CROSS REFERENCE SHEET

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Chamberlin, T. C.
Salisbury, R. D.

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The New Geology

By J. C. Chamberlain, Head Professor of Geology, University of Chicago.

It is an old saying, sorely worn and varied with others, that "Poets are born, not made." Geologists, thus far, for the great part, have neither been born nor made; they have just come up; or, at best, have brought themselves up as best they could.

The science is too young to have become hereditary and led new to home as yet well established provisions for producing its experts. It has no distinct colleges for the training of its specialists. There can well be pointed colleges for the production of lawyers, engineers, ministers, doctors, schoolmasters, and such, but the modes of becoming a geologist is a subject of inquiry. In the popular mind, an Essentia Education...
who carries an odd fossil about in his pocket and talks quaintly about it in season. A day of flood or
soon comes to be reckoned a prophet.
And if to this he adds a predilection for seeing "slipperiness of piers
described" in the simple disturbing effects of the settling and cracking of beds of rock, or "great commotions
cracks of nature" in the sloping mouth of fallen blocks that naturally forms on the face of a cliff, his popular
credentials are complete. Popular taste and the pseudo-geologist have
common ground in their fondness for violent and agency's and mysteri-
tious processes.
In reality, there is no field in which steady-going, level-headed Common Sense is as essential as a foundation, and
careful, sober training is as needful
To the Secretary of the Commonwealth of Massachusetts,

Concerning your recent letter, the report issued by the

Commissioner of Agriculture, I am informed by a source who

inquiries into the matter, that the proposed legislation

would be a far-reaching step in the direction of

dealing with the subject. Please furnish me with

additional information on this matter.
on the institutions that have furnished its practice-ground of this & past
initiatives, this almost of past goals, education and that have deferred lack of
the more inevitable growth. Great stress training and the antecedent afflictions
of the process of selection & elimination.

It is not, therefore, a misleading of the reality, but a feel that the new era in geology is dawning with
schools and being established for the systematic training of professional
geologists—schools that prepare not merely a few terms of study
of the literature of its subject, and be little desultory rambling in
museums, but thoroughly going courses,
based on ample preparation running through as many years as one
acquaintance, much more completely,
necessary to the preparation for active learned professions.\footnote{The author notes that eminently skilled studies are useful for understanding the Earth's ancient history but direct investigation of the earth formations and geological processes by individual contact in the field is crucial. This movement toward definite professional schools in geology has been inaugurated by a few, a very few, of the foremost institutions. In joining it, the University of Chicago hopes not only to strengthen it numerically but to aid in advancing it toward the attainment of its fullest function.}

But "the new geology," which I am invited to sketch, relates with relation to the science rather than its.
representatives. In a sense, all geology is new. It is one of the milestones of the development of science. There is no part of it that does not still undergo growth. But there is a newer among the new.

The foremost attainment of the pioneer geologists was naturally toward the sediments of the seas, the crumplings of the earth into ejecta of volcanic agencies. These embraced the more impressionable members of the earth's formation. They constitute the 7 major systems of the earth's body, a whole of that superficial portion which alone is accessible to study. They furnish the record of its great eras, the principal outcome of its great forces. The more detailed study of the face of the earth was left to later stages.
The study of physical scenery naturally comes later than that of the
coarser anatomy. The face of the
earth meets a character as legible,
and as significant of its previous
life and inherent nature as
does the face of man, and it
study is as difficult, as fascinating
and as important to intelligent
guidance. Youth and old age
are portrayed on the face of the land
as on the face of man. The
character is not more distinct in
social expression (from "Pictorial"
than in one landscape from another
when the landscape itself is considered
apart from its capable human
additions. And as it happens
that we have never had a real
school of landscape painting for we
have always had painters who
Concerned the significance moral of the landscape of the area. The contours of its hills are full of meaning; the curving of the valleys are historical inscriptions; the assemblage of features is an organic expression which merits study and particular.

This expression may be read in terms of economic application or of intellectual inspiration, or of aesthetic exhilaration or of ethical suggestiveness and may produce industry or intellectuality, art or morals. The discernment of the meaning of surface features gives depth and plane to that life often described as mundane study, geography, or history is divinification in every Cape and every delta.
A stream does not simply rise in such a place, flows in such a direction and finally into such a body of water, in the same fashion of lost many similar streams, but it takes its course for reasons that give it character to make its acquaintance with the making and a pleasure in the making.

In this place its new pedagogy is old new people.

This study of geo-unipsygnomy is being cultivated more as never before, especially by a group of American geologists who have blended it on new lines.

