as Cl in ICJ. There is the same confusion between dibasic and tetrabasic radicles, as in CO. Hence we infer that the distinction between even and odd-basis is altogether superior to that between monobasic and tribasic, dibasic and tetrabasic.

Now if a body can enter into double decomposition with hydrogen (that is, combine without condensation) it is obvious that it must be odd-basis; for in that case it will form a compound which being of two volumes cannot combine with another volume of H unless it combines with two volumes. If it does thus combine it will be tribasic, otherwise monobasic.

On the other hand, if a body cannot enter into double decomposition with the monobasic radicles, it must be even-basis; for in this case, since its volume after combination will be the same as before, there is no reason why it should not either combine with condensation with a new volume of the monobasic radicle (in which case it will be four or more basic) or else enter into double decomposition with it, in which case it will be dibasic. This explains why the dibasic radicles always lose their own volume in combining with the monobasic; why the tribasic lose twice their own volume, &c.

A radicle being a constituent in combination, it follows that its internal forces do not come to equilibrium of themselves, and this accounts for the fact that monobasic radicles cannot exist free. This fact is determined by reactions and not by vaporization, for according to the present theory the volume fixes neither the atom nor the molecule but the equivalent, that is to say, the amount of matter containing a unit of chemical intensity. The dibasic radicles may exist in the free state because, since in combining they are condensed, it follows that there is some disturbance of their internal forces.

An odd-basis radicle, being in itself out of equilibrium in this way, it follows that the addition of it to another radicle will change the basicity of that radicle from odd to even or from even to odd, while the addition of an even-basis radicle will have no such effect.


Art. XIII.—Exposition of the true nature of Pleurodactyium problematicum; by Carl Rominger, M.D.

Under the above name I have long kept in my cabinet a specimen, collected at Kirchweiller in the Eifel mountains. After having identified it with the fossil described by Goldfuss, I laid it aside, and only recently, twenty years afterwards, when I happened to look over it again, the first glance convinced me that the Pleurodactyium problematicum is merely the cap of a...
“The Place of Our Age in the History of Civilization.”
1863
Oration delivered at the reunion of the Cambridge High School Association, Thursday evening, 12 November.
Burks, Bibliography.

EXTRACTS FROM AN ORATION.

BY CHARLES S. PEIRCE.

Delivered at the Reunion of the
CAMBRIDGE HIGH SCHOOL ASSOCIATION,
THURSDAY EVENING, NOV. 12, 1863.

LADIES AND GENTLEMEN OF THE HIGH SCHOOL ASSOCIATION:—In attempting to address you, I feel keenly the disadvantage of never having made any matter of general interest a special study. I am, therefore, forced to select a topic on which I have scarcely a right to an original opinion—certainly not to urge my opinion as entitled to much credit. I beg you, then, to regard whatever I say as THE PLACE OF OUR AGE IN THE HISTORY OF CIVILIZATION, as much a suggestion as might be put forth in conversation, and nothing more.

By our age I mean the 17th, 18th, and 19th centuries. There are those who, dazzled by the steam-engine and the telegraph, regard the nineteenth century as something sui generis. But this I think is doing injustice to ourselves, to Bacon or Newton here, and to him the wonders our century has to show, and he will tell you, “All this is remarkable and deeply interesting, but it is not surprising. I knew,” he will say, “that all this or something very like it must come at this time, it is nothing more than the certain consequence of the principles laid down by me and my contemporaries for your guidance.” Either of them will say this. But now let me take the Century from the Century to the Age, (rocker from the settlement of Jamestown,) Let us bring the sublimest intellect ever shone before, and what would Dante say? Let him trace the rise of constitutional government, see a dem.trod people steadily bend a haughty dynasty, to obedience, give it laws and bring it to trial and execution, and finally reduce it to a convenient cipher; let him see the most enslaved people under the sun bow, their thousand arts perished, and establish such a terror that “all the kings of the earth, and the great men and the rich

