Charles S. Peirce

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2. Evolutionary Love

Peirce once remarked that in philosophy one must have a thorough-going evolutionism or none at all (6.14). In our day perhaps it would seem very odd for a thoroughgoing evolutionist to have reservations about Darwin's theory of natural selection. And yet Peirce had them. He was never very enthusiastic about the *Origin of Species* and to appreciate his own "thoroughgoing" evolutionism we must try to understand why. Peirce's reluctance to endorse Darwin wholeheartedly might simply have been due to the theory's novelty and lack of sufficient confirmation. No doubt, this is part of the reason, but it certainly is not the whole.

In reading what Peirce has to say about Darwinism we note that one thing stands out: Peirce was abashed that the new theory should receive such widespread, enthusiastic, and comparatively uncritical acceptance among scientists and philosophers. It was not that Peirce did not recognize in Darwin's work a truly great and significant scientific advance. He did and said so in many places. He could not understand, nor approve, the sweeping generalizations in fields as far removed from biology as political economy, ethics, and religion which followed almost immediately Darwin's book (published late in the year 1859). No sober mind, guided in its speculations by sound logic, could honestly and in good conscience indulge in such irresponsible declarations. Even from a purely scientific viewpoint, Darwin's work was not beyond criticism. Peirce was genuinely disturbed at these developments.

On the other hand, there were reactions, equally violent, in the opposite direction, which must have equally disturbed Peirce. There were philosophers and religious leaders who vigorously condemned Darwin's hypothesis on various *a priori* grounds. But evolution was not a new idea with Darwin. Why, then, did his account of it make such a sensation? Why was it that men could hardly discuss it dispassionately?1

1 Lamarck's theory was formulated between the years 1801 and 1809.
To understand Peirce's position, it will be helpful to keep in mind the distinction between evolution as a scientific hypothesis aimed at explaining the development of organic species and evolution as a philosophical hypothesis aimed at explaining the entire cosmos. Though Peirce was primarily interested in the latter, he always modeled it on the former. He realized that philosophical adaptation of scientific theories is always a risky business and so he insisted that it be based upon a sound and sane logic which would enable one to judge accurately exactly what science had established (and to what degree of probability) and what it had not. Only sound logical method enables one to see clearly where science ends and philosophical speculation begins, and so to avoid confusing the claims of each. The mistake of philosophers and scientists who thought that science confirms necessitarianism is of this kind—faulty analysis of the logical weight of the evidence. Peirce's reservations about Darwinism are both scientific and philosophical.

Why, then, was Darwin's theory so enthusiastically received by most of the scientific world even though it was far from being proved?

Darwin himself in the *Origin of Species* accepted the inheritance of acquired characteristics as playing a role in evolution. It was only after Weismann's work that Lamarck's principle was seriously challenged and controversy split the biologist's camp. Furthermore, evolutionism had always been a part of western thought since the Ionians. Anaximander, Empedocles and Anaxagoras proposed versions of natural selection and the survival of the fittest on observational and philosophic grounds. The Stoics advocated a theory of "logoi spermatikoi" for philosophical reasons. St. Augustine adapted the Stoic cosmology for theological reasons. His followers throughout the Middle Ages saw no conflict between "rationes seminales" and the Christian doctrine of creation. Indeed Augustine's theological reason for proposing a version of that Stoic doctrine was to reconcile certain passages in Scripture concerning creation (cf. *De Gen. ad litt.* 6, 5, 8; *De Trinit.* 3, 8, 13). It was the influence of Aristotle which inclined most medieval thinkers to hold to fixity of species, and so to interpret creation in that light. It might be that the opposition to Darwinism among nineteenth century philosophers was due to the influence of *a prioristic* dogmatism prevalent in many German Schools, and the reaction among religious leaders was due to a loss of contact with a part of the Christian tradition and to fundamentalism. On the other hand, the over-enthusiastic reception of Darwinism might be due to smouldering rebellion against both *a prioristic* metaphysics and fundamentalist religion which needed only the slightest fanning from science to burst into new flames.
Peirce finds the answer in the intellectual climate of the scientific world at the time, dominated as it was by mechanical philosophy and the "statistical method." Addressing himself to this very question, Peirce briefly surveyed the state of science from 1846 to 1859. He called this period the most productive period of equal length in the entire history of science (6.297). The big breakthrough came with the realization that chance begets order. According to Peirce it was put into its clearest light in 1847 by Quetelet’s paper on the application of probability theory to moral and political sciences. In the same year, Herapath, an English chemist, outlined kinetic theory and Helmholtz formulated the conservation of energy principle. In 1850 Clausius and Rankine, independently, worked out the mechanical theory of heat. Buckle’s *History of Civilization* (1857) met with great success because he had made use of Quetelet’s suggestion. In the very summer preceding Darwin’s publication of the *Origin of Species* Maxwell read the most important paper to date on the dynamical theory of gases before the British Association. Peirce observes:

