points directly to such differences. We believe ourselves
 185 to communicate directly with other human selves—to put questions to them, to be
 186 hailed by them and to share their experience. Such communication with inorganic
 187 nature, with plants, and with many classes of animals is either lacking or, at the least,
 188 is uncertain and unsystematized. The world of nature is accordingly in great part, to
 189 use Royce's phrase, an uncommunicative world.

190 From this preliminary statement of the basal principles of personalistic cosmology
 191 we must turn to detail and to argument. The personalist has first to show the psycho-
 192 logical likelihood that beings exist, far less complex than we and yet significantly
 193 described as selves. That the higher vertebrate animals are conscious beings is
 194 commonly admitted. The question is whether we are to think of earthworms and
 195 beetles, of bacteria and amoebae, of pebbles and lichens as selves. Leibniz was first
 196 among modern philosophers in the attempt to establish the possibility of the extra-
 197 human self by emphasizing in our human experience, the wide difference (1) between

possessed of such a power. This is in truth a question to be determined by argument. What is denied
 is the right to define the immediately observed, known self as a power.

¹⁴ *Essay*, Bk. II, Chapter 23, 15.

¹⁵ The position: "Either consciousness is a complex entity, not fundamental but definable in terms
 of simpler entities ... or else consciousness is fundamental and simple," seems to be based on an
 illicit conversion of the proposition: "The elemental is indefinable." This is, of course, true, but
 it certainly does not follow that "the indefinable is elemental." (Cf. E. B. Holt, *The Concept of
 Consciousness*, p. 73²).

¹⁶ On the conception of self, cf. M. W. Calkins, *A First Book in Psychology*, Chap. I and Appendix,
 Sec. I. (For bibliography cf. pp. 282 f.) "The Self in Scientific Psychology," *American Journal of
 Psychology*, 1915, XXVI, pp. 495 ff.; *The Persistent Problems of Philosophy*, fourth edition, pp. 407
 ff.

198 inattentive and inactive and attentive, active consciousness; (2) between simple and
 199 complex; (3) between sensuous and non-sensuous consciousness. It is essential to our
 200 purpose to study these conceptions and to begin by making them vivid to ourselves.
 201 Let each of my hearers, therefore, using Leibniz's own method, contrast himself in
 202 the alert, interested, competent handling of an intellectual problem with himself in the
 203 first moments of waking from a very sound sleep, utterly dazed and unaware of where
 204 he is or what he has to do, as little recognizing a past as anticipating the future. In this
 205 sleepy state he is an inattentive, sluggish, indiscriminating, inactive self; in the other
 206 case he attends, distinguishes, compares, relates, advances, controls. Between the two
 207 experiences are innumerable grades of attentiveness, weak and strong, dispersed and
 208 narrow; innumerable variations in the importance and complexity of non-sensuous,
 209 thought-factors of experience; innumerable gradations between utter passivity and
 210 complete self-initiative. The personalist appeals to this incontrovertible experience
 211 of widely different levels of our own consciousness as confirmation of the possibility
 212 of selves of many grades or types. There well may be, he insists, selves who are even
 213 more inactively and inattentively conscious than we are in the sleepest stage which
 214 we can catch by retrospection, selves who remain at this inactive level from which
 215 we have risen, though to be sure we periodically fall back into it. These would be the
 216 relatively stable selves, which constitute what we call the inorganic world, which we
 217 conceive as unconscious mainly because there seems no hope of getting them to talk
 218 to us. And corresponding to the successively more attentive, active, discriminating
 219 levels of our own consciousness would be other types of selves—until one reached
 220 the higher vertebrates whom, implicitly or explicitly, people already treat as selves
 221 even if they do not so conceive them.

222 Up to this point, in our attempt, following Leibniz's clue, to attain a conception of
 223 non-human nature-selves, on the analogy of our own widely varying types of expe-
 224 rience, we have scarcely touched upon the temporal distinction, emphasized both
 225 by Leibniz and Ward and by Royce, which may mark off one group of selves from
 226 another. In its genuinely sleepy state every self is unaware of past and future; so far as
 227 its own present consciousness goes, it is like Melchisedec "without father, without
 228 mother, having neither beginning of days nor end of life." It furnishes, therefore,
 229 the basis in human experience for Leibniz's simple self (his naked monad), *mens*
 230 *momentanea seu carens recordatione*,¹⁷ the momentary, unremembering, unrecog-
 231 nizing self. At the lower extreme from us, according to this view, are, or may be,
 232 momentary selves, selves whose consciousness of change does not rise to the contrast
 233 of past with present and future. They are thus selves of a moment, unremembering
 234 selves. And between them and us would be, as already suggested, an ascending scale
 235 of selves roughly rated by their capacity to recall and recognize the past and to antic-
 236 ipate the future. Royce's characteristic contribution to the conception of selves as
 237 temporally distinguished is well known and may best be stated in his own words.
 238 It is that of the varying time-spans. He supposes, in common with all personalists,
 239 that "when [we] deal with Nature [we] deal with a vast realm of finite consciousness