men and the chief captains and the mighty men and every bondman and every freeman hide themselves in the dens and in the rocks of the earth; let him see the human mind try to explain away the conflagration, the accusing, the burnt spirit, in a blazing fire, expose the falsity of its history, the impossibility of its miracles, the humanity of its manifestations, until the very heavens depart as a scroll when it is rolled together; and then let him see the restless boundary of man’s power extending over the outward world, see him dashing through time, conversing through immense distances, doing violence to the lightning, and living in such a fire of activity as less salamandrine generations could not have endured; and he who viewed Hell without dismay would fall to the earth quailing before the terrific might of intellect which God has scattered broadcast over this whole age. This century’s doings taken apart are mere jugglery—clever feats—but this age is that in which “the sun becomes black as sackcloth of hair, and the moon becomes as blood; the stars of heaven fall unto the earth even as a fig-tree casteth her untimely figs, when she is shaken of a mighty wind. I wholly disagree with those who think we are living in the age of the reformation. I do see something rationalistic in the tendency of that age. In our time, if we wish to find a new government, religion, or art, we begin at first principles, consider the philosophy of our object and follow it out. But the reformation, as its name implies, was an attempt to suppress abuses in existing institutions without doing away with the institutions themselves. In religion, they reformed the church, but all they had a church. In government, new governments cast aside the church, at least. In politics, they resisted the powerful growth of royalty, but only in favor of the ancient system. Even their great inventions, gun-powder, printing, and the compass were not the results of original research but were heard of in old books. The discovery of America, itself, was suggested by a study of the ancient geographers. The passion for antiquities,--inconceivable to us, except by remotenection bearing that the age which had preceded them, that of the crusades, was far more magnificent than theirs, and that the Greeks were both in mind and manners most evidently their superiors.

Then there was another great difference between them and us: their attempts at emancipating the human mind either from mistake or insufficiency were always failures; their republics were swept away, the passions of royalty were more firmly received, those arts perished, and the churches which they had set up gave no more room for freedom of thought than mother Rome herself. There was a stifled cry for liberty,—a blind groping for the light, backward instead of onward.

The Reformation was a struggle of humanity to regain its rightful master; in our day the aim is absolute liberty. We have Tracts for the Times in England, a strict Lutheran party in Germany, the Empire in France; but who will say that these are primary tendencies of the age? They are rather reactions against the extravagacies of the times. From the moment when the ball of human progress received its first spurt from the mighty hands of Descartes, of Bacon, and of Galileo,—we hear, as the very sound of the stroke, the decisive protest against any authority, however
The innate ideas of space, time, quantity, reality, cause, possibility, and so on are true, he found himself utterly unable to do this respecting the idea of Immateriality, Freedom, and God. Accordingly, all metaphysicians since his time have had nothing to remove this difficulty, but not altogether with success. Hegel's system seemed, at first, satisfactory, but its further development reveals also, respects to life of Jesus, against which he a human soul, the datum upon which he proceeded, itself cried out: the sense of mankind, which he had elevated into a God, itself repudiated the claim. However, that all the progress we have made in philosophy, that is all that has been made since the Greeks, is the result of that methodical scepticism which is the first element of human freedom. I need not repeat the political history of the last 50 years, to prove the predominance of the spirit of liberty in that sphere. You will find an ever-increasing irreverence toward rulers, from the days of the enlightenment to ours, when some of the more advanced spirits look forward to us, when some of the more advanced spirits look forward to us, and then, all the glory of our age has sprung from a spirit of Scepticism And Irreverence, it is easy to say where its faults are to be found.

Modern progress having been detached from its ancient mother by the dark ages, that fearful parturition, has since now lived a self-sustaining life. Its growth, its outline, its strength are all its own; influenced to some degree, by its parent, but only through an exterior medium. The only cord which ever bound them, and which belonged to either, is Christianity. Since the beginning of Christianity in England, the Rise of Christianity, the 2d in the age of the Migrations of the Barbarian, the 3d in the Age of the Establishment of the Modern Nations, the 4th is the age of the crusades, the 5th is the age of the Reformation, and the 6th is the time and the very idea of miracles, which was so despised by the church, and the book of Hume. How many scholastics, how many theologians of our own day would have done otherwise than say "Behold the fruit of our own opponent's system of philosophy!" This was the great, degraded spirit, which is eager to answer an opponent according to that doctrine, and still remains the slave of error, was far from being Kant's. He set about asking his own philosophy the question that Hume had asked of Locke, and that was that Kant, in a letter to Hegel, he said: "but how do we know that our innate ideas are true?"

The book in which he embodied the discussion of this question is, probably the greatest work of the human intellect. All later philosophies are to be classified according to their adoption and bringing into it, for it is all the direct result of this production. And in these later philosophies, whether we consider their profundity or their number, our age ranges far above all others put together. This wonderful fecundity of thought, I say, is the direct result of Kant's Critik; and it is to be explained by the fact that Kant presented a more insoluble doubt than all the rest, and one which has not been answered to this day, for while he showed that our
world. The church was divided in this age. The conception of its relations established to those outward institutions, doctrines, and works in which it embodied itself, it is that "beginning" of the church which has generally been made its standard in later ages.