> The consequence was that the idea that fortuitous events may result in a physical law, and further that this is the way in which those laws which appear to conflict with the principle of the conservation of energy are to be explained, had taken a strong hold upon the minds of all those who were abreast of the leaders of thought. (6.297)

It was inevitable that Darwin’s work should be welcomed by minds thinking along these lines. The *Origin of Species* was simply the application of the same principle to another “nonconservative” action, organic development. They looked on Darwinism as another confirmation of mechanical philosophy, a very special and a most welcome one, since it applied to life and growth, the two phenomena which fitted in least well with their philosophical view of the world. In other words, Peirce maintains that philosophical prejudice more than the intrinsic scientific worth (great though that was) of Darwin’s theory insured its warm and uncritical acceptance by a large part of the scientific community.

Nor was mechanism the only intellectual prejudice of the nineteenth century which provided a favorable environment in which Dar-
winism could rapidly take root in popular as well as in scientific thought. The dominant ethical theory of the day was utilitarianism. The strong family resemblance is unmistakable. The greatest good for the greatest number was merely the ethical counterpart of the survival of the fittest.

All this time, utilitarianism—that improved substitute for the Gospel—was in its fullest feather; and was a natural ally of an individualistic theory. Dean Mansell’s injudicious advocacy had led to mutiny among the bondsmen of Sir William Hamilton, and the nominalism of Mill had profited accordingly; and although the real science that Darwin was leading men to was sure some day to give a death blow to the sham-science of Mill, yet there were several elements of the Darwinian theory which were sure to charm the followers of Mill. (6.297)

Add to the various interpretations of utilitarian ethics, the economic theory and policy which dominated the nineteenth century, laissez-faire, and the picture is complete. All the sciences, physical and social, were using probability theory. Darwinism fitted right in.

Peirce’s explanation of why the Origin of Species was an immediate success in certain quarters also tells us why he was opposed to it as a philosophical account of the development of the universe. He had both theoretical and practical reasons against it. For him, Darwinism generalized into a philosophical thesis was nothing more than another form of mechanism and so labored under all the same theoretical difficulties which beset mechanical philosophy in general. Besides, if it is only a faulty logical analysis of chance (viz. merely ignorance of the causes at work) which led some philosophers to conclude that reduction of nonconservative physical forces to probability curves finally vindicated absolute determinism, it is the very same error to think that Darwinism added any force to that position. Statistical analysis as applied in kinetic theory or in natural selection, when properly analyzed, does not support philosophical mechanism. As we have seen, Peirce contends that just the opposite is the case. These scientific theories have a place in our understanding of the world, but they are not in themselves answers to philosophical questions about the nature of the cosmos. They may serve as data for
philosophical speculation but that speculation is only as good as its
logic. It is simply a mistake, a very naive one at that, to appeal to a
scientific theory as the justification of a philosophical theory designed
to explain the scientific one. Mechanical philosophy is designed to
explain scientific laws and laws of nature. No scientific theory will
or can justify that doctrine. Peirce's theory of tychism is a philosop­
ical theory designed to explain scientific laws and laws of nature.
The laws of nature cannot establish that theory.²

It must be thoroughly understood that Peirce is not criticizing
the use of probabilities in scientific method. On the contrary, he ad­
vocates it wholeheartedly. Peirce is not saying that kinetic theory is
a poor physical theory, nor even that Darwinism is scientifically un­
acceptable. The point he is making has to do with philosophical inter­
pretations given those theories and the implications they are supposed
to support.

The practical motive for Peirce's opposition to a generalized
Darwinism is that it encourages a basically unsound and immoral
social order. The nineteenth century, according to Peirce, was the
"Economical Century" in which political economy had been reduced
to "a philosophy of greed" (6.290). Of course Peirce did not think
for a minute that this was a legitimate conclusion of political econ­
omy, any more than he thought necessitarianism was a legitimate