¹⁷ *Theoriae motus abstract Definitiones*. Gerhardt edition, IV, p. 230. Cf. Ward, *The Realm of Ends*, pp. 255 ff.

240 of which [our] own is at once a part and an example.” He next points out that “our
 241 consciousness, for its special characters, is dependent upon a fact which we might call
 242 our particular Time-Span. If we are to be inwardly conscious of anything, there must
 243 occur some change ‘—not too fast nor too slow—’ in the contents of our feelings.
 244 What happens within what we describe as the ... thousandth of a second necessarily
 245 escapes us. On the other hand, what lasts longer than a very few moments no longer
 246 can form part of one conscious moment to us. But suppose that our consciousness
 247 had to a thousand millionth of a second or to a million years of time the same rela-
 248 tion that it now has to the ... length in seconds of a typical present moment. Then,
 249 in the one case, we might say: ‘What a slow affair this dynamite explosion is.’ In
 250 the other case, events, such as the wearing of the Niagara Gorge, would be to us
 251 what a single musical phrase now is, namely something instantaneously present ...
 252 This simple consideration,” Royce at once applies, suggesting, for example, that
 253 “a material region of the inorganic world would be to us the phenomenal sign of
 254 the presence of at least one fellow-creature who took, perhaps, a billion years to
 255 complete a moment of his consciousness, so that where we saw, in the signs given
 256 us of his presence, only monotonous permanence of fact, he, in his inner life, faced
 257 momentarily significant change.”¹⁸

258 The special use which Royce makes of this hypothesis, in the discussion of evolu-
 259 tion, does not here concern us. We have simply to emphasize the fact that actual expe-
 260 rience of the varying time-span justifies the hypothesis of still greater variation and
 261 thus the conception of selves with time spans so widened or so narrowed that we may
 262 even fail to know their existence. This speculative conception enlarges that gained
 263 by direct observation of our own inattentive, inactive, unthoughtful moments—the
 264 conception of the relatively simple, sensuous, stable, unremembering self.

265 The immediately preceding pages have mainly tried to show that the conception
 266 of non-human selves makes no assumptions which are not verifiable on some level of
 267 human consciousness. In other words, emphasis has fallen on the essential likeness of
 268 the human to the non-human self. In the pages which follow, the stress will fall upon
 269 the different groups of non-human selves and on the methods of distinguishing them
 270 from each other. When the superhuman self, whether God or Absolute, is disregarded,
 271 it is found, as already suggested, that the non-human selves are most readily grouped,
 272 according as they are from our human standpoint (1) intercommunicating, or (2)
 273 communicating, or (3) uncommunicating selves—in other words, according as they
 274 either signal to us and are signalled back to, or as they signal to us without being aware
 275 of us or of our message, or, finally, as they are totally uncommunicative. It will be
 276 profitable to dwell for a moment on these distinctions and, in particular, to stress the
 277 difference between intercourse, or intercommunication and mere communication.¹⁹
 278 Evidently, when any self (A) is in intercourse with another (B), A must be aware
 279 (conscious) of B and of B as conscious in his turn of A. Furthermore, since by self
 280 is meant inter alia a changing being, that is, a being of successive experiencings,

¹⁸ *The World and the Individual*, II, pp. 227–228.

¹⁹ Royce seems not explicitly to recognize what I have called communication. By ‘communicative’ he probably means ‘intercommunicative.’

281 this mutual awareness carries with it an awareness by A of B's changing experiences
 282 and by B of A's changes. Complete or adequate intercourse, finally, must imply a
 283 correspondence between these successive changes in A and B. Mere *communication*
 284 of A with B may be said to occur whenever A modifies B's experiences, but full
 285 *intercommunication*, or intercourse, implies the mutual relation and the awareness
 286 of it.

