

Lecture I to the Adirondack Summer School 1905

I have a difficult task before me to render these four lectures profitable to you. It would be less so if you came without a single idea on the subject. But everybody, every butcher and baker, has ideas of logic and even used the technical terminology of the subject. He says he deals in articles of "prime necessity". Perhaps he would be surprised to learn that the phrase "prime necessity" was invented by logicians to express a logical conception which has now become in common mouths very vague, it is true; but which still has a little of the original concept <sup>in</sup> a vague form clinging to it.

If I had a class in logic to conduct for a year, I should keep still, as I used to do at the Johns Hopkins, upon <sup>the</sup> my

maieutic character of my office, - which means that I should do all I could to make my hearers think for themselves, by which I earned the gratitude of men who are useful to mankind. I should insist that they must not suppose that my opinions were bound to be correct, but must work out their own ways of thinking. But now that there are but four lectures, and all falling in one week, the case is otherwise. I must beg you to remember that comprehension comes first and criticism is later. It will be as much as you can possibly do in this week with diligent endeavors, to understand what I mean by logic and what the general outline of my system is. In order to do as much as that you must endeavor to take up a sympathetic attitude, - to try to catch what it is that I am driving at, and to store up in your minds

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an outline of my theory which you will subject to criticism  
in the months to come.

In order that you may understand me, that you may  
for this one week put yourselves, as far as you can, in my  
intellectual shoes, — leaving yourselves to decide only after  
you have worn them for a while whether they really fit or  
not; — that I am going to begin by telling you something about  
my classification of the sciences; because it will aid you  
in the difficult task of imbibing my notion of the kind  
of science that I hold logic to be.

I have gained an unfortunate reputation as a  
writer upon the algebra of logic. It is generally understood  
that I hold logical algebra to be the main part of logic.  
But that is quite a mistake. I am in the world but not of  
the world of formal logic. A calculus, even in mathematics

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proper, is like the sword that our warriors by sea and land carry at their sides. Having it there at hand marks the mathematician as the sword marks the officer. Moreover it is <sup>like a sword</sup> a most handy instrument. There is a traditional use of the calculus just as there is a traditional sword practice. But just as swords ~~are~~ <sup>as</sup> far as practical use goes are more to the purpose in opening tombs than in opening men's abdomens, so the calculus is put by real mathematicians to uses the inventor little dreamed of. And if this is true of the differential calculus, it is a hundred times true of any logical calculus.

Professor Dedekind, one of the leading logic-mathematicians, — but like the sea he ~~is~~ <sup>is</sup> a mathematician in fact, and not a logician, — urges that mathematics is nothing but a particular branch of logic.

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He is quite mistaken. Having no inside acquaintances  
with the logical household, he does not know as I do  
from having been an inmate of both houses, that the  
logician's aims and ideals are entirely foreign to the  
mathematician, and the mathematician's to the  
logician. The mathematician is intent on finding  
ways of making intricacies intelligible. He wants to  
facilitate reasoning. The logician does not care a  
straw about that. He wants to know what the essential  
ingredients of reasoning and thought in general are.  
Far from wishing to abridge reasonings, as the  
mathematician ~~is~~ is perpetually doing where he  
can, the logician prefers to have them cumbrous  
so that no element may be overlooked. This difference  
is striking enough even where the logician is upon

mathematical ground. I should not, however, have  
 mentioned it <sup>in these lectures</sup> for any other purpose than to say  
 how much nearer the mathematician comes to  
 understanding the nature of logic than do the  
 psychologists or even the greater part of those who  
 call themselves logicians. I refer to those who think  
 that logic, if not a branch of psychology, is founded  
 on psychology, since it deals with human  
 thought. Yes it deals with human thought  
 just as the theory of the quadratic equation  
 deals with human thought, - just so much  
 and no more. I have not the slightest doubt  
 that if pure mathematics had not so developed  
 itself that it was perfectly hopeless to attempt  
 to give it a new direction, the present race of

of thinkers would make that to be founded on psychology. They would have the same reason to do so that they have to <sup>do a similar</sup> ~~make that the~~ foundation for logic.