² Cf. R. Wells, "The True Nature of Peirce's Evolutionism," Studies,
Moore and Robin, pp. 304-322. Wells is very hard on Peirce. Peirce's whole
undertaking, he feels, is so misguided that it cannot be repaired, only re­
placed. The basic reason is that the scientific ideal of testability is incompati­
ble with the metaphysical ideal of all-comprehensiveness (p. 305). Any
attempt to write them into a "scientific metaphysics" is doomed from the
start. All that Peirce achieves in metaphysics, it seems, is to make some analy­
tical statements which are true but irrelevant (p. 322). We disagree with this
position, but, of course, we cannot enter into details here. We think, perhaps,
there is some misunderstanding as to what Peirce means by "scientific
metaphysics." It does not mean substituting scientific hypotheses for philo­
sophical ones. Indeed, according to us, Peirce condemns "Social Darwinists"
for doing just that. It seems to us to be a different thing to use scientific
theories as models or guides for specifically philosophical explanations. To
distinguish natural science from metaphysics is not necessarily to "drive
them apart"; it may be that one distinguishes in order to unite. This, of
course, makes no sense if one is already committed to the proposition that
natural science is the only source of knowledge about the world.
conclusion of physics. The injustice and exploitation which the greed philosophy not only condoned but raised to the rank of virtue could not, in Peirce's view, produce anything but the direst consequences.

Soon a flash and quick peal will shake economists quite out of their complacency, too late. The twentieth century, in its latter half, shall surely see the deluge-tempest burst upon the social order—to clear upon a world as deep in ruin as that greed-philosophy has long plunged it into guilt. (6.292)

The only inaccuracy about this apocalyptic prediction is that the deluge twice engulfed the world in the first half of the twentieth century. And it is not over yet by any means. By raising Darwin's limited scientific hypothesis to the status of a philosophical and moral dogma, Peirce saw aid and comfort going to mankind's mortal enemy. According to the crudest version of the pragmatic maxim, this sort of philosophy meant disaster and it could not be accepted as true without absolutely compelling evidence. Peirce did not think, however, nor did he mean to imply, that Darwin's researches were motivated particularly by any political or ethical considerations, least of all by any conscious desire to further greed-philosophy. The only point is that as a matter of fact it played right into the hands of those who did desire to justify such a philosophy (6.297).

3 "The Origin of Species . . . merely extends politico-economical views of progress to the entire realm of animal and vegetable life. The vast majority of our contemporary naturalists hold the opinion that the true cause of those exquisite and marvelous adaptations of nature . . . is that creatures are so crowded together that those of them that happen to have the slightest advantage force those less pushing into situations unfavorable to multiplication or even kill them before they reach the age of reproduction. Among animals, the mere mechanical individualism is vastly reinforced as a power making for good by the animal's ruthless greed. As Darwin puts it on his title-page, it is the struggle for existence; and he should have added for his motto: Every individual for himself, and the Devil take the hindmost!" (6.293). In an unpublished fragment Peirce speculates whether Darwin was influenced by Malthus and political economy. This fragment also contains a summary of his evolutionary theory. (Peirce Papers, #954)

4 Karl Pearson in Grammar of Science, Chap. I, argued that in accordance with Darwinian theory the *summum bonum* is social happiness, and social stability. Peirce argues that this does not follow from Darwinism.
There is no need to enter into details concerning Peirce’s reservation about Darwinism as a strictly scientific hypothesis designed to explain the origin and development of organic species. At the time, the hypothesis was simply not sufficiently confirmed to warrant making it the sole factor in evolution. Peirce remarks that it had not been proved by the evidence as Darwin first presented it and that more than twenty years after the publication of the *Origin of Species* a sober mind must judge the case even less likely of ever being established (6.297). Peirce thought, however, that Darwin showed beyond serious doubt that natural selection played some role in the process but just how great was not yet clear. When we remember that Lamarckism was still biologically respectable, Peirce’s doubts about Darwinism are not hard to understand. Indeed, further developments in genetics have shown Peirce’s logic to be correct in that Darwinism has had to be revised. This scientific prudence and sobriety was merely an application of “humble fallibilism”: do not be “cocksure” of anything in science (cf. 1.366 n. 1).

Peirce’s own theory of evolution was philosophical, designed to account for the origin and development of the cosmos. He meant to model his philosophical theory on the best scientific information and theories available. There were three main theories of the evolution of organic species current in his day: Darwinism, Lamarckism, and cataclysmal evolution (1.104; 6.14-17).