287 From this statement of the principle of classification, we turn back to the problem
 288 of grouping the non-human selves. To begin with: everybody will agree to describe
 289 the higher vertebrates as intercommunicating selves. In this case we have strong
 290 empirical (if not metaphysical) evidence of their intercourse with each other and
 291 with ourselves. Nor is there any conclusive reason for limiting the group of inter-
 292 communicating selves to the vertebrates, to the exclusion of the higher anthropoids,
 293 for example. At the other extreme are the non-human selves which make up what
 294 we call the inorganic world. We become aware of their presence through such of
 295 our sensational experiences as we do not refer to the communicative selves, men
 296 or animals. Suppose, for example, that I have at one and the same time, a great
 297 complex of sense-experience—visual, auditory, kinaesthetic—not attributed to my
 298 own initiative. Part of this experience I designate as awareness of voices, gestures,
 299 and faces; and this part I regard not merely as indication of the existence and pres-
 300 ence of other selves but as disclosing to me their changing experience. Another part,
 301 however, of my sensational experience, the perceptual awareness, for example, of
 302 hardness and grayness or of blueness and rippliness, I describe as consciousness of
 303 pebble or of lake. But in this case I am conscious of no give-and-take of experience
 304 between pebble or lake-self and me; I find no mutually varying series of changing
 305 ideas which enables me to designate or to 'feel' just this complex of sensation, as
 306 sign of a communicating self. I cannot, in other words, regard either one of these
 307 sensation complexes as indications of a single, individual pebble-self or lake-self
 308 with the assurance with which, when I am conscious of a gesturing, talking human
 309 body, I regard it as a sign of another self. It is true that, on the strength of my person-
 310 alistic philosophy, I believe that my pebble consciousness indicates the presence
 311 of personal being. I have, however, no way of knowing that the pebble is, like my
 312 own body, the 'phenomenal sign' of a *single* non-human self. It may, rather, indicate
 313 merely one part or aspect of a non-human self, or again, it may indicate a whole
 314 group of such selves. In other words, the pebble may correspond not to a human
 315 body, as experienced whole, but to one organ or fragment of a body or else to a group
 316 of bodies.

317 We have next to consider the status of the vast numbers of living beings, lower
 318 in the scale than the intercommunicating non-human selves, yet widely different,
 319 it seems, from the stolid inorganic world.²⁰ We have, apparently, no intercourse
 320 with them, yet the more we know about them the more we incline to conceive
 321 them as conscious beings. For experiments on animal behavior show that animals of
 322 every class may learn by trial and error, in other words, may adapt their reactions

²⁰ Merely in the interest of brevity, the following paragraph omits any reference to the possible plant-selves.

323 to their environment. Not merely insects and crustacea but infusoria—the stentor of
 324 Jennings’s classical experiments,—have learned both to vary response with changing
 325 environment and even to alter their reactions to a fixed environment.²¹ Now this
 326 acquired capacity to vary reactions to a fixed environment is the most significant
 327 indication of consciousness. By most biologists the stentor which alters its response
 328 to a harmful stimulus and the crab which learns to shorten its progress through
 329 a labyrinth are judged to be conscious animals, that is, selves. And we may go
 330 even further. Not only is an adaptively reacting animal probably conscious; it is
 331 also in a very literal sense communicating with the observer, informing him, by
 332 its forward or backward movements, let us say, of its changing experience. On the
 333 other hand, nothing suggests that the observer makes the animal aware of his own
 334 onlooking experience. The animal is, in other words, a communicating, but not an
 335 intercommunicating self; it gives but does not take. Thus experimental observation
 336 justifies the recognition of a group of communicating, non-human selves midway
 337 between the totally incommunicative and the obviously intercommunicative nature-
 338 selves.

339 One difficult topic suggested in the preceding pages must at least be touched on.²²
 340 The distinction of the uncommunicative from the communicative selves has more
 341 than once involved a reference to the human body. These casual references have now
 342 to be amplified, and the relation between self and body to be stated in personalistic
 343 terms. (It should be emphasized at the outset that the personalist does not share at
 344 all in the spiritualistic dualist’s concern to show the independence of some aspect of
 345 self-memory or emotion or will—from the body.²³) For, to the personalist, brain and
 346 body are themselves mental, and “the experience of the body is the body.”²⁴ Looked
 347 at *en bloc* and uncritically my body may be described as follows: It is a peculiarly
 348 ubiquitous object—in the querulous words which the little girl applied to God, it is
 349 always “tagging me around”; and it has two important aspects: (1) In the first place, it
 350 is not only, like all physical things, a public object, open to other people’s observation
 351 as well as to my own, but it is a mediating, instrumental sort of object, serving to
 352 indicate my existence to other people—in Royce’s words, serving as ‘phenomenal
 353 sign’ of me.²⁵ (2) My body, in the second place, according to the uncritical observer, is
 354 not merely a visible and audible and tangible object, perceived by other people along
 355 with me. Rather, it is also a source of unshared organic sensation, the awareness, for
 356 example, of stabbing pain, of palpitation, or of bodily vigor. This description of the

²¹ “Studies on Reactions to Stimuli in Unicellular Animals,” *American Journal of Physiology*, 1902, VIII, pp. 23 ff. Cf. *Behavior of the Lower Organisms*, 1906, Chapter X, especially pp. 175 f.