Turning to another aspect of science, the lathe studies have been more largely directed to derivation its earlier having related more to reproduction the discovery
of the great formations was noticed. This led to the immediate question, how were they made, and it was only when this was measured well answered that inquiry turned to the more remote question when came the material. This in turn led on to a more and more intimate study of the processes of derivation. This, in its turn, led to the sculpturing of the coastal from the words of which the sea create more new forms were derived. This sculpturing and its concurrent agencies are the chief factors in giving expression to the face of the coast. This attention has already been discussed. Just as geological inquiry was thus led from the more immediate and trivial to the more occult and remote, from the gross and familiar...
The more delicate physicality of the rocks, as it were, proceed from the larger to the less intense, and more minute, from the macroscopic to the microscopic. This only about two decades since, from the foremost lithologists began to practice the splitting of rocks, to such thinness that they could be examined by transmitted light, which, especially in its polarized form, reveals their internal strata in as no other known agency can. It opened a new realm of investigation and the new petrology is incomparably superior. With the lithology, by common consent a new name has been assumed. Microscopic petrography is essentially a new science. It reveals the internal life of the rock as well as...
their minute structure for it is not only histological but physiological. Cellular activity is a characteristic of rocks as of other living things; for all things seem to be living. Death is indeed an obvious fact in a sense, but its dead can but its transitional. Death is a change, not a state. Our life follows another life and its life and death of rocks, its following of our constructive process upon another, the accumulation within the rocks are revealed by the microscope as paraledged light. But let the old geology is the science of processes as distinguished from products, as life rather than deposits. I speak of this as life within qualifying it as "incorporeal."
doubt whether, in its last analysis, it looks organic, and
I want to help on that reversal
of sentiment which shall do justice
to lower hidden matter. We put
it under our heel enough in the
natural course of things without
decapitating it as "dead" merely
because its activities have reached
unsurpassing constancy, merely because
it has arrived at a state typical
of Buddha's Nirvana, ceasing as
finity without appreciable desire
or discomfort.

But turning to the field of life
in the common human sense, the
old era of geological life—duly was
filled with forest hunting & spearing—
Making, To feed a new genus
and name it with a soul-wrenching
compound of Greek derivatives.
or to find a new species & name it for a fellow paleontologist. During my many years of field work, I've been in full expectation of a like immortalization in return, was the most thrilling characteristic of the old paleontological spirit. It was not the least characteristic that it got by some lectures to the whole. It would be seen justly as a fair characteristic. It was necessary that the relics of ancient life should be assiduously gathered at all distilleries of form & function, most critically studied & differentiated, and the factors of personal opinion given due respect to the work of others. Much stress was laid on minute & merely verbal distinctions of so many species made, it was

(continues: see next page)
But the new paleontology concerns itself more with geologies than systematics. Its main endeavor is to trace one form into another, to establish species by merging variety into variety through the discovery of intermediate forms and to work out the lineage of the forms. This is the obvious effect of the revolutionary doctrine of species which has taken possession of the biological field during the last three decades. But had it not come, the drift of effort would doubtless have been in much the same direction. Relativities are fundamentally more important than diversities and later stages to more modern effects of investigation are chiefly concerned with correlation.
Connections

A phase of study of the geologic
process relates to migrations
of life during the geologic ages.
In the changes of conditions of
the conflicts of species incident
to migration, whether voluntary
or forced, are probably to be
found the most potent of
instrumentalities for weeding out
undesirable species and fostering
the best fitted ones, and possibly
due to more occult, though
underestimated, agencies that
produced variation itself. At
any rate, the field is rich and
enticing and will yield results that
are sure to reflect light on other
branches of its science, for when
specific migrations shall have
been demonstrated, there

will be opened for the discovery of the changes of climate or of territorial extension or contraction by continued elevation or depression or otherwise that may have occurred there. And as physics and biology will be advanced by this new poetry.

These are some—and only some—of the phases of this new poetry. The new poetry is the outgrowth of the idea in the Newtonian laws of progress. This makes a intellectual force because it reaches deeper into the life and soul of the physicist and higher into the relations of the biologist.
Dr Harper: The question that is before us, as I understand it, is a double question, and it is one about which I am very anxious myself, from the outside entirely, of course, to get some light. And it is one that seems to need settlement. The first part of it is, perhaps, one that we need hardly discuss; it is the question of the desirability of combinations among closely related departments, and entire independence. The departmental work of the University is not at all uniform. In some departments, for example the History department, we have gone into minute sub-divisions. We have done the same thing in the Biological departments. They are now distinct. In other Scientific departments there is not such division. And perhaps the first question, I am not sure but that it is entirely the question, is the question of further sub-division; and naturally right there, the question of the independence of the work of Palaeontology. Are there reasons sufficient to set aside Palaeontology as a separate department with a separate organization?

Then the other question is, if that does not seem to be expedient at any rate at present, — granted that it may be the best thing to do ultimately, — if there seem to be reasons why it is not wise to do it now, — What is the best adjustment of the Palaeontological work?

I understand that this conference is held for my benefit, and that I may understand the relation of Palaeontology to the Geological department on the one hand, and to the Biological department on the other.

We have all expressed our opinions in written form, and of course that is the most definite form. But I labor under the disadvantage of not being able to see just what reply would be made to the position taken by one side from the other side. And I thought we might in an informal way discuss the matter, and the point of view taken by one side might be answered by the other; and in that way I might bring into juxtaposition for my own consideration the points involved. And with that in view I should be glad if Mr. Chamberlin would present the matter as it lies in his mind, allowing
us to interrupt him and to ask questions, and to answer the points made.