First, the theory of Darwin, according to which the entire interval from Moner to Man has been traversed by successive purely fortuitous and insensible variations *in reproduction*. The changes on the whole follow a determinate course simply because a certain amount of change in certain directions destroys the species altogether, as the final result

Rather if natural selection is generalized into a philosophical thesis man’s *sumnum bonum* can only be the continuance of the stock regardless of the happiness of individual men. The individual is of no account except insofar as he can reproduce. And since there is no happiness except that of individuals, Darwinism has nothing to do with happiness at all (8.133–136). The only thing that motivates scientific inquiry is desire to know the truth. Furthermore, Peirce does not think that there is the slightest reason to believe that man’s highest good consists in procreating, and consequently it is just absurd to extend Darwinism into ethics.
of successive weakenings of its reproductive power. Second, the theory of Lamarck, according to which the whole interval has been traversed by a succession of very minute changes. But these have not taken place in reproduction, which has absolutely nothing to do with the business, except to keep the average individual's plastic by their youth. The changes have not been fortuitous but wholly the result of strivings of the individuals. Third, the theory of cataclysmal evolution, according to which the changes have not been small and have not been fortuitous; but they have taken place chiefly in reproduction. According to this view, sudden changes of the environment have taken place from time to time. These changes have put certain organs at a disadvantage, and there has been an effort to use them in new ways. Such organs are particularly apt to sport in reproduction and to change in the way which adapts them better to their recent mode of exercise. (1.104)

Peirce is convinced, despite Weismann's attack on Lamarck, that most probably all three modes of evolution have acted to produce species, and further, he thinks it probable that the third mode has been most efficient (1.105).5

The controversy concerning the inheritance of acquired characteristics went on until much after Peirce's death. With the great strides made in genetics the importance of the controversy gradually subsided because most biologists considered the question misplaced. Gene mutation was the real mechanism at work in the transformation of species. Peirce's instinct, then, seems to have been correct, namely, that there is much more to organic evolution than Darwin's hypothesis provided. Furthermore, since Peirce's philosophical evolutionism meant to account for all sorts of development—of ideas, of mind, of institutions, of history—there was no reason why he should restrict his speculation to one scientific model even if only one model should turn out to be correct for biological development. He was interested in the biological theories for their structures, that is, insofar as they were suggestive of how things might have developed. He then considered various phenomena to see which mechanism was more likely to be the sort of thing needed. Thus he tried a Darwinian and a Lamarckian model to explain the historical development of weights and measures (1.106). He did the same with regard to the development of our opinions and beliefs (1.107). He thought that the cataclysmal model was more appropriate for an understanding of the development of science
On Peirce's view these theories of evolution are complementary. Lamarckian theory only explains the developments of characters for which individuals strive, while the Darwinian theory only explains the production of characters really beneficial to the race, though these may be fatal to the individuals (6.16). Geological and paleontological evidence seems to require cataclysmal evolution. The data seems to indicate that species are not very greatly modified under normal circumstances, but are rapidly altered after cataclysms or rapid geological changes (6.17). On this assumption, then, Darwin and Lamarck would account for the insensible variation of species during the millenia between the geological ages when some drastic alteration of environment broke up established patterns of life abruptly, thereby bringing about drastic and rapid adaptive changes in the species which survived (6.17). Considered more philosophically, these sorts of evolution may be interpreted respectively as evolution by chance, evolution by habit and effort, and evolution by breaking up of habits and formation of new ones. And with this foreshadowing of Peirce's own developed philosophical position, let us turn to consider his analysis of various philosophical theories of evolution and their interrelations.

Peirce's classification of philosophical evolutionism is rather complex, and, as is his wont, he has devised a very unusual vocabulary to designate the divisions. The main divisions of Peirce's classifications are (1) elements of evolution, (2) modes of evolution, (3) doctrines of evolution. Each of these divisions is subdivided into three parts.

His own general theory of evolution, however, must also explain these various mechanisms themselves—how they developed and how the laws which govern them came about. Cf. T. A. Goudge, "Peirce's Evolutionism—After Half a Century," Studies, Moore and Robin, pp. 323–341.

6 Peirce coined unusual technical terms deliberately in accordance with the principles of his "Ethics of Terminology." New ideas should have new words to express them. If old words are made do, he thought, only confusion results. Since the old, familiar words retain some of their old meaning, a person seeing them quickly assumes that he knows how they are being used in the new context. Hence he runs the risk of missing the new meaning. Peirce would prefer to use obscure and unfamiliar words in such a case than familiar but ambiguous ones. It forces the reader's attention on the novelty of the idea expressed and makes him work to grasp it.
The terms for these subdivisions are ingeniously contrived out of the stems of three Greek words with appropriate suffixes indicating the main division in question. The Greek words are *tyché* (chance), *anangké* (necessity), and *agapé* (love of friendship). The classification is as follows (6.302):

1. **PROPOSITIONS ABOUT THE MODES:**
   a) *tychism* affirms that as a matter of fact chance plays a role;
   b) *anancism* affirms that as a matter of fact necessity plays a role;
   c) *agapism* affirms that as a matter of fact creative love plays a role.