²² The paragraphs which follow, to the end of this section, have been added to the paper as read.

²³ It is curious to find Bergson, of all men, playing into the hands of these dualistic spiritualists by the teaching that memory cannot be cerebrally localized. Cf. *Matter and Memory*, Chap. II.

²⁴ D. H. Parker, *The Self and Nature*, p. 86¹.

²⁵ It should be noted that these are only relative distinctions of the body from other physical objects. There are other persistent ways of experiencing—the consciousness of clothes and of home, for example. And there are other instrumental ideas, mediating experiences. The experience, for example, indicated by the words “using a microscope” is essential to my having that other experience designated as “seeing the capillaries of a frog’s circulatory system.”

357 body in terms of the every-day observer has now to be philosophically interpreted.
 358 In the terms of the impersonal idealist, plainly, my body is a persistent complex of
 359 sensations, visual and auditory and contact sensations, on the one hand, kinesthetic
 360 and visceral sensations, on the other. The personalist goes further. He points out, first,
 361 that sensation is somebody's sensing and that accordingly 'complex of sensations'
 362 means somebody's complex sense-experiencing. In the second place, he reaffirms
 363 the plain man's distinction of public from private object, that is, he describes my
 364 visible, tangible, and audible body as complex experience shared by me with the
 365 other selves who are said to see, hear, and touch me. Finally, and once more in
 366 agreement with everyday observation, the personalist describes my body as that part
 367 of other people's shared sense experience which suggests to them the existence, the
 368 presence, of me, a self with individuality of its own. (And conversely, the part of
 369 my sense experience which I call "consciousness of other human bodies" suggests
 370 to me the presence of other selves.)²⁶ My body as directly experienced is, therefore,
 371 according to the personalist, a complex and chiefly sensuous experiencing—in part,
 372 my incommunicable experience and in part the shared experiencing of many selves
 373 which serves as the 'sign' of my presence.

374 But this description of the human body is still incomplete. It has left out of account
 375 those portions of my body which are not, and need never be, objects or parts of any
 376 one's direct experience. For in addition to (1) my body as seen, touched and heard,
 377 and in addition also to (2) my body as 'felt' by me alone, in a toothache, for example,
 378 there remains (3) my body as inferred object—my body, as containing spleen and liver
 379 and cerebral ganglia, for instance. I infer the existence of some of these organs when
 380 I have watched the cook drawing a chicken and of still others when I have studied
 381 the diagrams in a physiology book or have dissected a cat.²⁷ By the surgeon when
 382 he operates, or by the histologist, still other organs—the adrenal glands or the white
 383 blood corpuscles—may be directly observed. Yet neither adrenal glands, nor blood
 384 corpuscles, nor brain, nor liver can be described (in the way in which my *directly*
 385 *experienced* body is described) as my peculiarly constant sense-experiencing, in part
 386 private but in part shared, and serving as *sign of me*. The reason, once more, why my
 387 body-as-inferred is not to be described as sign of me is clearly this: neither I, nor other
 388 people when conscious of me, are inevitably or invariably or even often aware of my
 389 caudate nucleus, blood corpuscles, adrenal glands, or even of my liver and my lungs.
 390 And yet, according to careful observation and experiment, I, the conscious self, with
 391 my experience, am closely related to this merely inferred portion of my body. In
 392 particular, that part of my experience which constitutes my directly-perceived body
 393 is closely bound, in one organic system, with the inferred portions of the body. For
 394 example, my muscular reactions (directly observed), vary with changes in the frontal

²⁶ For the sake of brevity, no reference is made to the consciousness of my body as phenomenal sign of me which, in addition to my direct introspective awareness of myself, I possess.

²⁷ "Few of us realize the limitations of our direct 'private' knowledge of the interior of our bodies. Probably the most important item of it is that knowledge of something beating under our tangible and partly visible ribs."

395 Rolandic region (inferred) and my bodily vigor in anger or in rage (observed) vary
396 with the secretions of the adrenal glands (inferred).