Mr. Chamberlin: (Quotes definitions of Palaeontology from Biologists and Geologists.)

It should be noted as a significant fact that this History of Ancient Life is arranged on a Geological basis. This work is a work on Palaeontology from a Geologist's standpoint. Prof. Nickelson in his Biological work says "Palaeontology is a branch of Geological science, and requires separate study; a separate branch of Geology and a separate branch of Biology."

On the presumption of separate departments, my opinion would be the same as Prof. Nickelson's. There are two branches, one studying Palaeontology in its Biological relations, and one in its Geological relations.

Prof. Whitman: Do I understand that you recommend two separate and independent departments?

Prof. Chamberlin: If we were to adopt a separate system, I would recommend a department based upon Palaeonzoology and one on Palaeon-Geology.

Dr. Harper: May I ask is there a parallel between the relation of the Palaeontological work and the work of Geology and Botany, and the older Philological work, the older languages and the modern languages?

Prof. Chamberlin: I do not think there is. This is a history study.

Dr. Harper: When one studies the forms, the syntax, he is compelled to go back and bring up material from the dead languages. Is it a parallel between the dead and the living languages?

Prof. Chamberlin: Not very close, because some of the species are living. Geology takes cognizance of present forms.

Dr. Harper: Would you recommend three distinct departments of Palaeontology?

Prof. Chamberlin: I would not recommend this except on the ground of separate organizations. My thought is this: that the greater extent to which we separate departments the greater number of gaps
As I阅read the text, it appears to be discussing the relationship between geology and photography. The text mentions the importance of understanding the history of photography and its evolution. It highlights the work of geologists in the field of photogeology and how photography can be used to study geological features and landscapes.

The text also mentions the importance of recognizing the role of photography in the geological sciences and how it can be used to enhance our understanding of geological processes and formations. The author seems to emphasize the close relationship between geology and photography, and how these two fields can complement each other in advancing our knowledge of the Earth.

Overall, the text seems to be advocating for a greater integration of photography into geological studies, suggesting that this approach can lead to new insights and discoveries in the field of geology.
are apt to be, the less complete will be the organization coordination of work, and the less will we find in students possibilities of transition from one department to the other, that is the less perfect will be our organizations.

Dr. Harper: Is it not true that while the separation may make it a little more difficult to coordinate work, there is an advantage from the point of investigation?

Prof. Chamberlin: That has two sides; the answer depends upon the subject and the extent to which the separation is carried. If it is carried too far it interferes with investigation, as the investigator works with greatest efficiency and greatest freedom in a department which entirely encompasses his field and in which he is all his relations, because then he has an intermediate connection. If one has to go to another system there is a disadvantage.

Dr. Harper:

But, on the other hand, if each department does that, would not each department give us an immense amount of duplication?

Prof. Chamberlin: You could avoid duplication.

Prof. Donaldson: I would like to ask if my interpretation is correct that Prof. Chamberlin recommends three departments in view of the separation of Palaeontology at all?

Prof. Chamberlin: I made the statement that if the system of separation is carried into this department (which I oppose) that three subjects are necessary in the department.

Prof. Donaldson: It seems to me that those of us who ask for the separation of the Palaeontological department do not ask but for one Palaeontological department, and that you who do not believe in the separation ask for three.

Prof. Chamberlin: One of the reasons why we stand opposed to the separation as a present proposition, is the fact that one great
Dr. Hartfield: I do not think that the expectation may make it

fitting more favorable to continue the work, there to an agreement from

the point of investigation.

Part Compendium: That two weeks; the nearer approach upon the

place and the experiment to make the expectation at a, lead. It is to

continue too, if it investigates with investigation, as the investigation

for more with increased attention, and increased attention in a grade.

more with the particular circumstances, the field and in which we live still.

All the present, believe there is no an intermediate connection.

If one has to go to another way, there is a gradation.

Dr. Hartfield:

And on the other hand, it exact agreement does that other

not exact agreement gives an unmeaning moment of agreement.

Part Compendium: You obtain much qualification.

Part Devotion: I would like to see if it investigation is some

how, I would Gampin in term. Some agreeable in view of the

expectation of personality that.

Part Compendium: I make for statements that the matter of reputation

as necessary in the agreement.

Part Devotion: It seems to me your choice of the way to look for the end.

Part Compendium: The reason we assign proposition, is the fact that one great

expectation as a present proposition, is the fact that one great
phase of it is not appreciated and will be neglected. Now because of that we insist that this phase of it ought to remain organically connected with a department which is in true sympathy with it. Or if separated, it must be put into a separate department where it will receive sympathetic treatment.

Dr. Harper: If Palaeontology is separated then there ought to be in that department three sub-divisions?

Prof. Chamberlin: That is one of the two phases which it might take. It might go into a large department with three sub-divisions, or if it is to be divided on the basis proposed of refined separation, then these three departments should be distinct from each other. My proposition is that each of these is as distinct a department as Neurology.