The migrations of the barbarians witnessed the entire sweeping away of the vestiges of ancient civilization. The new people were without history, without pagan prejudice, and full of the spirit of freedom. The Roman Empire and its modes of thought melted at their breath. To the church which appeared in those troublous times as the sole preserver of the arts of peace as well as of spiritual health, they bowed and quickly knelt. This institution, while the civil confusion was becoming greater, consolidated its internal government more and more, spread its external influence wider and wider through all the ages of life, and in the night of ignorance which ensued, the only intellectual movement of Europe was that of the church.

The next age is one of establishment. The church grew up. The feudal system arose from small beginnings until it formed the law of Europe. The Empire of Charlemagne was established and soon separated into the three great kingdoms of France, Germany, and Italy; while all the other nations of Modern Europe received their separate governments. Even learning began to glimmer through the Pyrenees. The universities of Paris and Oxford were founded, and philosophy began to take root. The condition of the church was humiliating, her spiritual power was vastly increased. The temporal power began to arise, and at first the promise was that the head of the church should be the head of Christendom. And had the clergy kept the high spiritual post that was offered to them, it might have been so. Unfortunately, they began to love their power, and as a consequence, became ambitious. Their ambition generated corruption; corruption, speaking vice, intrigue, rebellion, and ruin. John the XII, the Pope, was deposited; Otho, the Emperor, for murder, incest, and plots against the State; and a few years later we witness the now familiar spectacle of a Pope kept in his place by the arms of an Emperor. What a lesson is this of obedience to the conditions which God has imposed upon us?

The next age is that of the Crusades. For four hundred years, God had been preparing another civilization, with which that of Christianity might be compared; namely, that of the Mahomedans. Christianity now presented its most imposing aspect. The influence of Rome finds its parallel in that of Solomon: Scolasti-

The result of this comparison on the mind of Europe, I need not dwell. Modern times, modern breadth of thought, and modern freedom from ecclesiastical superstition followed the crusades, in place of the mediæval narrowness and fondness for ignorance which had preceded them. The great idea which emerged was that the church is a great and good thing, but that it should not be allowed to override all the other means and appliances of civilization.

We now come down to the age of the Reformation, the character of which I need not sketch. It seems to me apparent that, by this civilization is the work of Christianity.

Christianity is not a doctrine, or possible law; it is an actual law—a kingdom. And all things shall be put under his feet. What then does it not include? Do you assert that liberty is of any value? "His service is perfect which loveth his Brethren." But that is an unwarrantable subterfuge to reconcile the statement with the fact. The Jews were not understood by every token that language or the miraculous course of their history could convey, that they were to be taken care of and saved as a nation. I say that no human being however spiritually minded could have read those Jewish prophecies and have got any other idea from them than that the Messiah there promised them was a Prince, seated upon the throne of his fathers, conducting the affairs of the nation, and leading them on to national glory as much as to individual immortality. When the promise was extended to the Gentiles, it meant the same thing for them. If therefore we are Christians it seems to me we must believe that Christ is now directing the course of history and preparing for its destinies in kings and in nations, and is the head of the public weal which does not come within the bounds of his realm. And civilization is nothing but Christianity on the grand scale.

In a mimic history—a well-constructed play—the development of the plot has a regular course. It begins with a prologue, or semi-lyrical speech of one of the characters, revealing the general idea of the play, putting the audience in the right state of mind. This accomplished, the drama proper begins. First, the materials and elements of the plot are displayed. To this situation the character in which the idea is to be embodied. Next, the idea is preserved by these elements. The plot is actualized. Next, it is necessary to see the cause, the means, the conditions by virtue of which the plot is actualized. Otherwise, we could not see any development in the play. Fourth, comes the display of the passion in full operation, neither over nor under-drawn, but well marked, definite, and human. This is the middle of the play. Next, if the plot is an instructive one relatively to the working of the idea it embodies, there must be a counterplot, or plurality of plots, all having reference to the same conception. Thus, in Othello, after the treachery of Iago
Every statement may be regarded as an object, that is it is something outside of us which we can know, and the grammatical analysis of a statement is nothing more familiarly seen than the parts of speech. The first condition of a statement is that it shall state something—that it shall have a predicate. But this again implies a whole series of conditions providing for the statement of the proposition, which shall enable you to comprehend the notion which I wish to convey as well as the language in which I convey it. Before a man can read a book, he must understand the meaning of the words which he is to read. In the same way, before a man can hear the voice of God or even comprehend an example of revelation, he must have a notion of what revelation is, and by self-development of the ideas that must previously have had an inward revelation of religion. In complacent with this condition, both heathen and Jews, before the birth of Christ, had attained to the idea of an intimate union of humanity with Deity, such that they should not have doubted (?). 1 (And whether the creature should be so completely in union with the creator that all his motions should be brought under law, as much as inanimate natures are, and yet that man should in this relation and passivity find his highest freedom, activity, and bound completion. This, then, is the predicate of the formula by which I propose to express Christianity—"And I will call it the Kingdom of heaven." The Jews had besides this complacent ideal, a system of purification which as the epistle to the Hebrews argues never could effect anything, and a temple and templeworship. The purer were the people, the more perfect were the forms. All this was symbolic. It was the grammar of Christianity, without its substance. It was the fulfillment of that other condition which I am about to explain. It is not only a comprehension of ideas, but an acquaintance with the language in which they are to be put.