397 How then shall the personalist conceive these inferred portions of my body? Only
398 two ways seem to be open to him. Either he must content himself with describing them
399 in merely ideistic, not personalistic, terms, as inferences (and in part percepts) of the
400 scientist, forming part of an ordered description of the world of actual and possible
401 sense impressions,²⁸ or (basing his speculation on the personalistic conception of
402 body or bodily organ as sign of self) he must follow Leibniz and Ward in supposing
403 that such parts of my body as are not signs of me must be signs of some other self
404 or selves. To such selves I should stand in relation of 'dominant' to subordinated
405 self or selves.²⁹ Such selves, other than I, would have direct experience of what for
406 me are my inferred bodily organs. I should stand to them in no adequate relation of
407 intercommunication. For though, truly enough, they might be said to affect me, for
408 example in my unlocalized fatigue, and though I might be said to affect them when
409 I took chloroform or strychnine, we should yet have no mutual awareness each of
410 the other's awareness of him.³⁰ It is this lack of complete intercourse which would
411 debar me from knowing the number or the exact nature of such subordinate selves.

412 With this parenthetical and speculative consideration of the obscure self-body
413 relation this rough outline study of the personalistic nature philosophy must end. To
414 sum up its main points: It has taken the term self at its introspective face value, yet
415 has distinguished three main groups or grades of non-human self: first, the intercom-
416 municative selves, represented by the higher vertebrates; second, a group even less
417 distinctly limited, of selves imperfectly and one-sidedly communicative; finally, the
418 group of selves which constitute the reality of inorganic nature, selves whom we
419 cannot disentangle from each other or delimit, selves with whom we are apparently
420 related but of whom we are not directly aware, with whom we have not intercourse.

421 IV

422 The final section of this paper attempts to state and to meet the most common of the
423 serious criticisms urged against personalistic cosmology. Purely emotional prejudices
424 must be disregarded since it is obviously futile to combat criticisms after the order
425 of

426 I do not like you, Dr. Fell;

427 The reason why I cannot tell.

428 Irrationality apart, people ordinarily ignore or discard personalism, as nature philos-
429 ophy, because they confuse it with what it is not. And of such misinterpretations
430 there are at least three:

²⁸ Cf. Pearson, *op. cit.*, chapter on "The Scientific Law."

²⁹ To avoid awkwardness of phraseology, I use the plural 'selves' in the remainder of this paragraph but without intending to decide dogmatically between the two hypotheses.

³⁰ The relation of this speculation to the various subliminal-self hypotheses must be passed over, since it would carry us too far afield.

- 431 1. First and foremost, personalism is confused with pre-scientific animism and
 432 our philosophers are consequently desperately eager not to ‘compromise them-
 433 selves’ with it. But the truth is that present-day personalism differs almost as
 434 much from the ancient fashion of personifying laurel trees and rivers as it differs
 435 from the modern realist’s apotheosis of mathematical and logical quantities. The
 436 modern personalist, as we have seen, turns his back on tree-selves and pebble-
 437 selves; emphasizes the differences between selves of different levels; and frankly
 438 disclaims the right to a definite conception of any selves with whom he has no
 439 communication.
- 440 2. More serious is the confusion of personalism with impersonal idealism or the
 441 identification of personalism with the solipsistic form of personalism. Such theo-
 442 ries reduce to mere series of ideas—whether or not referred to a self makes, at this
 443 point, little difference—solar universe after solar universe and geologic epoch
 444 after geologic epoch. Against this doctrine the instinctive repulsions of scient-
 445 ists and nature lovers are arrayed. And though this largely affective rejection of
 446 ideism and solipsistic nature philosophy cannot be accepted as a metaphysical
 447 refutation, though the achievements of Mach and Pearson and the other phenom-
 448 enalists constitute proof positive that scientific progress is compatible with the
 449 adoption of this view—none the less it must be admitted that this reduction of the
 450 nature world to the compass of a single mind, to the status of succeeding ideas
 451 is, to speak very temperately, a barren and repelling doctrine. And, whether true
 452 or false, attractive or repelling, the conception of the world of nature as a series
 453 of phenomena simply is not identical with personalism, the conception of nature
 454 as a society of concretely real persons. Personalism can not fairly be rejected for
 455 characters which it does not have.
- 456 3. More important than either of these misinterpretations is the confusion of person-
 457 alism with the conception of the universe as lawless. Personalism is condemned
 458 for its alleged break with the conception of natural law. To conceive the physical
 459 world as fundamentally made up of conscious beings, or selves, is held to menace
 460 the doctrine of uniformity, the assumption of predictability on which experi-
 461 mental science is based. The advance of science, it is pointed out, is bound up
 462 with the possibility of experiment; and experiment presupposes the recurrence of
 463 phenomena; and the recurrence of phenomena involves a uniform and necessary
 464 causal relation between them. Such a necessary uniformity, we are told, is what
 465 is meant by a law of nature; and scientific progress, it is justly held, has consisted
 466 and must consist in the establishment of laws of nature, verified hypotheses. The
 467 personalistic conception of nature, it is urged, substitutes for this conception of
 468 an orderly world of predictable phenomena, causally connected, what is virtually
 469 the picture of the nature-world as a mob, a crowd of irresponsible, capricious,
 470 lawless conscious beings.