2. **MODES OF EVOLUTION:**
   a) *tychastic* evolution (tychasm) designates any evolutionary process which involves the action of fortuitous variation;
   b) *anancastic* evolution (anancasm) designates any evolutionary process which takes place by mechanical necessity;
   c) *agapastic* evolution (agapasm) designates any evolutionary process which takes place by creative love.

3. **DOCTRINES OF EVOLUTION:**
   a) *tychasticism*, according to which fortuitous variation plays the principal if not the only role in evolution;
   b) *anancasticism*, according to which mechanical necessity plays the principal if not the only role in evolution;
   c) *agapasticism*, according to which creative love plays the principal if not the only role in evolution.

The point of this rather elaborate scheme is to help the reader understand the dialectical synthesis Peirce sketches. As one might suspect there is a connection between Peirce's evolutionary scheme and his categorial scheme. The structure of both analyses is too strikingly similar to be merely coincidental. Certainly it is not when we recall that he explicitly applied the "triad" to Darwinian evolution in his paper "A Guess at the Riddle" (1.395). The first division cited above corresponds to a phenomenological affirmation. At this point the only claim made is that these elements are to be accounted for in any scheme. The second division, on the other hand, introduces
the notion of discrimination and ordering. Modes look to the inter­
relation of the elements at work in evolution. One could not hold
just one mode of evolution to the exclusion of the others, just as one
could not hold one category only. Furthermore, the interdependence
of the modes of evolution follows a definite order which cannot be
altered, just as the interrelation of the categories does. Finally, the
third division introduces the synthetic doctrines resulting from the
ordering of the modes. One could not consistently be a tychasticist,
an anancasticist, and an agapasticist.

It is clear that Peirce has Darwinism in mind as an example of
tyhastic evolution (6.298; 6.304). Evidently, the Darwinism to which
Peirce is willing to give a place in the development of the universe
is not that of the mechanists who tried to make it shore up a collapsing
a priori principle.\(^7\) Authentic Darwinism accounts for evolution in
terms of two factors: heredity and natural selection. These factors
are capable of great generalization (6.15).

Wherever there are large numbers of objects having a
tendency to retain certain characters unaltered, this
tendency, however, not being absolute but giving room for
chance variations [thus a mechanistic interpretation is not
legitimate], then, if the amount of variation is absolutely
limited in certain directions by the destruction of everything
which reaches those limits, there will be a gradual tendency
to change in directions of departure from them. (6.15)

The clearest illustration of this sort of evolution is that of gamblers
betting at an even game. As one after the other is ruined, the average
wealth of those left in the game continually increases (6.15; 1.396 ff.).

Here is indubitably a genuine formula of possible evolution,
whether its operation accounts for much or little in the
development of animal and vegetable species. (6.15)

Diametrically opposed to tychastic evolution is anancastic. Peirce
has in mind such men as Hegel, Spencer, and others (6.298, 6.14,
6.305). Evolution by mechanical necessity, whether that necessity is
external or internal, is plainly absurd on Peirce’s view for reasons

\(^7\) Peirce has in mind among others Chauncey Wright and Herbert
Spencer. Cf. 6.14 and E. H. Madden, *op. cit.*, Ch. 1 and Ch. 4 *passim.*
already sufficiently considered. Absolute mechanical necessity would be the death of evolution. It would be hell freezing over. There simply is no reign of absolute and exact law in the universe. Such a frozen state of things might be posited as a theoretical limit toward which the growth of law and order tends, just as absolute chaos might be posited as the opposite limit. But neither limit is ever reached. Speculation approaches them only asymptotically. The kernel of truth in back of mechanism is simply the presence of law in the cosmos, but mechanism itself is an exaggeration. The kernel of truth present in tychastic evolution is that chance is really ingredient in things, but a denial of law amid the chance is equally an exaggeration.

Tychasm and anancasm, therefore, are conceptions at odds with one another. They are at opposite poles, as it were, and the only hope of reconciliation is through a third party, a mediator. If the kernels of truth in them both are to be preserved, a synthetic view must be taken. Obviously Peirce is using the same strategy he did in the analysis of the categories: Firstness and Secondness can be reconciled only through Thirdness. Agapasm, of course, fills the bill.

Among the scientific theories, Lamarckism most closely resembles agapasm. Peirce believed that enwrapped in Lamarck's theory was a third position which supersedes the strife between the other two (6.299). What attracted him to a theory of development through effort and striving was its likeness to habit-taking, the great law of mind.