But my classification of the sciences will give you a first inkling of my notion of the position that logic holds among the sciences.

This classification adopts the general idea of <sup>the</sup> ~~Comte's~~ classification, called Comte's. When I speak of it as "the classification called Comte's" I must state that of my own knowledge, I know no reason for not simply calling it Comte's classification. But <sup>Robert</sup> Dr. Flint and other writers ~~say very positively~~ <sup>are very solemnly</sup> "by that classification possess any merits they must be ascribed to Dr. Bain who conceived it and to Saint-Simon, who first received and published it; and not to Comte, although he showed

how much could be made of it." Notwithstanding the scum-  
 dredgy character of the clerical profession in times past, I  
 cannot believe that Dr. Flint would use such language  
 without conclusive proof <sup>of its truth,</sup> convincing <sup>to every mind of its</sup>  
~~truth~~ I am sorry that I cannot <sup>quite</sup> suppress a lingering suggestion  
 of doubt in my mind owing to the unspeakable mendacity  
 of the cloth, <sup>in times too recent,</sup> ~~rather long ago.~~ I certainly cannot for an instant  
 believe that Comte was a conscious plagiarist

This scheme, as you know, arranges what are called by  
 Comte the "abstract sciences" in a ladder, with the idea  
 that each derives its principles from the discoveries of  
 the more abstract science that occupies the rung  
 above, while all are at the same time forever  
 expanding in the endeavor to become more "abstract"

Since Comte first set forth that scheme, many



others have been proposed; but among the score or more which ~~I~~ <sup>seem to me</sup> have ~~found~~ to be at all deserving of study, including all that are widely known, I have not found one which was not manifestly founded upon that which goes by Comte's name; and if my own has no other <sup>distinction</sup> ~~merit~~ it shall have that of honestly owning a filiation <sup>to a system of</sup> ~~with~~ philosophy to which I am profoundly opposed, - a filiation <sup>it</sup> which ~~is~~ <sup>is</sup> too many of its offspring seem to be basely ashamed to own.

This, however, is not the only peculiarity of my classification. In order to make it useful I wished it to be a natural classification, that is, I wished it to embody the chief facts of relationship between the sciences so far as they

present themselves to scientific <sup>and</sup> observational study.  
 Now to my apprehension, it is only natural  
 experiential objects that lend themselves to such  
 a natural classification. I do not think, for  
 example, that we can make a natural classi-  
 fication of plane curves or of any other mere  
 possibilities. We do classify them, or rather,  
 divide them, according to their orders and classes,  
 or their so-called deficiencies. ~~But~~ this is a mere  
 enumeration of the logically possible cases. These  
 bodies, <sup>positive</sup> information cannot therefore serve  
 the same purpose as a natural classification.  
 My notion is that what we call "natural  
 classification" is, from the nature of things  
 limited to natural objects. Now the vast ma-

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most of classifications of the sciences are classifications of possible sciences, which are certainly not natural objects. What is a science as a natural object? It is the actual living occupation of an actual group of living men. In that sense only that I presume to attempt any classification of the sciences. A very considerable proportion of all the so-called classifications of the sciences are classifications of scientia, or ἐπιστήμη, in the ancient sense of perfect knowledge. Others are classifications of not of sciences but of the objects of systematized knowledge.

But what I mean by a "science", both for the purpose of this classification &

in general, is the ~~the~~ life devoted to the  
 pursuit of truth according to the best  
 known methods <sup>on the part of</sup> of a group of men who  
 understand one another's ideas and  
 works as no outsider can. It is not ~~ne-~~  
~~er~~ what they have already found out which  
 makes their business a science; it is that  
 they are pursuing a branch of truth accor-  
 ding, I will not say, to the best methods, but  
 according to the best methods that are  
 known at the time. I do not call the soli-  
 tary studies of a single man a science. It  
 is only when a group of men, more or less in  
 intercommunication, are aiding and  
 stimulating one another by their <sup>under-</sup> ~~latter~~