Dr. Harper: Is it true, or isn't it true, that for the highest work and the best work in the department of Palaeontology there are at all events the two departments of Zoology and Botany, and that the man who is investigating and has made a specialty of Zoology would hardly be capable of doing the best work in the Botanical department? Is there not as much need of division of Palaeontology and Zoology and Botany as between Zoology and Botany?

Prof. Donaldson: No sir, the grounds for the division of the department in my assumption are based upon the problems with which a department can occupy itself. The problems are the principal point. When around a certain material, or certain part of a system, say around the nervous system, a group of problems gather which are sufficient in importance and in complicity to occupy the time of people, you have proper basis for a department. About Palaeontological-Botany there gather very few problems, because it is not worked out to the same degree. And so Zoology is not to be put on a parallel with Embryology. There is no suggestion at the present time that the embryology of plants will lead to as much as the embryology of animals.
Dr. Mole: It is mandatory to proceed with caution.

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Dr. Mole: To proceed with caution.
Dr. Harper: Is it true, or isn't it true, that in a department of Palaeontology the man working at the matter from a Geological side, and later from the point of view of the Biologist needs a special training, as well as the man who works at it from the Botanical side.

Prof. Donaldson: What would Prof. Chamberlin mean by regarding Palaeontology from the Geological side?

Prof. Chamberlin: I want to follow out your definition. Suppose the flora and the flora of the Carboniferous period be presented.

Dr. Donaldson: I would not take it up in that division.

(Discussion of terms)

Prof. Chamberlin: Your definition only differs from mine in that it is larger, more scientific, and more difficult to handle. You take all of life up to the present and study life as a whole— a field altogether beyond handling. I shut it down to a field that would be somewhere within the competency of some one.

Prof. Whitman: Prof. Chamberlin has just made a statement in regard to what Palaeontologists do.

(Prof. Chamberlin continues his statement).

Perhaps the subject will be brought out as clearly as in any way if we attempt to ascertain how Palaeontology came into existence. It was observed that there were the marks, remains, or impressions of what seemed to be organic forms in the rocks. This was an observation from a Geologist's standpoint. The organic character of these was questioned by Geologists. Those who observed them XXX and drew Geological inferences, maintained that they were remains of ancient life. Further observation showed that as they proceeded upward and downward through a series of rocks, that these changed, entirely disappeared, and new forms came in. It was observed by tracing beds horizontally that the same forms appeared. This was found to be true in one form or another of minerals, of concretions,
of other marks. The Geologists tried all these, and by going into a neighboring region they found that where there was a similar bed, the forms belonging in one bed were found in another. This was true of the minerals and of the marks of life. By further tracing them out they brought them together, and there resulted Palaeontology, namely, that certain forms representing life were represented in certain beds and limited vegetable distribution. Further away the Geologist found another series of rocks and in these similarly located representations of life. And by using the two or three forms of rock strata, the marks of fossils, it was found that the fossil marks were the best criterion for coordination; and by coordinating them on the basis of the fossil remains, a reasonably satisfactory arrangement chronologically of the series was possible. The Geologists arrived at this conclusion; that the organic correlation forms a basis, while the physical correlations do not form an equally good basis. In that began the study of the distribution horizontally and vertically of life forms, and that is the essence of the Geological side of Palaeontology. By following these beds up the series is greater, and from the bottom to the top of the 2000 feet of beds, the Geologist has made out a series of these beds, learned the position of the beds, and their relation.

Prof. Whitman: If you stand by what you have said we will agree to leave this discussion and let Geology do what it claims. That is the position exactly which we accept. The real Palaeontology is, of course, something altogether different. All we want is the real Palaeontology.

Prof. Chamberlin: On the basis of this orderly succession as demonstrated by the physical supervision of the rocks, the classification of forms was built up, and it was found that certain forms had lived earlier than others. It appeared that a very considerable amount of time must have elapsed between series. In that way those life-forms were thrown out into other phases chronologically. That is the essence of the modern view of the extension of life. That was a prerequisite to the modern development of life.
The geologist first of all considers the physical environment in which the forms were made. He explains the forms of action of the geologist in his work and in the field. His explanation of the process of the forces which have molded the forms and the rocks of which they are composed is not the whole story. He must consider the history of the forms as they were created and the conditions under which they were produced.

The geologist's work is not confined to the study of the physical environment. He must also consider the history of the forms as they were created and the conditions under which they were produced. He must consider the history of the forms as they were created and the conditions under which they were produced. He must consider the history of the forms as they were created and the conditions under which they were produced.

The importance of the geologist's work is not confined to the study of the physical environment. He must also consider the history of the forms as they were created and the conditions under which they were produced. He must consider the history of the forms as they were created and the conditions under which they were produced. He must consider the history of the forms as they were created and the conditions under which they were produced.