471 The personalist meets this formidable arraignment by protesting that it is founded
 472 on an inadequate view of personalism, and on a misconception of scientific law. To
 473 start from the first of these positions: it is of capital importance to point out that
 474 personalism is not of necessity an indeterministic doctrine. It has been so described

475 largely because it has been confused with entelechistic vitalism which conceives the
 476 soul as possessed of genuine initiative. But the self, notwithstanding the characters
 477 which it shares with the soul, differs from the soul both in origin and in nature.
 478 Thus the soul is inferred as explanation of biological phenomena, whereas the self is
 479 directly experienced. And the inferred soul, or entelechy, is conceived as “suspending
 480 physical reactions now in one direction and now in another,” whereas the activity
 481 attributed to self is a species of consciousness, a feeling of activity. Such a feeling
 482 of power or activity is not always a consciousness of capacity for choice—it may
 483 consist, for example, in the mere expansive feeling of spontaneity, untrammelledness.
 484 And even when it does take the form of feeling of power, such a feeling may perfectly
 485 well be illusory. In other words, the active self may be a really determined self for
 486 all its feeling of power. It is true that most of our modern pluralistic personalisms—
 487 Bergson’s, for example,—are indeterministic, but this is not because a self is of
 488 necessity an undetermined being. Leibniz’s essentially deterministic personalism is
 489 a standing refutation of the uncritical identification of pluralistic personalism with
 490 indeterminism. And absolutist personalism offers what is perhaps the only a priori
 491 confirmation of determinism.

492 Even more important to the present purpose than the truth that not all personalism
 493 is deterministic is the consideration that personalism even of the indeterministic type
 494 does not stand irreconcilably opposed to the conception of scientific law. Scientific
 495 law is of course to be taken not in the old, traditional and mythical sense of an
 496 inexorable sort of external force, an inexplicable coercing power, but in its truly
 497 and admittedly scientific sense, as formulation of the results of “humanity’s process
 498 of making a survey of the universe “—formulations which, as Jennings points out,
 499 reduce to predictions such as these: “When you have such and such experiences
 500 you will have such and such other experiences.”³¹ In a word, a scientific law is an
 501 experienced, generalized, justifiably predicted uniformity of experience. Now this
 502 conception (obviously stateable, and in fact most often stated, in personal terms)
 503 clashes with indeterministic personalism only when the uniformity is regarded as
 504 absolute, when the predicted recurrence is conceived as apodictically certain. But the
 505 temperate, experimental scientist makes no such claim. He simply postulates absolute
 506 uniformity for the purposes of experiment and description. When the union of NaCl
 507 and H₂SO₄ fails to give hydrochloric acid and sodium sulphate the experimenter
 508 does not, to be sure, view this as a proof of indeterminism but rather as indication
 509 that his salt or his sulphuric acid or both are impure. But this practical postulate of
 510 complete uniformity is far from constituting an assertion of axiomatically absolute
 511 nature uniformities, of necessary predictions. Here the clear thinker, scientist or
 512 metaphysician, must take his stand with Hume. Scientific laws are generalizations
 513 from experience: in the nature of the case, finite experience cannot be universal.
 514 No human being has ever seen or can ever see every particle of matter; attraction
 515 inversely as the square root of the distance is not the only conceivable relation between
 516 particles; even the law of gravitation is therefore a generalization from the widest

³¹ “Doctrines Held as Vitalism,” *The American Naturalist*, 1913, XLVII, pp. 392–393.

517 observation, not an intuitive and axiomatic certainty, still less an inexorable compeller
518 of the motion of particles.