After the inward revelation, comes the objective revelation, and this latter must itself be something more than mere bearing as it must a higher message it must itself act suggestive-ly in order that its meaning may be perceived. This culminating point is the phenomenon of perfection in the book which man can see and know it; that is, it must be perfection in human form. The first condition, therefore, the enunciation of the predicate, was fulfilled at the birth of Christ.

(If the orator here proceeded to analyze the formula "The Church is the Kingdom of Heaven," we would endeavor to show what part each age had played in its enunciation.)

This division of history into ages suggests another reflection. That there is an analogy between the course of events in modern Grecian and of modern history. If we had our migration of peoples, so had they theirs, 2000 years before. Corresponding to our age...
of chivalry, they had the Argonautic expeditions and Trojan war. Our
reformation is very imperfectly represented by a reform of
another kind, that of the governments of the Grecian States. But
there are other curios coincidences: it is that one dawns
in Rome, the other in Dante. But between the
these last ages is, that between the Greece of two thousand years ago and our own times, is truly remarkable. The resemblance, in-
deed, is so close that it is difficult to exempt one to follow
The most striking tendency of our age is our materialistic
tendency. We see it in the development of the material arts and
the material sciences; in the desire to see all our theories, philosophical or moral, exemplified in the material world, and
the tendency to value the system only for the practice. This tend-
ancy often seems to be opposed to another great movement of our
age, the idealistic movement. The idealist often spoke as having a real existence.—Hence, he places as much value on
him as on things. Moreover, by his wide and deep study of the
human mind, he proved that the knowledge of ideas can only be
attained by the knowledge of ideas. This truth may seem instante-
ous to the materialist. His object being the ideas contained in
the mind, there is nothing that he would more carefully eradicate
than any admixtures of ideas from his own mind; so that it seems
to him like overturning natural science altogether to tell him
that all truth is attained by such an admixture. He thinks at
least that nothing more than common sense should be admitted from
the mind. This amounts to admitting the loose ideas of the un-
trained intellect into his science, but to refuse admission to
those which have been exercised, strengthened and controlled. He re-
jects that the conjunction of speculation with science, whether in
stantly led to error. But it is so; but it is only by means of
idealism the truth is possible in science. Human learning must
fail somewhere. Materialism fails on the shrinking of the
laws of the mind. Idealism always presents a systematic totality, but it must always
have some vagueness and thus lead to error.—Materialism is desti-
tute of a philosophy. Thus it is necessarily guided by common
understands its relations to idealism; it misunderstands the na-
ture of its own logic. But if materialism without idealism is
blind, idealism without materialism is void. Through the
wonderful philosophies of this age and you will find in every one of
them evidences that their novel conceptions have been to a
very large extent suggested by physical sciences. In one point of
view indeed, pure a priori reasoning is an exercise as much as to
say analysis with nothing to analyze? Analysis of what?
I ask. Of those ideas which no man is without. Of common
sense. Metaphysics is the system of the phases of thought of that uncommon sense which results from
the physical sciences in order to comprehend perfectly the con-
cept and the mind. So much so that I think the recognition of the obligations of the idealists to the scientists will show that even their claims will receive a just award if we inter-
pret the whole greatness of our age according to this materialistic
tendency.