standing of a particular group of studies <sup>as</sup> ~~if~~  
 outsiders cannot understand them, that I  
 call their life a science. It is not necessary  
 that they should all be at work upon the  
 same problem, or that all should be fully  
 acquainted with all that it is needful for  
 another of them to ~~know~~ know; but their studies  
 must be so closely allied that any one of  
 them could take up the problem of any other  
 after ~~a~~ <sup>some</sup> few months of special preparation  
 & ~~that~~ each should understand pretty  
 minutely what it is that each <sup>one's</sup> or the others  
 is now consisting in; so that any two of  
 them meeting together shall be thoroughly  
 conversant with each others' ideas and

In particular, one thing which commonly <sup>14</sup> unites them is their common skill <sup>imposed</sup> by outsiders in the use of certain instruments & their common skill in <sup>explaining</sup> ~~doing~~ <sup>certain</sup> ~~most~~ kinds of work.

the language he talks and should feel each other to be brethren. The men of that group have dealings with the men of another group ~~whose~~ <sup>whose</sup> studies are more abstract, to whom they go for information about principles that the men of the second group understand better, but which the men of the first group need & apply. At the same time the men of this first group will probably have far more skill in their special applications of these principles than have the members of the second group who understand better the principles themselves. Thus the astronomer resorts to the student of Optics, who understands the

principles of optics better than he does. But he  
 understands the application of those prin-  
 ciples to astronomical instruments and to  
 work with them far better than the pure  
 optical student does. One group may be  
 in such wise dependent upon several  
 other groups. Now I do not pretend that  
 all the ramifications of dependence of one  
 science upon another can be <sup>fully</sup> represented  
 by any <sup>scheme of</sup> arrangement of the names of these  
 sciences, even if we limit <sup>the kind of</sup> ~~that~~ depen-  
 dence that we seek to represent to  
 dependence for principles. But I do  
 undertake to represent somewhat vaguely  
 the dependence for principles only of each

science and each group of sciences upon others in the manner of Comte, or Charles Boudin or whoever <sup>it was that</sup> made that wonderful discovery.

All human lives ~~are~~ <sup>separate</sup> themselves and segregate themselves into three grand groups <sup>in a general way</sup> whose members understand one another but can for the life of them understand sympathetically the pursuits & aims of the others. The first group consists of the devotees of enjoyment who devote themselves to earning their bread & eating as fine bread as they can and who seek the highest enjoyments of themselves and their fellows. This is the largest and most necessary class. The second group despise



such a life and cannot fully understand it.  
 Their notion of life is to accomplish results.  
 They build up great concerns, they go into  
 politics, not as the heeler does, for a living, but  
 in order to wield the forces of state, they un-  
 dertake reforms of one and another kind.  
 Their group makes civilization. The men of  
 the third group who are comparatively few  
 cannot waste at all a life for enjoyment  
 and look down upon a life of action. Their  
 purpose is to worship God in the development  
 of ideas and of truth. These are the  
 men of science. They again segregate  
 themselves into three great groups dis-  
 tinguished by their different conceptions of

of the purpose of science. There are those who look upon themselves as the tutors and superiors of the doers. Science to their minds tells them the world's work is to be done; and the sciences they cultivate are the Practical Sciences. But in order to develop any practical science, a man must have the equivalent of a digest of science. A systematized account of all human knowledge. Therefore there must be a <sup>second</sup> class of men ~~whose purpose it~~ <sup>whose purpose it</sup> is to produce such digests, one working upon one part of it and another upon another. For these men, science is what Colbridge defined it as being, organized knowledge. This very business I am engaged in, of clas-