Such a transmission of acquired characters is of the general nature of habit-taking, and this is the representative and derivative within the physiological domain of the law of mind. (6.299)

Furthermore the very notion of striving and endeavor means end-directed activity and consequently is essentially psychical, even though not necessarily conscious. New forms are created by spontaneity ("energetic projaculation") and habit forces them to take practical shapes compatible with the structures which the new forms affect; further, habit gradually replaces the spontaneous energy which sustains those forms.

Thus, habit plays a double part; it serves to establish the new features, and also to bring them into harmony with the
general morphology and function of the animals and plants to which they belong. (6.300)

Peirce sees in this account of evolution what he calls the "action of love."

The movement of love is circular, at one and the same impulse projecting creations into independency and drawing them into harmony. This seems complicated when stated so; but it is fully summed up in the simple formula we call the Golden Rule. (6.288)

And he attributes these views to St. John, "the ontological gospeller," who made "the One Supreme Being, by whom all things have been made out of nothing, to be cherishing-love" (6.287). Be it understood, however, that for all the religious overtones in this conception, Peirce looked upon it as strictly philosophical.

The philosophy we draw from John's gospel is that this is the way [i.e. by creative love] mind develops; and as for the cosmos, only so far as it yet is mind, and so has life, is it capable of further evolution. Love, recognizing germs of loveliness in the hateful, gradually warms it into life, and makes it lovely. That is the sort of evolution which every careful student of my essay "The Law of Mind" must see that synechism calls for. (6.289)

So far Peirce has said very little about the place of cataclysmal evolution, the third scientific hypothesis, as a model for his philosophical interpretation. Where would it fit in the tripartite division: tychasm, anancasm, and agapasm? In one place he groups the defenders of cataclysmal evolution with those who make mechanical necessity the chief factor in the process (6.298). But he seems to think that this is merely an erroneous interpretation of scientific data in the same way that a necessitarian interpretation of Darwinism is a mistake.

8 Peirce seems to have been very much impressed with the doctrines of Swedenborg just becoming widely known in his day. Henry James, Sr. did much to make them known in this country through his book Substance and Shadow. For the influence of Swedenborg and James on Peirce see M. G. Murphey, op. cit., pp. 350–352, and W. P. Krolikowski, "The Peircean Vir," Studies, Moore and Robin, pp. 257–270.
Thus, naming Nägeli, Kölliker, and Weismann as mechanists, he remarks:

It is very noticeable that all these different sectaries seek to import into their science a mechanical necessity to which the facts that come under their observation do not point. (6.298)

He adds in the very next sentence:

Those geologists who think that the variation of species is due to cataclysmic alterations of climate or of the chemical constitution of the air and water are also making mechanical necessity chief factor of evolution.

The mistakes are always the same: (1) cocksureness which closes the mind to other possibilities and other facets of the evidence, resulting in sweeping generalization and exclusivity; (2) failure to realize that the mechanism (efficient cause) proposed as the “explanation” of evolution is efficient only because its force is under the guidance and control of law (final cause), and that it is precisely law which needs an explanation.

We suggest that the counterpart to cataclysmic evolution in Peirce’s theory is the sometimes violent breakup of habits. Strictly speaking Lamarckian theory only accounts for the acquisition of habits through effort. It does not account for change of habit. Surprise and shock bring about the destruction of certain habits of thought in a manner very much like the sudden changes in environment which produced, according to some scientists, the rapid adaptation of species, say at the beginning of the glacial period. Something brute takes place which upsets established patterns. Either those patterns are given up or extinction ensues. Only those things develop which remain plastic enough in their habits to change them in the face of experience. In the development of science, for instance, it is true that it advances through cooperation and common effort of a community of inquirers (e.g. 2.157), and that there is continuity in scientific results even when those results come out of a theory later found deficient (2.150). But that does not necessarily deny that science makes its great strides forward by leaps (1.109). Today we would say that scientific advances depend upon the ability of men to look at the data afresh and so conceive a whole new framework
in which to theorize. Once the new framework is established scientists cooperate in working out its implications and in testing its results. Furthermore, what has been verified in the whole framework is not abandoned. It remains a true acquisition within the system and many times has its counterpart in the new framework, although perhaps couched in very different terms and/or formulas. When Peirce thought of the community of inquirers, he had in mind primarily an ideal group of dedicated men pursuing a correct method of research. Now precisely the point of fallibilism in men of science is to expect and to welcome new conceptual frameworks. The new frameworks, of course, rarely come out of the blue. Usually they are "in the air" when someone formulates them. The very fact that scientists are working on a certain set of problems with unsatisfactory results paves the way for a new look. Evolution, or development, along Lamarckian lines, therefore, is not so incompatible with development by leaps and bounds.\(^9\)

Peirce, then, believed that agapasm incorporated the best in tychasm and anancasm. These latter are only degenerate types of the former (6.303). Tychastic evolution alone could not handle the notion of positive sympathy among created things springing from continuity of mind (6.304). Anancastic evolution alone might do if it worked, but Peirce was convinced that without a good dash of tychism to relieve the atrophy of necessitarianism it was all a Hegelian dream (6.305). Only agapasticism satisfactorily accounts for all the various sorts of development going on in the universe by admitting both chance and law, but uniting them in and through habit.