519 But when once this is admitted, as it is indeed admitted by most scientists, all
520 incompatibility vanishes between experimental science with its postulate of unifor-
521 mity and even indeterministic personal cosmology. For the nature world as the inde-
522 terministic personalist conceives it is no anarchic universe in which one event is as
523 likely to occur as another, in which prediction is futile. Rather, the world of the inde-
524 terministic personalist is itself a world of laws; but these are statistical laws, laws of
525 average behavior, uniformities of the conduct not of individuals but of classes. From
526 their wide observation of the ages at which men die, the insurance companies—in
527 spite of the great diversities of physical constitution—make up their tables of vital
528 statistics, predictions of the dates of death of their clientele. From their incompar-
529 ably wider acquaintance with particles, utterly simple beings, physicists formulate
530 the law of gravitation—still a statistical law, but an indefinitely greater, indeed a
531 practically complete approximation toward an absolute uniformity. To quote from
532 James Ward’s illustration of the same point: Supposing that industrial statisticians
533 “instead of trade returns from a score or two of countries had returns from one or
534 two thousand, the inhabitants being increased a myriad fold, and being also severally
535 vastly more the creatures of habit than men now are, we can imagine such statistics
536 would approximate still more closely to those of the physicist. The physicist, like
537 the statist,” Ward insists, “is always dealing with aggregates, but unlike the statist he
538 finds the constituent individuals to be beyond his ken. The statist is aware that indi-
539 vidual variations underlie his aggregates but they do not interest him: the physicist is
540 ignorant of those underlying his and assumes that they do not exist.”³² Thus, for the
541 indeterminist, in Royce’s phrase, the statistical not the mechanical (in the sense of the
542 inevitable or absolute) is the canonical form of scientific law.³³ But this conception
543 of the nature-law as statement of average behavior, especially when applied as in
544 physical science to the behavior of relatively static individuals, amply justifies the
545 experimentalist in his scientific postulate of complete uniformity.

546 A final criticism must be met. Granting all that has been said—granting that
547 personalism is unjustly identified with pre-animism, with phenomenalism and with
548 the doctrine of the lawless universe, it remains to the end, the critic insists, a concep-
549 tion totally unfitted to interpret the detailed results of scientific observation and
550 experiment. The personalist, it is with some show of reason alleged, is shut up to the
551 unfruitful statement: “there exist non-human selves”, but has no clue to the number or
552 the limit of them; and knows far too little about their nature to translate into personal
553 terms facts of chemical combination, for example, of radioactivity, or of electrical
554 insulation.

555 The personalist, in the face of this objection will admit, in the first place, that nature
556 philosophy, is a more speculative doctrine than social philosophy, and, in the second
557 place, that the physical world has often to be described in terms not of selves, but of

³² *The Realm of Ends*, Lecture III., pp. 65–66.

³³ “The Mechanical, the Historical and the Statistical,” *Science*, N. S., XXXIX, 1914, pp. 551 ff., *passim*.

558 spaces and motions and weight, not to name colors and sounds.³⁴ To take random
 559 examples: the description of Arcturus as shining like two hundred suns, of the sun as
 560 containing sodium, iron and copper in the form of gleaming vapors—these scientific
 561 descriptions certainly are not and cannot be in terms of the sun’s or of Arcturus’s
 562 conscious experience. The personalist, to be sure, will supplement this admission by
 563 pointing out that these descriptions of Arcturus’s brilliancy and of the sun’s gases are
 564 descriptions of the world as it appears, or as it might appear, to observing scientists.
 565 In other words: even when or if we find it impossible to describe physical phenomena
 566 in an adequately personalistic fashion, that is, in terms of individual conscious beings
 567 each with its own unique experiencing and initiative, we are yet driven to describe
 568 these phenomena in terms of the shared experiencing of conscious, observing selves.
 569 To use Fite’s phrase in our own setting: when we are no longer able to know things
 570 as they feel, we none the less know them as they look—to us human selves.³⁵

571 The personalist, however, is not content to stop here. He finds in scientific accounts
 572 of the physical world, not merely recorded observations, refined and multiplied by
 573 modern technique, of things as they look to people, and not merely laws stateable in
 574 terms of the uniform and predicted sequences of experience, direct or inferred. He
 575 finds also an irrepressible tendency to talk about corpuscles, atoms, ions as possessed
 576 of an individuality, a unique being, and, in particular, an activity and initiative of
 577 their own. “The atom,” for example, is said to start with a certain “amount of kinetic
 578 energy”³⁶; radium is said to “emit energy”; bodies are held to “exert force”; “lines of
 579 force” are supposed to “repel each other.”³⁷ These conceptions, the personalist boldly
 580 asserts, are of value, have a meaning, only as bodies and substances, thus dynamically
 581 conceived, and are virtually, though vaguely, regarded as active, initiating selves.