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Take all the fossils in existence, take away the data, take away the mineralization, and sweep away all the Geological knowledge, and the Biologist taking these in his own field will be unable to project these backward. He could not take these and distribute them through the two or four hundred million years. The time was formed by the fact that these forms were found in certain beds. These beds occur here so much later; between these and those there was an interval of ten million years. Now the Geologist can put the ten million years in. If the same specimens were presented to the Palaeontologist, he would say, These are probably Where do they come from? He cannot tell. Nor the time. No Palaeontologist, no Biologist, would probably be able to build up put these within ten million years of their proper places. The putting of these in their proper places was the function of the Geologist. Cites another case of the Paradoxical (?) beds.

Except for the fact that these forms are found in these horizons made out by Geology, the Biologist has no scientific basis by which he can put this system into its basis. These forms must be shown to have distributed themselves in time before they can make out any scientific form of Palaeontology. And so in the historical science the putting of these forms back through their time, through their order, is determined by Geology, and cannot be by Palaeontology or Botany.

Dr. Harper: This simply means that the man who studies Palaeontology must have studied Geology.

Prof. Chamberlin: No it means that the study depends upon knowing this fact, that these forms come out in this order, Philologically and genetically.

Prof. Whitman: Who is competent to determine the question of Animal or Plant Genealogy?

Prof. Chamberlin: Both are absolutely necessary.

Prof. Whitman: I will not admit that.
The whole process of extrapolation, take away the facts, take away the general knowledge, the entire process is only the logical extension of the one which will be made to the object of the present case. Some of the general conclusions are, therefore, more important than others. These conclusions are not only important in themselves, but they are also important in forming the basis of further research.

To the geologist, the weather is the key to the phenomenon. In the case of the geologist, what property to study, what property to analyze, what property to examine, what property to observe, what property to study, and what property to consider are all determined by the geologist's general knowledge.

But, in the case of the geologist, the weather is the key to the phenomenon. The conclusions drawn from the weather are the key to the phenomenon. These conclusions are not only important in themselves, but they are also important in forming the basis of further research.

The whole process of extrapolation, take away the facts, take away the general knowledge, the entire process is only the logical extension of the one which will be made to the object of the present case. Some of the general conclusions are, therefore, more important than others. These conclusions are not only important in themselves, but they are also important in forming the basis of further research.
Prof. Whitman: I think this point ought to be put in here. It goes to the heart of the matter. The Geologist speaks of a Geological sequence of strata. On the other hand the Biologist or the Palaeontologist maintains that there is a Palaeontological sequence. The two are radically distinct, and that is the point which Prof. Chamberlin does not seem to realize, and the distinction is the essence of Palaeontology. The Geological sequence is a physical sequence; the Palaeontological sequence is a sequence of organisms genetically related, distinct one from the other. That is a species is modified by circumstances, and perhaps there results two different species from one, and so you run on through the whole line of past creation, splitting up the different species, though they are connected genetically.

Prof. Chamberlin: There is a third sequence, that is in time. There is a sequence of species; species have their range over certain horizons, and then there is a physical classification of beds. There is a genetical sequence which is philological.

(D Prof. Chamberlin refers to the distribution of the races, and the difference between the study of the races historically and ethnologically).

Prof. Whitman: I simply reiterate that Prof. Chamberlin comes down to this one thing: That we have on the one side a physical sequence, and on the other side a sequence of inorganic beings which are related to each other in the form of a tree; and that Geology has no means of divining what that tree is. It simply determines the time of its strata.

Dr. Harper: But has not time something to do with this?

Prof. Whitman: I have never asserted that we could determine the forma and flora by purely Biological data. We owe a great deal to Geology. We know that Geology claimed then in the first instance, and when they were separated we had Palaeontology, and not before. And the whole history of Palaeontology from the time of the separation has
Thus far we have not taken anything for granted.

The geometric elements of the projective plane are:
- Points
- Lines
- Incidence of points and lines

These elements form a structure that is essentially different from the traditional Euclidean setting.

We consider a quadrangle in the projective plane as a figure of four points and four lines.

In this context, the concept of duality becomes evident.

Duality states that every theorem in the plane of the projective plane has a dual theorem.

For example, the dual of a theorem stating that four points determine a unique line is the statement that four lines determine a unique point.

In projective geometry, the concept of parallelism is not applicable.

Parallel lines do not exist because any two lines in the projective plane meet at exactly one point.

This means that the concept of distance and angle, which are central in Euclidean geometry, do not have a place in projective geometry.

We can say that projective geometry is more about the relationships between points and lines than about the intrinsic properties of these elements.

In summary, projective geometry is a powerful tool for understanding the structure of geometric figures and for solving problems that are not easily addressed within the confines of Euclidean geometry.
been more and more away from the Geological basis.

Prof. Chamberlin: Will Prof. Whitman tell us how the associations which make up the life of a period can be determined on a Biological basis?

Prof. Whitman: You give us the essence of Palaeontology.

Prof. Chamberlin: The question of the form of a given time is a thing which the Geologist only can tell. You cannot take these fossils and put them together as they lived in the past. You cannot take a series of related forms and put them together. The Geologist finds these forms together; he connects them with their relationship, their association; and then the Biologist tells what are the biological characteristics. The Geographical contribution is absolutely essential.