Peirce was very much aware of the difficulty in keeping the lines of demarcation between these modes of evolution as sharp as is desired. Indeed such sharp delineation is impossible due to the nature of things—reality is continuous, not discrete. If all three modes are operative in the process of growth, they will be found to a greater or lesser degree in all such processes (6.306). Of course, this observation does not take anything away from the fact that the three are different. This way of looking at things reflects Peirce's thinking about the universal categories. Peirce saw that things may be distinguished

although not in fact separable. The modes of evolution can indeed be distinguished but cannot be separated in any adequate account of the real evolutionary process. Before bringing this chapter to a close therefore, let us consider these modes of evolutionary development in relation to the categories.

Peirce definitely thought of the three evolutionary modes and their interrelations along the lines of the three categories and their interrelations. This is just what one would expect, since the categories are universal. We would also expect that Peirce's peculiar contribution will have to do with what corresponds to the category of Thirdness since he was convinced that practically all philosophers of his day except himself had fallen into the nominalistic error of denying the reality of that category. We have already seen that Peirce refuses to do away with any of the evolutionary modes, just as he refused to do away with any of the categories.

Tychastic evolution corresponds to Firstness. It is pure spontaneity. It is lawless and aboriginal, therefore requiring no explanation. It is what it is without reference to anything else. For that very reason, it cannot be the only factor at work in this world of existents. Anything that exists requires interaction with an environment and hence Secondness. Anancastic evolution corresponds to Secondness. It is the brute element in development. It is the blind interaction of objects supplying the force after the manner of the sheriff. Finally, agapastic evolution corresponds to Thirdness, mediating between chance and brute force and so producing order, law and the reasonableness of the court.

If there could be any doubt about Peirce's mind in this matter a long passage in the paper "Evolutionary Love" removes it. He remarks that there is only one variety of tychastic evolution, but two of anancastic and three of agapastic. This is exactly the way in which the categories are analyzed: Firstness can have no degenerate form, Secondness can have two, Thirdness three (6.307).10

Here is how Peirce works out the variety of modes in the evolution of human thought:

1) tychastic development (Firstness): new ideas arise through

10 Cf. Part I, Ch. 1.
purposeless and purely spontaneous departures from habitual ideas;

2) *anancastic* development (Secondness): new ideas are adopted without seeing whither they tend but whose character is determined either
   a) by *external* causes such as environmental changes (genuine), or
   b) by *internal* causes such as logical development (degenerate);

3) *agapastic* development (Thirdness): new ideas are adopted neither heedlessly nor blindly, but by an immediate attraction for the idea itself, divined even before the mind consciously possesses the idea by the power of sympathy or affinity (continuity of mind) either
   a) by the community possessing the idea in its collective personality and then passing it on to individuals otherwise incapable of attaining it, or
   b) by an individual discovering the idea for himself but only because he is in sympathy with a community and this sympathy allowed him to experience the idea's attractiveness, or
   c) by an individual discovering the idea for himself independently of his human affections simply by virtue of the attractiveness of the idea itself.

These subdivisions of agapasm seem to correspond to the genuine (c) and two degenerate (a, b) forms of Thirdness. When Peirce talks of the "attractiveness" of the idea one is reminded of what we saw in Part I about the normative sciences. Indeed it was just about the time when he wrote "Evolutionary Love" (ca. 1893) that he became convinced that ethics is connected in some important way with logic. He had not yet taken up a serious study of the relation between logic, practics, and esthetics, but it is clear that his cosmological speculations prepared the way for the investigation. Certainly the work he did on evolutionary theory foreshadowed what he finally said about man's ultimate good.

A paragraph from the paper "The Architecture of Theories" is
worth reproducing here because in it Peirce explicitly applies the notions of First, Second and Third to what we have been considering.