582 Confirmation of this conclusion is derived from the statements of scientists and
 583 methodologists of science. Ostwald, for example, bids us study our own “voluntary
 584 activity” (*Willensbetätigung*) in order to “gain an idea of the content of the concept
 585 of energy;”³⁸ Montague observes that “potential energy is ... perceivable internally
 586 or by participation in it through ... the muscular sense”³⁹; and W. F. Cooley says:
 587 “The fact seems to be that for most investigators, as well as for men in general,
 588 the straining of which we are conscious in our own organisms when in action is
 589 accounted sufficient ground for the posit of an active something within us ... which
 590 is transferred to similar situations external to us and used as the natural cue for
 591 their interpretation ... That factor we call force, energy, power, at times will. It is,
 592 evidently, an object of immediate experience.”⁴⁰ It will be remembered that this is
 593 Pearson’s contention. And, phenomenalist that he is, he would banish from science

³⁴ All manufactured things, clothes and houses, and automobiles have to be described in these terms.

³⁵ Warner Fite: “The Human Soul and the Scientific Prepossession,” *Atlantic Monthly*, December, 1918, Vol. XXII, p. 778.

³⁶ J. J. Thomson, *Electricity and Matter*, 1907, pp. 156 f.

³⁷ *Ibid.*, pp. 7 ff. Cf. W. F. Cooley, *The Principles of Science*, p. 129².

³⁸ *Vorlesungen über Naturphilosophie*, pp. 153 ff.

³⁹ *Essays in Honor of William James*, p. 123.

⁴⁰ Cooley, op. cit., pp. 110–111.

594 the conception of force excepting in the sense of “conceptual measure of motion,”
 595 precisely because he believes that force, in any other sense, “is the will of the old
 596 spiritualist separated from consciousness.”⁴¹ But Pearson and Mach avail no more
 597 than Berkeley to hold down the scientist to the purely phenomenalistic categories.

598 Even the supposedly static characters of physical things are conceived in terms
 599 which, to say the least, are as truly personal as impersonal. Thus inertia (“the one sole
 600 unalterable property of matter”)⁴² is either defined in terms of passivity or inaction,
 601 as the property in virtue of which “matter cannot of itself change its own state,”⁴³
 602 or it is conceived as “resistance to any change of state.” But passivity is a basal
 603 character of the perceiving self, and resistance is, once more, a form of activity. In a
 604 word, the physicist when he talks in explanatory and not in descriptive terms, really
 605 personifies his units. For change and persistence, passivity and activity would be
 606 meaningless terms if they did not suggest to each of us his own self-identity and
 607 growth, his receptivity and self-initiative. I am not arguing, of course, that these
 608 conceptual entities of the scientists, the atoms and ions and electrons which they
 609 infer to account for observed phenomena, are really existing selves. I am claiming
 610 only that they are beings constructed after the analogy of selves—constructs which
 611 are meaningless unless conceived in personal terms. And if this is true, if at the very
 612 core of speculative science lies the concept of the conscious self, then assuredly
 613 personalism is no negligible factor of a genuine nature-philosophy.

614 In conclusion, therefore, I venture to appeal, in behalf of personalistic cosmology,
 615 for the respectful and detailed consideration which it has seldom received. Two
 616 tendencies of modern science, as this paper tries to show, seem to favor such an
 617 upgrowth of personalistic doctrine. The first of these is the prevalence, suggested
 618 in the pages immediately preceding, of dynamic theories in physics. The second is
 619 the rising opposition, evident in all the papers of this year’s discussion,⁴⁴ to vitalism
 620 in the biologist’s sense of the term. Biological vitalism, as mere emphasis on the
 621 categories of order and fitness, has been rejected on the ground that the biologist
 622 has no monopoly on these categories. Biological vitalism, as a capriciously indeter-
 623 ministic entelechy doctrine, has been condemned as a baseless hypothesis. But the
 624 elimination of biological vitalism opens the way, as the first division of this paper
 625 seeks to show, to psychological vitalism or personalism. I look hopefully, therefore,
 626 for a recognition of the claims of personalism as soon as scientists and metaphysi-
 627 cians can be persuaded that it involves neither animism, phenomenalism nor crass
 628 indeterminism.

41 *The Grammar of Science*, second edition, pp. 305, 119.

42 R. K. Duncan: *The New Knowledge*, p. 179, quoted by Cooley, op. cit., p. 87.

43 Ganot, transl. E. Atkinson, *Physics*, 13th ed., p. 10.

44 Cf. this REVIEW, November, 1918, *passim*.