Prof. Whitman: I would like to get your ideas more definitely. Suppose we take some concrete case; suppose we take fishes. I want to know what Geology has to do with fishes, and what Palaeontology, in order to know where they overlap.

Prof. Chamberlin: I do not admit any relation.

Prof. Whitman: There is no trouble about the position. Geology is the science of the earth; Biology is the science of life; Palaeontology is the science of ancient form.

Dr. Harper: Biology is the science of all life, ancient and modern.

Prof. Chamberlin: It is not the science of ancient forma and flora. No one can tell us how we are to determine forma and flora on a biological basis.

Dr. Harper: The difficulty there is in my mind is that I think the same statement might be made about a great many sciences. Physiology requires Physics and Chemistry. Is not that a parallel? Will you point out the difference?

Prof. Chamberlin: The difference is just this: To determine the ancient vertebrate range of a species you must use Geology.
Professor T. C. Chamberlin,
University of Chicago.

Dear Sir:--

In accordance with your request for an expression of opinion concerning the relation of paleontology to geology, I beg to submit the following brief statement.

It will certainly be conceded that a thorough knowledge of geology requires the study of several branches of scientific investigation of the earth, such as mineralogy, petrography, physical geography, stratigraphy, paleontology, etc. A complete geological department must, therefore, include instruction in all these subjects, and the elimination of any one of them detracts from the efficiency of the department in just so much as that subject is important to a general knowledge of geology. A geological department can no more afford to lose its paleontological division than it can its mineralogical, its geographical, or any other division. Simply because paleontology has a biological aspect, is no reason why it should be removed from the geological
In accordance with your request for an expression of opinion concerning the relation of geology to geology, I submit the following partial statement.

I will certainly do so, having that a thorough knowledge of geology.

In all cases, the study of various branches of science, including geology, is necessary for a complete understanding of the world. A complete knowledge of the subject, such as mineralogy, palaeontology, etc., is essential. Geologists and geographers must use the available information to gain a clear understanding of the phenomena of the earth.

A subject is important to a general knowledge of nature, and it can be studied in various branches of geology. Simply because palaeontology is a subject in itself, it does not mean that the geologist can ignore other fields of study. The interrelation of these subjects is necessary for a comprehensive understanding of nature.
department than that mineralogy should be removed to the chemical department because it has a chemical aspect, or that crystallography should be given to the physical department because it has a physical aspect. They all represent phases of related sciences, which have their greatest development in the study of geology.

Not only is geology thus dependent on paleontology, but paleontology is, probably more than any other subject, dependent on geology. The same region, and even the same rock, affords a field of investigation in both subjects. The paleontologist is usually dependent on the geologist for his collections, and, what is more important than all, he has frequently to check his results by the field observations of the geologist.

If, therefore, paleontology is so nearly indispensable to geology, and geology is so nearly indispensable to paleontology, the most natural association is to group these subjects together.

Very truly yours,

W.F. Fessmer Sr.

The above statement accords completely with my own views on the subject. I should consider it a most serious mistake to divorce paleontology from geology completely. Experience has shown that much trouble and error have arisen from the separation of paleontology independent of geology.

Yours very truly,

The Department of Agriculture has a definite need for more knowledge of the
vegetable production. It is a matter of great importance to the
Department that this knowledge be obtained.

The Department is making every effort to
obtain the necessary information. The
Department is working closely with
various organizations, including
universities, to secure this
information.

The Department has recently
appointed a committee to
study the problem of
vegetable production.

This committee will
work closely with
other organizations to
secure the necessary
information.

The Department is
grateful for the assistance of
these organizations and
looks forward to a
successful campaign to
increase vegetable
production.

Yours truly,

[Signature]
Prof. T. C. Chamberlin,

University of Chicago.

Dear Sir:—

In response to your request for an expression of my opinion concerning the relationship which paleontology should sustain to the department of geology, I submit the following statement:—

I think no competent geologist could be found, either in Europe or America, who would for a moment regard a department of geology as complete without paleontology.

The separation of paleontology from the department of geology would, in my judgment, be essentially as harmful to that department, as the separation of any other single branch of geology. In my judgment, mineralogy, petrography, geographic geology, or economic geology might with almost equal propriety, be divorced from the department. Without paleontology, geology is no longer an integral subject.

Furthermore, I believe that the paleontologist who is working primarily from the standpoint of geology, should be perfectly free to follow out his work, either investigative or instructional, in whatever direction it may lead, even if it be into the biological phases of the subject. Some of the best paleontological work, even from the biological point of view, which has been done in recent years, was done by an
University of Chicago

Dear Sir:

In response to your request for an expression of my opinion concerning the installation of a Biology Department at the University of Chicago, I offer the following statement:

I think on competent Biological science is lacking, and hence it is difficult to wonder why this is the case.

The separation of biology from the department of the department of biology at the University of Chicago, as an example, shows a lack of integration of the biological sciences.

Furthermore, I believe that the biology department is more integrated than the biology department. To my mind, the interest in the biological sciences is more pronounced in the biology department than in the biology department.

I am at a loss to explain the present situation, but I am sure that the biology department should be preserved, and that the biology department should be expanded.