sifying the sciences <sup>is a necessary part of</sup> ~~belongs to this group~~ <sup>the</sup>  
 this work of systematizing and digesting human  
 knowledge. I have called such sciences the  
 Sciences of Review, and also Tactics, or  
~~Taxospondes~~ <sup>Taxosponde</sup> ~~Taxosponde~~, the endeavor  
 to arrange science. The third great  
 division of science I call heurotics or  
heurospende, the endeavor to discover.  
 It is true that all scientific men are  
 engaged upon nothing else than the  
 endeavor to discover. This is true so  
 to taxospondes and the prattofundists  
 as much as of the heurospende. But the  
 difference is that the prattofundists  
 endeavor to discover for the ultimate pur-

pore of doing, and the theosophists endeavor  
 to discover for the purpose of applying know-  
 ledge in anyway, be it in action or <sup>more especially,</sup> in cog-  
 nition. But the theosophists look  
 upon discovery as making acquaintance  
 with God and as the very purpose for  
 which the human race was created. In-  
 deed as the very purpose of God in cre-  
 ating the world at all. They think it a matter  
 of no consequence whether the human race  
 subsists and enjoys or whether it be  
 exterminated, as in time it very hap-  
 pily will be, as ~~long~~ <sup>soon</sup> as it has subserved  
 its purpose of developing a new type  
 of mind that can <sup>serve</sup> worship God better.

You must not think that I mean to say in any  
 wooden sense that God's notion in creating  
 the world was to have somebody to admire him.  
 We cannot possibly put ourselves in God's  
 shoes, even so far as to say in any definite,  
 wooden sense that ~~the~~ God is. I only mean  
 that the purpose of creation as it must appear  
 to us in our highest approaches to an understand-  
 ing of it, is to ~~have~~ make an answering <sup>movement toward</sup> ~~mind~~  
~~to~~ His God's self reproduction. And when  
 I say that God is, I mean that the conception  
 of a God is the highest flight toward an  
 understanding of the original of the whole  
 physico-psychical universe that we can make,  
 It has the advantage over the agnostics and others

other views of offering to our apprehension an object to be loved. Now the neurospueticist ~~need~~ has an imperative need of finding in nature an object to love. His science cannot subsist without it. For science to him is not to be worship in order not to fall down before the feet of some idol of human workmanship. Remember that the human race is but an ephemeral thing. In a little while it will be altogether done with and cast aside. Even now it is merely dominant on one small planet of one insignificant star, while all that our sight embraces on a starry night is to the universe far less than a single cell of the brain is to the whole man.

So the three great branches of science are  
 Neurospude, Tasso spude, and Pratto spude.  
 I have drawn up <sup>a very</sup> an elaborate classifi-  
 cation of the Practical Sciences; but I shall  
 not take up time with any account of  
 that. I have ~~not~~ never attempted any  
 classification of the Sciences of Review. But  
 it is Neurospude, or Pure Science which  
 concerns us, as it now exists, happens to have  
 three grand divisions. There is Idioscopy, or the  
 Special Sciences, such as Sociology, As-  
 tronomy, and the like, the great business  
 of which is to discover and study hitherto  
 unknown phenomena. Secondly, there  
 is Philosophy, or Genoscopy, which does

<sup>not only enunciating it in order</sup>  
<sup>like Seneca to have said "I will give you"</sup>  
<sup>an introduction of future summer</sup>  
An opinion which I ask nobody to share, is that <sup>among</sup> ~~the~~ <sup>future</sup> ~~sciences~~ <sup>sciences</sup>  
the future <sup>spide</sup> ~~sciences~~ will divide <sup>into</sup> Mathematics, ~~and~~

<sup>the history of thought</sup>  
Positive Science, and another branch hitherto undeveloped,  
<sup>the history of thought</sup>  
consisting only of Genoscopy and Idioscopy.