The origin of things, considered not as leading to anything, but in itself, contains the idea of First, the end of things that of Second, the process mediating between them that of Third. A philosophy which emphasizes the idea of the One is generally a dualistic philosophy in which the conception of Second receives exaggerated attention; for this One (thought of course involving the idea of First) is always the other of a manifold which is not one. The idea of the Many, because variety is arbitrariness and arbitrariness is repudiation of any Secondness, has for its principal component the conception of First. . . . In biology, the idea of arbitrary sporting is First, heredity is Second, the process whereby the accidental characters become fixed is Third. Chance is first, Law is Second, the tendency to take habits is Third. Mind is First, Matter is Second, Evolution is Third. (6.32)

In another place, he developed the same idea in a slightly different way, relating the notions of absolute first and absolute last to the Christian conception of God as Alpha and Omega.

The starting-point of the universe, God the Creator, is the Absolute First; the terminus of the universe, God completely revealed, is the Absolute Second; every state of the universe at a measurable point of time is the third. (1.362)

If one holds that all there is to the universe is what is measurable with no absolute first or last, with no definite tendency whence or whither, he is an Epicurean; if one holds that the definite drift of nature’s course is cyclic so that the absolute end is only a return to the nothingness of the absolute beginning, he is a pessimist (6.363). On Peirce’s view, the only conception of the universe compatible with Christian theology is an evolutionism which admits that the absolute First is distinct from the absolute Second, and that the state of things in the end has a general character different from the state of things in the beginning (1.362, n. 1).

11 Although Peirce was a deeply religious man, he did not give religious conceptions much philosophic standing. Religion for him was not the specu-
In summary, then, Peirce's evolutionary cosmology is best characterized as "hyperbolic" (8.317). It begins in the world as it is—a world in which there is life and growth everywhere. Spontaneity and variety abound amid regularity and order. His world view looks in both directions: backward toward the origins of this growing cosmos, and forward toward the development yet to be realized. As man looks in each of these directions he only approaches the limits indefinitely. To have reached the limits in either direction, even in thought, would be to transcend the space-time order to which man is bound. At best man can only speculate as to the how of the origins and of the outcome. Peirce's idea of evolution, then, can be thought of as an hyperbolic curve indefinitely approaching the x-axis of origin and the y-axis of end.

In a letter to Christine Ladd-Franklin (August 29, 1891) Peirce described these axes like this:

The state of things in the infinite past is chaos, tohu bohu, the nothingness of which consists in the total absence of regularity. The state of things in the infinite future is death, lations of theologians and philosophers. It was a personal conviction based on one's direct (if mediate) experience of God. God was not to enter into metaphysics as an explanatory hypothesis. Still, he is not willing to condemn all philosophers who have used the term God to designate some part of their system. Thus he thinks that those philosophers who speak of "ideas in God's mind" are on the right track, but are using figures of speech which are more ludicrous than false (6.199). In another place, in a more indulgent tone, he concedes that those who must think of the universe as having an adequate cause are justified in thinking of that cause as God (5.536). We must remark in passing that the greatest weakness in Peirce's treatment of religion is his studied neglect of its cognitive or interpretative element. In particular if he had been more aware of the cognitive claims of Christian theology he would have better understood the gigantic intellectual efforts put into the problems of analogus predication by the great scholastics. To our knowledge, Peirce, despite his familiarity with the scholastic tradition, never takes up the question of whether there are any distinctions to be made between sorts of analogy. He lumps them all together under the heading of anthropomorphisms. Cf. J. E. Smith, "Religion and Theology in Peirce," Studies, Wiener and Young, pp. 266–267. For a representative presentation of the problems of analogy taken up by the great scholastics, cf. G. P. Klubertanz, Introduction to the Philosophy of Being, 2nd ed. (New York: Appleton-Century-Crofts, 1963), passim.
the nothingness of which consists in the complete triumph of law and absence of all spontaneity. (8.317)

Between these two different sorts of nothingness

... we have on our side a state of things in which there is some absolute spontaneity counter to all law, and some degree of conformity to law, which is constantly on the increase owing to the growth of habit. (8.317)

The tendency to form habits, to generalize, grows by its own action.

Its first germs arose from pure chance. There were slight tendencies to obey rules that had been followed, and these tendencies were rules which were more and more obeyed by their own action. There were also slight tendencies to do otherwise than previously, and these destroyed themselves. (8.317)

Finally, the law of habit is the law of mind and hence the growing cosmos is "alive." Matter is merely mind deadened by the development of habit to the point where the breaking up of those habits is very difficult. Consequently, the universe is not as the mechanistic philosophers would have it. It is not governed solely nor principally by the laws of dynamics. It is governed by reasonableness working itself out in the concrete. It has an intrinsic and immanent finality which cannot be reduced to the interaction of blind forces. All that remains for us to consider is Peirce's speculations about the universe's beginning and end.