Sincerely,

[Signature]
Chamberlin.

American geologist, (Professor H. S. Williams, now of Yale), and done because of its geological bearing. The nature and the relations of the questions involved were such that it would have been altogether impossible for a biologist, who was not also a geologist, to have accomplished it. In my judgment, a knowledge of geology is indispensable for the intelligent prosecution of many of the strictly biological phases of paleontology.

While the field of paleontology which the geologist only can successfully cultivate is very wide, there is a field, including both paleo-botany and paleo-zoology, which is outside his sphere, and to which he has no claim; but this field is certainly not wider or more important, so far as opened up at the present time, than that which belongs to the geologist, and which no one but a geologist can successfully cultivate. The limits of these two fields is not sharply defined, and they frequently overlap. To draw lines between departments which would not allow this overlapping, would be to do violence to nature.

Yours truly,

T. D. Salisbury
American Geologist. Professor H. S. Williams, now of Yale, and gone

American Geologist. Professor H. S. Williams, now of Yale, and gone

The name and the reputation of Professor H. S. Williams are not easily forgotten. He was a geologist, who was not also a geologist, and he was not also a geologist, to have accomplished what he did. In my judgment, a knowledge of geology is indispensable for the intelligent prosecution of many of the scientific problems of the present day.

While the field of geology today is a field of specialization, and the geologist is not trained in other sciences, he must have some knowledge of other sciences. Geology and biology, chemistry, and physics are all essential to an understanding of the earth's history and the processes that have shaped it. The student of geology must be prepared to deal with these sciences in addition to his own.

In the United States, the time of education is not entirely cut off, but time to learn of the processes that have shaped the earth is not entirely cut off. To gain these processes, geologists must be able to observe and analyze.
By dear President Harper,

Your very welcome letter of the 21st has put an end to a period of very great anxiety on my part. And I am greatly obliged for the expression of your feeling on the matter. As this is the first time I had known of your method of enquiring, and since the manner of putting the question seemed to raise a fundamental issue, then seemed to me to be the best one, interpretation to be put upon it. I am delighted to learn that I put a wrong interpretation on it. I will not say how uncomfortable my mind has been the past few days. It has proved to show me how strong an attachment for my surroundings has grown up in me. I shall be glad to consider the proposition of modifying the arrangement of my program if it is deemed advisable. But my
Experience so far seems to indicate that each year some one fails to complete the course. It is a fact that the course is so adaptable that it can be varied to suit the students, and without changing the title of the course, it may be extended over two years or contracted to two quarters or taken into at various places. So far I have modified it to suit students who come with various kinds of preparation.

Thanking you for the expression of your consideration, and regretting that I should have given myself too much leisure and unhappiness I remain

Yours very truly

[Signature]
President Wm. R. Harper,

My Dear Sir:-

In response to your request of September 27th, I beg leave to submit here a statement regarding field work in the summer of 1899 in connection with the department of geology. I have made the statement cover somewhat more than you intended with the thought that you might eliminate anything not desired.

I have also included a statement regarding the field work of the current summer in which you may be interested for a moment and which will be on file in both offices for use at any future time.

Very truly yours,
I. During the first term of the summer quarter intensive field work in geology was conducted in the vicinity of Devils Lake, Wis., by a party of fifteen students under the direction of Messrs. W. W. Atwood and N. M. Penneman.

II. During the same term a field class of students made excursions twice a week to various points lying within 100 miles of Chicago for the purpose of illustrative study, conducted by Professor Salisbury and Mr. Finch. These excursions were supplemented by concurrent laboratory work occupying three afternoons in the week.

III. Occasional excursions to points within 100 miles of Chicago were made by other classes in geology and glaciology, conducted by Professors Chamberlin and Salisbury.

IV. During the second term of the summer quarter a second party, numbering eight, was engaged in intensive geological work in the field about Devils Lake, Wis., conducted by Prof. F. H. H. Calhoun.

V. During the second term a party of advanced students, numbering fourteen, engaged in geological investigation at and in the region of the Grand Canyon of the Colorado and the San Francisco mountains, with headquarters at Flagstaff, Arizona.

VI. Five candidates for Ph.D. were engaged during the summer quarter in individual work in Wyoming, Colorado, and Ohio.

Respectfully submitted,
I. During the first term of the summer quarter in

Field work in geology was conducted in the vicinity of Devil's Lake.

W. W. Wyman, F. M. Pemberton

Abstract and F. M. Pemberton

II. During the same term, a field course of studies was arranged for

Two weeks a week to various points lying within 100 miles of

City, and an effort was supplemented by

Field trips in the vicinity of the course were conducted by

III. Occasional excursions to points within 100 miles of Chicago

were made by open classes in Geology and Paleontology, conducted by

Professors Chapman and Stetson.