See too, what truth, and what peculiarly christian truth there
is in this tendency. There are two fields of human learning, the

science of outward things and the science of the mind itself.
Now materialism opposes itself to this letter; not as an orna-
mental study, a regulative study, or an educative study, but as
having any value or truth in itself. Of the assertion that
man was not made to turn his eye inward, was not made for him-
selves alone, but for the sake of what he should do in the outward
world, we all admit; but what ask how christianity will appear if we
look upon it as a materialistic point of view? There is one
aspect which it certainly will not present; there will be no
German refining away of Christ into a class or into self. It will
be inclined to slight the subtleties of dogmas and look upon
dogmas in a common sense way. True religion, it will think,
consists in more than a mere dogma, in visiting the fatherless
and the widow, in keeping ourselves from being spotted from the
world. It will say that christianity reaches beyond even that,
reaches beyond the good conscience, beyond the individual life; must
trumpet forth the whole of all human law—through the social or-
organization, the nation, the relationship of races to one another, and
the races. It will demand that not only where man’s determinate
activity goes on, but even where he is the mere tool of providence
and in the realm of inanimate nature Christ’s kingdom shall be
seen.

Our age is brilliant; and apparently confident of its own
eternity. But in it never to end, as the Greek age merged in
the Roman? The human mind cannot go on ever after on with al-
ways the same characteristics, for such monotony is too poor for
it. In love to make the earth to end? Are we then to go on forever to-
ing with electricity and steam, whether in the industrial
business, and never use these means in the broad field of human-
ity and social destiny? I seem, perhaps, to sneer at what you
read. And I confess we have little surplus energy in the business of philanthropy on our triumphant road to

The horseman serves the horse;
The heatherd serves the sheep;
The materialist serves the purse;
The eater serves the meat.

‘Tis the day of the chattel; web to weave and corn
to grind.

Things are in the saddle, and ride mankind.

The fulcrum has yet to be found that shall enable the lever of love to move the world. Is a new age need to end? As man can-
cannot do two things at once, so mankind cannot do two things at
once. Now Lord Bacon, our great master, has said, that the end of
science is to make men know that glory of God, and the use of man. If then, this
is so, action is higher than reason, for its purpose; and to say that it is not, is the essence of selfishness and
atheism. So then our age shall end; and indeed, the question is
not one of why should it not, as why should it continue. What
sufficient motive is there for man, a being in whom the natural
impulse is—first to sensation, then reasoning, then imagination,
doing for the last 250 years? It is unnatural, and cannot last. Man must go on to use these powers and energies that have been given him, in order that he may impress nature with his own intellect, converse and not merely listen.

First there was the egotistical stage when man arbitrarily imagined perfection, now is the idyllic stage when he observes it. Hereafter must be the more glorious tulip stage when he shall be in communion with her. And this is exactly what, step by step, we are coming to. For if you will recur to my dry analysis of the formula of Christianity, you will perceive that the conclusions of the preceding ages have answered three kinds of questions concerning that proposition. Two were mental, physical, what is its predicate--and what is its subject? two were dynamical: is it hypothetical or actual? And is it logical or conditional? two were mathematical: what is its quality, and what is its quantity?

And now there are questions of but one kind more that remain to be asked, and they are physical. And they are two. The first is, is Christianity a fact of consciousness merely, or one of the external world? And this shall be answered by the conclusion of our own age. The second is, is this predicate true to the understanding merely, or also to the sense? And this, if we may look forward so far, will be answered by Christ's coming to rule his kingdom in person. And when that occurs, religion will no longer be presented objectively, but we shall receive it by direct communication with him.

When the conclusion of our age comes, and scepticism and materialism have done their perfect work, we shall have a far greater faith than ever before. For then man will see God's wisdom and mercy, not only in every event of his own life, but in that of the gorilla, the lion, the fish, the polyp, the tree, the crystal, the grain of dust, the atom. He will see that each one of these has an inward existence of its own, for which God loves it, and that He has given it a nature of endless perfectibility. He will see the folly of saying that nature was created for his use.---He will see that God has no other creation than his children. So the poet in our days, and the true prophet, personifies everything, not rhetorically but in his own feeling. He tells us that he feels an affinity for nature, and loves the stone or the drop of water. But the time is coming when there shall be no more poetry, for that which was poetical and religious shall be scientifically known. It is true that the progress of science may die away, but then its essence will have been extracted. This cessation itself will give us time to see that cosmos, that aesthetic view of science which Humboldt prematurely conceived. Physics will have made us familiar with the body of all things, and the unity of the body of all; natural history will have shown us the soul of all things in their infinite and amiable idiosyncrasies. Philosophy will have taught us that it is this all which constitutes the church. Ah! what a heavenly harmony will that be when all the sciences, one as viol, another as flute, another as trumpet, shall peal forth in that majestic symphony of which the noble organ of astronomy forever sounds the theme.