not bother with ~~new~~ <sup>novel</sup> phenomena, but finds  
enough to do in endeavoring to understand  
those which are brought before every grown  
person every day of his life; and finally  
there is Mathematics, which never makes a  
single positive assertion of fact, but merely  
invents hypothetical states of things & says  
that if such and such were the case, not  
caring a snap of the fingers whether it  
be so or not, though usually it is not  
the case, then such and such would therein  
~~be true.~~ Now idioscopy, or special science,  
has two wings the physical and the psychical,  
the psychical depends on the physical. Yet  
on the whole, it is truer to regard them as

two parallel rings. Each has its nomo-  
logical, its taxonomic, and its de-  
scriptive divisions. The nomological

sciences are pure physics on the physical  
 side, <sup>general sociology, general economics</sup> general psychology on the <sup>psychical</sup> psychical  
 side. ~~These sciences all tend to pass into metaphysics~~  
 scale. <sup>taxonomy, etc.</sup> The classificatory sciences <sup>in which they</sup> depend  
 are chemistry, crystallography, mineralogy  
 and biology on the physical side, linguistics,  
 ethnology, and special psychology on the psy-  
 chical side. ~~The descriptive sciences~~

The classificatory sciences tend to become  
 nomological. Chemistry & physiology  
 tend to ~~become~~ <sup>pass into</sup> general physics, parts  
 of linguistics to become general psycho-  
 logic, etc. The descriptive sciences, so-called,

endeavor not only to describe but also to account for the characters of individual objects. They are astronomy and zoology on the physical side, history, archeology, etc on the psychological side.

We now come to what particularly concerns us, Genealogy, or Philosophy. You will observe that I make this a branch of science upon which all special science including psychology depends, while the empirical philosophers generally, Comte followed by his imitators (and ~~all their violent opposition~~ <sup>himself</sup> marks their ~~dependence~~ <sup>material</sup> ~~on~~ <sup>of</sup> Spencer and Locke, as well as Wundt and many others, make philosophy depend upon the special sciences. I do not however so totally

disagree with them as ~~app~~ <sup>would</sup> appear at first glance. On the contrary, I quite acknowledge that there is such a science as they call <sup>or</sup> positive philosophy or Synthetic Philosophy or by some other such name. That science stands in my opinion at the head of the Sciences of Reason. But all these philosophers make ~~the~~ one of the most disastrous mistakes possible in confounding ~~the~~ science with Genealogy, which must not depend upon the special sciences inasmuch as they, on the contrary, need to depend upon it.

The reason that I hold this <sup>unification</sup> ~~confusion~~ of widely separated sciences to be so disastrous is that it leads to the unimportant

questions, especially logical questions, never ~~to~~ receiving any serious consideration at any time. One branch of cosmology is logic, and one branch of logic is methodology which should investigate the general principles upon which scientific studies should be carried on. But under the plan of these philosophers, logic is to be founded upon the study of all the other sciences. That is to say you are first to make your researches and after that inquire how they ought to be made, locking the barn door after the horse is already stolen. To be sure, these philosophers maintain that no sciences can be reciprocally dependent upon ~~each~~ each

other. But the question of whether they can be so  
 dependant or not, <sup>than</sup> which no question is ~~and~~ <sup>of greater</sup>  
 importance to the well-being of science, never  
 receives at their hands any serious study. The  
 question is asked in the vaguest terms, without  
 any exact determination of what kind of  
 dependence is referred to; and is answered on  
 the basis of a loose analogy to cases in which  
 when the number of observations exceeds the  
 number required to draw a conclusion the  
 conclusion is utilized to correct the observations.  
 They do not ~~analyze~~ <sup>analyze</sup> the conditions under  
 which such a thing is possible. For the rea-  
 son that under their method they find as-  
 sume an answer to it without any serious

examination; and then having acted upon  
 that hasty opinion throughout, it has naturally  
 lost all practical importance, and so never  
 does get any serious consideration. If they  
 were to analyze the case which they fancy sus-  
 tains their notion of reciprocal dependence,  
 they would see that, far from sustaining that  
 idea, it is quite opposed to it. A student of  
 one subject <sup>say Dr. A</sup> may go to a student of another  
 subject <sup>say Dr. B,</sup> and ask him a question and  
 make use of his answer; and subsequently  
<sup>Dr. B</sup> ~~the one~~ who gave the answer may ask a  
 question of Dr. A, and if it be a wholly  
 independent question there is no reason why  
 he should not derive solid information