IV. During the second term of the summer quarter, a second party:

V. During the second term of the summer quarter, a second party:

VI. During the second term of the summer quarter, a second party:

VII. During the second term of the summer quarter, a second party:

VIII. During the second term of the summer quarter, a second party:

IX. During the second term of the summer quarter, a second party:

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XXVIII. During the second term of the summer quarter, a second party:

XXIX. During the second term of the summer quarter, a second party:

XXX. During the second term of the summer quarter, a second party:

Respectfully submitted,
My Dear Sir:-

I wish to present my private collection of fossils to the Walker Museum. Ever since my connection with the University the collection has been in the building and has been constantly available for use by the students of the department, but it has never been incorporated into the Museum Collection. I shall now, as true efforts, proceed to catalog the material of the collection and arrange it with the other collections in the museum. The collection consists in large part of Carboniferous insect-bearing material from Missouri, but includes also much valuable material from other horizons and localities. In all there will be perhaps 1000 catalog entries, with from 2000 to 3000 specimens.

Yours Truly,

Stuart Weller.
CINCINNATI

[Handwritten text not legible]
Tulsa, Okla.
Oct. 10th, 1913.

Dr. Harry Pratt Judson,
President of the University of Chicago.

Dear sir,—

Today I learned that it was rumored that Dr. Atwood was going to leave the University. If you will pardon the liberty I take in addressing you and will understand that I speak through a desire to be of service to my alma mater, I am going to express what I sincerely believe.
to be the heartfelt sentiment of every man who ever took me off Dr. Atwood's course.

He is the most able teacher with whom I have ever come in contact. He has that rare gift of the gods, the faculty of making men hunger to learn. Until I had known Dr. Atwood I never experienced a real sincere desire for knowledge; I was in college simply because I had been brought up to regard such an experience as a requisite. Dr. Atwood opened for me, and for countless others like me, the windows through which I caught my first glimpse of what was of value in life. Doubtless I err in saying it, but my experience has been that real men are as scarce on university pay rolls as they
are anywhere else. Dr. Atwood is a man of such worth, of such appreciation of life, of such broad understanding of men, that he would stature as a leader and as a friend anywhere on earth that men might congregate. He is the type of a man that if another day men would have followed and died.
for—because they would have known that his heart was right.

In or out of the University this is the first time I ever lifted my voice as to University proceedings and it is with great timidity and only because I am deeply stirred that I do so now,—but somehow I feel that we had better lose a stately Gothic
structure or two than to lose a man capable of exerting through a lifetime such tremendous influence.

Trusting that you will understand the spirit in which I have written, and with the sincerest hope that my statements have been only a repetition of what you yourself believe, I am sir,

Very respectfully,

John Mason Houghton
Class of Nineteen and Eleven.

310 South Denver Street.
Chicago, October 14, 1913.

Dear Mr. Houghland:

Your favor of the 11th inst. is at hand. I am very much obliged for your courtesy in writing me and expressing your views on this interesting matter. I am always gratified to have alumni communicate with me with the utmost frankness on all matters relating to the University. In the present case I greatly regret that Dr. Atwood has felt it necessary for him to accept the very important offer made by Harvard University. The professorship there was of such character and the circumstances attending it of such character that, much as I felt his loss to the University of Chicago, I could not feel that I ought to urge him to stay with us. The details in question are somewhat

Dear Mr. Kupperle:

You know of the first incident.

I am very much obliged for your communication and I am enclosing a copy for your information.

With reference to the matter of your letter in regard to the University.

I am the President and I expect to return there within the next three weeks. It is necessary for him to see me, and I am sure that he would wish to have a similar communication with me as regards the University.

I am in receipt of your letter of the 10th, and I expect to return there within the next three weeks. It is necessary for him to see me, and I am sure that he would wish to have a similar communication with me as regards the University.

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confidential, and I could not write them to you, but if I should go over the matter with you in detail you would see at once that the matter is not one that could have been given any other direction than the present one. I heartily concur with you in the highest regard for Mr. Atwood's personality and his value to any institution with which he is connected.

With sincere regards, I am,

Very truly yours,

H.P.J. - L.

Mr. J. K. Houghland,
310 S. Denver St.,
Tulsa, Oklahoma.
confidentially and I cannot write fully to you.

But if I can get over the matter with your
permission, you may see it once after the matter is not
open and cannot have been given any other indication
by me and the President only.

I am particularly concerned with you
in the interest of your 
M. 
Vfecoag, a personality
and the nature of my instruction with which you are
connected.

With sincere regards, I am,

Yours faithfully,

[Signature]

II.-L. - L.
Madison, Wis., April 29, 1903.

President Wm. R. Harper,
University of Chicago,
Chicago, Ill.

My dear President Harper:—

It is with regret that I resign the position of Non-resident Professor of Structural Geology in the University of Chicago. The courses which I have given in that institution have been a source of very great pleasure to me.

Very sincerely yours,

Through Prof. T. C. Chamberlin.

C. R. Van Hise.
March, 1922

P. H. Kasper

President

University of Chicago

Chicago, Ill.

My dear President Kerper:

I am with regret that I have to resign the position

of non-resident Professor of Entomology in the University of

California. The course with which I have been given in that institution have

been a source of very great pleasure to me.

Very sincerely yours,

[Signature]

Through Prof. T. G. Chamberlin